



## **ROLE OF RADIO AND MOBILE PHONE IN DISSEMINATING AGRICULTURAL INFORMATION TO CROP FARMERS IN CENTRAL ZONE OF BAUCHI STATE, NIGERIA**

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### **ABSTRACT**

The study examined the roles of radio and mobile phones in disseminating agricultural information to crop farmers in Central Zone of Bauchi State, Nigeria. Multistage sampling technique was employed in selecting 180 farmers from the study area. Primary data were obtained through administration of structured questionnaires from the respondents. Data were analyzed using both descriptive and inferential statistics. The result reveals that majority (78.9%, 77.2% and 73.3%) of the respondents were male, hausa and married, while 47.2% and 45% of the respondents were into farming and had attained tertiary level of education in the study area. The result further shows that most of the respondents were within their active ages of production as indicated by the mean age of 41.5 years and 10 years of farming experience. The result also shows that respondents had a mean of 5 persons per households and 2.8ha of land. The result further reveals that majority (96.7%, 88.3%, 74.4% and 71.1%) of the respondents owned a mobile phone, radio, listens to local stations and owns a smart phone. The result also shows that majority (84.4% and 62.2%) of the respondents purchased phones and subscribed to MTN network. The result also shows that the major information accessed by the respondents were on conservation practices, pest/disease outbreak and livestock management and were ranked 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> respectively. The factors influencing the use of radio and mobile phones were years of experience, household size and number of technologies adopted significant ( $P < 0.05$  and  $P < 0.001$ ), respectively. The result also shows that the major challenges faced by the respondents in accessing information from radio and mobile phones were occasional presentation of agricultural program, digital skills and lack of awareness which were ranked 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> respectively. The study concluded that years of farming experience, household size and technologies adopted were the factors influencing the use of Radio and Mobile phones in the study area. the research recommended that, Agricultural programs should be constantly presented among local and international radio stations in the study area, farmers should form cooperatives and create and avenue for training on the use of digital technologies.

**Keywords:** Role, Dissemination, Information, Mobile phone, Radio, Crop

### **INTRODUCTION**

Information Communication Technologies (ICTs) revolution has permeated every aspect of life and farmers are already especially benefitting from mobile communications. ICTs are the best hope to accelerate development process and mobile telephony is one of the most exciting forms of ICTs particularly in the context of the developing countries (Nyamba and Mlozi, 2012). Mobile phones have great potential to transfer information at the speed of light regardless of distance. Mobile phones, being a component of ICTs, are now accessible



to 60% of the population in sub-Saharan Africa countries (World Bank, 2016). The fast penetration of mobile phones could be attributed to its ease of use, low cost in comparison to other ICTs such as computers and its potential to break geographic barriers (De Silva and Ratnadiwakara, 2008). It was in the same vein that Aker (2010) described mobile phones as cheap and widely used ICT that has a great potential to solve the problem of cost and lack of access to information.

Agriculture is a significant area in the universal setting, the World Bank (2017) states that agriculture is key to fiscal development; it accounted for one-third of global gross-domestic product (GDP) in 2014, covers above a third of universal land, and is the chief supply of revenue for the majority of people who live in rural areas globally. The World Bank (2017) goes further to report that development in the agriculture sector is the most effective way of raising the earnings of the poor when compared to other sectors. The 2016 analysis has it on record that 65% of the poor workforce were making a living through agriculture and 815 million people worldwide were hungry, and agricultural development is among the major tools that can be used to end extreme poverty, worldwide. In agriculture, information is needed to bring Change in the way people do farming as well as in other dimensions of agricultural production. Agricultural information incorporates innovations, advice, techniques, skills, technologies and regulations on land use with environmentally safe practices that is shared between and among stakeholders in the agricultural sector through the instrument of extension services (Funom, 2020).

Availability of agricultural information is significant in changing the lives of the people who depend on farming (Lwoga 2011). If agricultural information reaches farmers, they can improve their farming skills, which will result in increased production. In this modern time, the sourcing for agricultural information has been prompted by the advent of information and communication technologies (ICTs). Agricultural information can be obtained via radio, television, the internet, and mobile telephone services. Information that ranges from specific technologies and practices to information that enables reaction to climate change, disaster management, early warning on possibility of drought, floods, and diseases outbreaks; to price information, production efficiency and market access are now readily available (World Bank, 2012). According to the e-agriculture website (2017), the aims of the e-agriculture community are to apply ICTs in current agricultural information distribution, especially in poor rural areas, and also use information and communication technologies as mechanisms for increasing foodstuff manufacturing, equally in quality and quantity. The e-agriculture community aims at enabling the exchange of e-agriculture knowledge and ensuring that this created knowledge is efficiently and successfully shared and used globally. Ali *et al.* (2014) opine that ICTs permit easy access to agricultural information among stakeholders, make it easy for the distribution of information in the agricultural sector, help in information circulation to many farmers who live in remote rural communities and assist agricultural stakeholders to make informed decisions. Ali *et al.* (2014) was of the opinion that the major factors contributing to this slow growth include: lack of technological awareness of those who seek for agricultural information, lack of an adequate amount of information on the information needs of farmers, lack of suitable Information and communication technologies tools, the available information is packaged and being disseminated in the format which is unfavourable to the farmers, and poor infrastructure. However, in spite of the barriers, there are several success stories on ICTS usage especially cell phones, in the dissemination of agricultural information in Africa. Palmer (2012), lists Information communication technologies activities which are being



practiced globally. Musungwini (2018) notes that the main problems being faced by farmers comprise of: getting information on prices for agricultural inputs, prices and markets for their farming products, lack of farming knowledge, and failure by the Grain Marketing Board (GMB) to pay in time for their produce. Oladele (2011) observes unavailability of agricultural information is the main reason limiting agricultural development in developing countries. Cellphones can facilitate the mitigation of problems of agricultural information dissemination. The fact that the available mobile phones and radio services are still limited, in terms of their area coverage. Literatures have shown not much has been done on the use of mobile phone and radio in the dissemination of agricultural information. It is against this backdrop this research conducted.

Based on the foregoing problem the study aimed to achieve the following objectives,

- i. describes the socioeconomic characteristics of the respondents;
- ii. describe the number of agricultural technologies promoted;
- iii. determine factors influencing used of radio and mobile phone in disseminating agricultural information; and
- iv. describe the constraints affecting use of radio and mobile phone among crop farmers in the study area.

## **METHODOLOGY**

### **Study Area**

Bauchi state lies between 9.30 North of the equator and longitude 8.50 and 110 East of the Greenwich Meridian. The state is bordered by Kano, Jigawa and Plateau States to the west. Yobe, Gombe and Adamawa to the North-East and Kaduna to the North-West. Bauchi state covers a total area of 49, 259.01km<sup>2</sup> which is about 5.3% of the total land mass of Nigeria. It has a total population of the area experiences both dry and rainy seasons, during the month of April the temperature of 40°C is recorded in which is the hottest and in November to January, the temperature of 17.11°C is recorded being the coldest month of the year and as well the time when hamattan is experienced in the area. The mean annual rainfall ranges from 460mm in the Northern part of the state to 1300mm in the southern and south-western part. The relative humidity decreases from 94% in August to less than 10% during hamattan. The topography ranges from hilly in the south to low land in the north. The vegetation ranges from Sahel Savana and Sudan Savana in the North to Guinea Savana in the South.

Thus, the choice of the area is based on the fact that it is typical representation of diverse socio-economic, cultural and rural urban setting obtained in Northern Nigeria; with the majority of farmers engaged in farming at subsistence level. The people of the area are predominantly farmers, traders, fishermen, hunters and pastoralists. This was made possible by the favorable climatic condition and natural gift to the place. The state has varieties of tribes like Hausa, Fulani, Kanuri, Jarawa, Sayawa and Kare-Kare etc (BSADP, 2022).

### **Sampling technique and Sample Size**

The multi-stage sampling was use for the study. In the first stage involve purposive selection of 3 LGA in the zone. The second stage entailed stratified sampling of ward and villages. This is because they are the major crops cultivation area. In the third stage, a total of 180 farmers were randomly selected out of the 3570-farmer population using the sample size calculator at 5 per cent precision and 95% confidence levels.

$$n = \frac{N}{1+N(e^2)} \quad \dots (1)$$

where;

n= Sample size,



N= Population size and  
 e= level of precision

### Sampling Frame

**Table 1:** Sample Frame

S/N	LGAs	Districts	Villages	Population	Sample
1	Darazo	Darazo	Gabchiyai	300	15
			Yalwan darazo	250	13
		Sade	Papa	280	14
			Wahu	400	20
2	Ganjuwa	Ganjuwa west	Kafin madaki	250	13
			Maya	300	15
		Ganjuwa East	Gungura	380	19
			Nahuta	260	13
			Kurmi	200	10
3	Ningi	Bura	Kafin lemo	250	13
			Zidanga	300	15
		Ningi	Guda	400	20
			Total	3	6

Source: Reconnaissance survey, 2022

### Data Collection

Primary data were collected using structured questionnaire. The data collected comprising both quantitative and qualitative. Information collected include:

**Section (a)** Farmers’ socio-economic characteristics such as age of household head, gender of household head, marital status, educational level of household head, farm size, land quality, technology adoption, per capita aggregate income, access to market, membership of cooperative, household size.

**Section (b)** types of mobile phone and radio use by farmers

**Section (c.)** Number of agricultural technology farmers adopted through use of mobile phones and radio (d) Factors limiting access to agricultural information using mobile phone and radio

**Section (e.)** Constraints limiting usage of mobile phone and radio in accessing agricultural information in the study area.

### Method of Data Analysis

Both descriptive statistics and inferential statistics were used in analyzing the data collected.

#### Descriptive Statistics

Descriptive statistics such as frequency, percentages and means were used to achieve objectives i, ii and iv.

#### Inferential Statistics logit regression model

For the purpose of this study, the logistic regression will be used to capture objective (iii). The explicit of the model is written as:

$$Y = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \beta_5X_5 + \beta_6X_6 + \beta_7X_7 + \beta_8X_8 + \dots + \beta_{11}X_{11} + \varepsilon \quad \dots(1)$$

The detailed model is explained below.

Where;

Y = Access to mobile phone or radio (1 = Yes, 0 = No)



X <sub>1</sub>	=	Age of farmers (years)
X <sub>2</sub>	=	Annual income (naira)
X <sub>3</sub>	=	Farm size (hectares)
X <sub>4</sub>	=	Level of education (years)
X <sub>5</sub>	=	Farming experience (years)
X <sub>6</sub>	=	Household size (numbers)
X <sub>7</sub>	=	Extension contact (number of contacts with extension agents in a year)
X <sub>8</sub>	=	Number of technologies adopted through mobile phone
X <sub>9</sub>	=	Number of technologies adopted through radio
X <sub>10</sub>	=	Sex (1 =male, 0=female)
X <sub>11</sub>	=	Cost of production (naira)
X <sub>12</sub>	=	Awareness (years of awareness of improved production technologies)

## **RESULTS AND DISCUSSION**

### **Socio-economic Characteristics of the Respondents**

The result from Table 2 shows the socioeconomic characteristics of the respondents, the findings shows that majority (78.9%) of the respondents were male, while 21.1% of the respondents were female. This implies that most of the respondents were male which could be connected to the facts that most of the people addicted to radio are male, it can also be attributed to cultural and religious barriers hindering women participation in agricultural production practices in the study area. The result also shows that majority (73.3%) of the respondents were married, while 20.6% of the respondents were single. Only 5.6% and 0.6% of the respondents were divorced and widowed. This implies that most of the respondents were married with certain levels of responsibilities and will be willing to accept technologies to improve their productivity levels in the study area. The result further shows that 47.2%, 24.4% and 18.9% of the respondents were into farming, trading and civil service respectively as other forms of occupation. Only 5% and 4.4% of the respondents were into off-farm casual work and students in the study area. This implies that respondents had several ways of income from other occupation in the study area.



**Table 2:** Demographic Distribution of the Respondents (n = 180)

Variables	Frequency	Percent
Sex		
Male	142	78.9
Female	38	21.1
Marital status		
Married	132	73.3
Single	37	20.6
Divorce	10	5.6
Widowed	1	.6
Occupation		
Farming	85	47.2
Trader	44	24.4
Civil servant	34	18.9
Off-farm casual work	8	4.4
Student	9	5.0
Educational level		
Non-formal Education	9	5.0
Primary education	47	26.1
Secondary education	43	23.9
Tertiary education	81	45.0
Language spoken		
Jarawa	13	7.2
Hausa	139	77.2
English	19	10.6
Fulani	9	5.0

Source: Field survey, 2023

The result also shows that 45%, 26.1% and 23.9% of the respondents had attained tertiary, primary and secondary levels of education respectively. Only 5% of the respondents had not attained any form of formal education in the study area. This implies that most of the respondents had attained one form of education or another in the study area which helps in obtaining accurate form of information on crop production in the study area. The result also shows that majority (77.2%) of the respondents speaks Hausa, while 10.6%, 7.2% and 5% of the respondents speak English, Jarawa and Fulani languages in the study area. This implies that most of the respondents understand and speak native languages in the study area which plays a vital role in information dissemination among the respondents in the study area.

The result from Table 3 shows quantitative socioeconomic characteristics of the respondents, the findings show that respondents had a minimum age of 20 years and a maximum age of 80 years. The mean age of 41.5 years implies that most of the respondents were within their active ages of production in the study area.



**Table 3:** Distribution of the Respondents Based on Age, Years of Experience, Household Size and Farm Size

Variables	N	Minimum	Maximum	Mean	Std. Deviation
Age	180	20	80	41.55	12.976
Years of experience	180	1	30	10.19	7.510
Household size	180	0	30	5.42	4.822
Land size	180	1	10	2.85	1.847
Valid N (listwise)	180				

Source: Field survey, 2023

The findings also showed that respondents had a minimum of 1 year farming experience with a maximum of 30 years farming experience. The mean years of farming experience of 10 years implies that respondents had good number of years in crop production in the study area. The findings also showed that respondents had maximum household size of 30 persons with a mean household size of 5.4 persons in the study area. This implies that most of the respondents had relatively small household size in the study area. The result also shows that respondents had a minimum farm size of 1ha and a maximum of 10ha. The mean farm size of 2.85ha implies that most of the respondents were small scale crop farmers in the study area.

#### **Sources of Agricultural Information**

The result from Table 4 shows the sources of information on crop production in the study area. The findings showed that 45.6% and 40.6% of the respondents had mobile phones and radio as their sources of information on crop production, while 10% and 3.9% of the respondents had television and internet as their sources of information on crop production in the study area. Anifowose and Odukoya (2013) asserted that communication involves the process by which information and understanding are transferred from one person to another.



**Table 4:** Sources of Agricultural Information (n = 180)

Variables	Frequency	Percent
Source of information		
Radio	73	40.6
Mobile phones	82	45.6
Television	18	10.0
Internet	7	3.9
Own radio		
No	21	11.7
Yes	159	88.3
Station listen		
Local	134	74.4
International Station	46	25.6
Own mobile phone		
No	6	3.3
Yes	174	96.7
Category of the phone		
Basic cell phone	24	13.4
Mid-range phone	28	15.5
Smart phone	128	71.1
Phone acquisition		
Gift	27	15.0
Purchased	152	84.4
Organization	120	66.7
Network subscribed		
Airtel	64	35.6
MTN	112	62.2
Glo	68	37.8

Source: Field survey, 2023

This implies that most of the respondents had different sources of information on crop production in the study area. The result further shows that majority (88.3%) of the respondent's own radio, while 11.7% of the respondents do not own radio. This implies that most of the respondents had radio which is the cheapest and fastest way of getting information on crop production in the study area. The findings also showed that majority (74.4%) of the respondents listens to local stations, while 25.6% of the respondents listens to international stations. This implies that most of the respondents listens to local stations where information on improved crop production are disseminating in the study area. The result further reveals that most (96.7%) of the respondents owns mobile phones, only 3.3% of the respondents do not own mobile phones in the study area. This implies that most of the respondents own a mobile phone which helps in disseminating information on crop production in the study area. Masuki, *et al.* (2010) while commenting on the growth of mobile phone in developing countries asserted that; currently mobile telephony is the predominant mode of communication in the developing world.

The result also shows that majority (71.1%) of the respondents owns smart phones, while 15.5% and 13.4% of the respondents had mid-range and basic cell phones. This implies that most of the respondents had android devices which supports internet connections and





social media platforms where information can be disseminated easily and faster to end users on crop production in the study area. Chisita (2010) opined that mobile ICT's have also impacted heavily on access to information relating to markets, weather, and other essential services because this information can easily be accessed through the use of mobile phones.

**Information Access by the Respondents through Radio and Mobile Phone**

The result from Table 5 shows the various information obtained by respondents through radio and mobile phones in the study area. The findings showed that the major information obtained by the respondents through radio and mobile phones were on conservation practices, pest/disease outbreak and livestock management which were ranked 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> respectively. This implies that most of the respondents use radio and mobile phones to acquire important improved production practices in agriculture in the study area.

**Table 5;** Information Access by the Respondents through Radio and Mobile phone

Variables	Frequency	Percent	Rank
Information access by the respondents			
Conservation practices	46	25.6	1 <sup>st</sup>
Pest and disease outbreak	43	23.9	2 <sup>nd</sup>
Livestock management	39	21.7	3 <sup>rd</sup>
Fertilizers	36	20.0	4 <sup>th</sup>
Climate change	36	20.0	4 <sup>th</sup>
Pesticides	35	19.4	6 <sup>th</sup>
Alert on weather	28	15.6	7 <sup>th</sup>
Commodity price	19	10.6	8 <sup>th</sup>
Mobile banking	10	5.6	9 <sup>th</sup>
Transport alternative	10	5.6	9 <sup>th</sup>
Reminder of activities	7	3.9	11 <sup>th</sup>
Agricultural insurance	4	2.2	12 <sup>th</sup>
Farm business management	4	2.2	12 <sup>th</sup>
Irrigation	2	1.1	14 <sup>th</sup>

Source: Field survey, 2023

This is followed by information on fertilizers, climate change, pesticides, alert on weather and commodity prices which were ranked 4<sup>th</sup>, 6<sup>th</sup>, 7<sup>th</sup> and 8<sup>th</sup> respectively. This implies that respondents are technology adopters who are determined to search for improved technological practices in crop production in the study area. Others include mobile banking, transport alternative, reminder of activities, agricultural insurance, farm business management and irrigation which were ranked 9<sup>th</sup>, 11<sup>th</sup>, 12<sup>th</sup> and 14<sup>th</sup> respectively. This implies that respondents effectively and efficiently utilized their devices for several purposes and obtained different kinds of information especially on agriculture in the study area.

**Factors Influencing the Use of Radio and Mobile Phone Technology**

The result from Table 6 shows the factors influencing use of radio and mobile phones by the respondents in the study area. The findings showed that the factors influencing use of radio and mobile phones include years of experience (P<0.001), household size (P<0.001) and number of technologies adopted through mobile phones (P<0.001) were positive and significant at 1%. This implies that most that increase years of experience, household size and



number of technologies adopted through mobile phones will result to increase in adoption of technologies through the use of radio and mobile phones by the respondents in the study area.

**Table 2;** Factors influencing the use of Radio and Mobile Phone Technology

Variables	B	S.E.	Wald	Sig.
Age	.054	.038	2.021	.155
Land size	.114	.224	.259	.611
Education level	-1.063	.443	5.770	.016**
Years of experience	-.194	.065	8.863	.003***
Household size	.815	.253	10.350	.001***
Extension contact	-.372	.650	.328	.567
Number of technologies adopted mobile phone	-6.011	1.583	14.417	.000***
Number of technologies adopted radio	.386	.679	.324	.569
Gender	2.082	1.183	3.099	.078
Constant	.196	2.037	.009	.923
Pseudo R= 0.425				
-2 Log likelihood = 85.317 <sup>a</sup>				
Chi-square = 44.366***				

Source: Field survey, 2023 \*\*= significant at 5% and \*\*\*= significant at 1%

The findings also showed that educational level ( $P < 0.05$ ) was positive and significant factor at 5% influencing the use of radio and mobile phones in the study area, which implies that increase in educational level will lead to increase in adoption and use of radio and mobile phones for agricultural service delivery in the study area. The finding further shows that age, land size, extension contact, number of technologies adopted through radio and gender had no significant influence on the use of radio and mobile phones in the study area. This implies that socioeconomic factors of the respondents had significant influence on their use of radio and mobile phones in the study area for agricultural information services.

#### **Agricultural Information Technology Adopted by the Respondents**

The result from Table 7 shows the technologies adopted by the respondents in the study area. The findings showed that the major technologies adopted by the respondents were improved crop varieties, fertilizer application rates, pest/disease management and market prices which were ranked 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> respectively in the study area. The result further shows that weather updates, soil fertility management, field management and disease/pest outbreak were ranked 5<sup>th</sup>, 6<sup>th</sup> and 7<sup>th</sup> respectively by the respondents. Others were crop insurance and fertilizer types which were ranked 9<sup>th</sup> and 10<sup>th</sup> by the respondents in the study area. This implies that most of the respondents had adopted one form of technology or another in the study area.



**Table 3:** Agricultural Information Technology Adopted by the Respondents

Variables	Frequency	Percent	Rank
Agricultural information adopted			
Adopt improved crop varieties	115	63.9	1 <sup>st</sup>
Fertilizer application rates	42	23.3	2 <sup>nd</sup>
Pest and disease management	18	10.0	3 <sup>rd</sup>
Market prices	18	10.0	3 <sup>rd</sup>
Weather updates	9	5.0	5 <sup>th</sup>
Soil fertility management	7	3.9	6 <sup>th</sup>
Reminder on field activities	6	3.3	7 <sup>th</sup>
Alert on outbreak of pest and disease	6	3.3	7 <sup>th</sup>
Crop insurance cover	5	2.8	9 <sup>th</sup>
Fertilizer types	2	1.1	10 <sup>th</sup>

Source: Field survey, 2023

### Challenges Faced by the Respondents in Accessing Agricultural Information Using Radio and Mobile Phone

The result from Table 8 reveals the challenges faced by the respondents on accessing agricultural information through radio and mobile and phones in the stud area. The result shows that the major challenge faced by the respondents were occasional presentations of agricultural programs, digital skills and lack of awareness which were ranked 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> respectively by the respondents.

**Table 8:** Challenges faced by the Respondents in accessing Agricultural Information Using Radio and Mobile Phone

Challenges	Frequency	Percentage	Rank
Occasional presentation of Agricultural programs	114	63.3	1 <sup>st</sup>
Digital skills	105	58.3	2 <sup>nd</sup>
Lack of awareness	103	57.2	3 <sup>rd</sup>
Additional cost	101	56.1	4 <sup>th</sup>
Lack of electricity	101	56.1	4 <sup>th</sup>
Financial resources	99	55.0	5 <sup>th</sup>
Language on technology	100	55.6	5 <sup>th</sup>
Poor network coverage	98	54.4	7 <sup>th</sup>
Illiteracy	97	53.9	8 <sup>th</sup>
Message not required	97	53.9	8 <sup>th</sup>
Message broadcast not clear	92	51.1	9 <sup>th</sup>
Language of broadcast	84	46.7	10 <sup>th</sup>

Source: Field survey, 2023

The result also shows that additional cost, lack of electricity, financial resources, language on technology and poor network coverage were ranked 4<sup>th</sup>, 5<sup>th</sup> and 7<sup>th</sup> respectively by the respondents in the study area. Other challenges faced by the respondents were illiteracy, message not required, broadcast not clear and language of broadcast which were ranked 8<sup>th</sup>, 9<sup>th</sup> and 10<sup>th</sup> respectively by the respondents in the study area. This implies that though respondents had benefited from agricultural information services through radio and mobile phones but yet



they faced some challenges which hinders smooth flow of agricultural information services to the end users in the study area. In many African countries relatively, high costs of services and lack of supporting infrastructure are the prominent challenges (Lwonga, 2011; Mwakaje, 2010; Dutta and Bilboa Osorio, 2012).

## CONCLUSION AND RECOMMENDATIONS

The study concluded that education level, years of experience, household size and number of technologies adopted were the factors influencing the use of radio and mobile phones in dissemination agricultural production in the study area. The study recommended that Agricultural programs should be timely presented in local and international radio stations in the study area, farmers should form cooperatives and create an avenue for training on the use of digital technologies, government and non-governmental organizations should create more awareness on the use of radio and mobile devices in disseminating agricultural information in the study area and government should improve electricity supply in the study area

## REFERENCES

- Aker, J. C. & Fafchamps, M. (2011). *Dial "A" for Agriculture: Using Information and Communication Technologies for Agricultural Extension in Developing Countries*. Retrieved from [http://sites.tufts.edu/jennyaker/files/2010/02/Dial-A-for-Agriculture\\_Aker.pdf](http://sites.tufts.edu/jennyaker/files/2010/02/Dial-A-for-Agriculture_Aker.pdf).
- Ali, B. Q. M. P. F., Keerio, C. A., Buriro, R. A., & Razaque, A. (2014). Adoption of Information Communication Technology tools Among Fishermen. *Journal of American Science*, **10**(7): 234-245.
- Anifowose, R., and Odukoya, A. (2013). Towards curbing electoral violence in Nigeria. BSADP (2022). Progress report, Bauchi State agricultural development publication, Bauchi State 83.
- Chisita, C. T. (2010). An investigation into the impact of ICT's in the provision of agricultural information to small scale farmers in Harare. Scientific and Technical Information and Rural Development IAALD XIIIth World Congress, Montpellier, 26-29 April 2010.
- De Silva, H., & Ratnadiwakara, D. (2008). Using ICT to reduce transaction costs in agriculture through better communication: A case-study from Sri Lanka. *LIRNEasia, Colombo, Sri Lanka, Nov*.
- Dutta, S., & Bilbao-Osorio, B. (2012). The Global Information Technology Report 2012 Living in a Hyperconnected World. World Economic Forum. Recuperado a partir de [http://www3.weforum.org/docs/Global\\_IT\\_Report\\_2012.pdf](http://www3.weforum.org/docs/Global_IT_Report_2012.pdf)
- FAO (2017). *Decent Rural Employment*. Retrieved August 21, 2017 from <http://www.fao.org/rural-employment/work-areas/working-conditions/en/>.
- Funom, B. C. (2020). Utilization of Agricultural Information by Soybean Farmers in Niger State, Nigeria. *Journal of Agripreneurship and Sustainable Development*, **3**(3): 225-237.
- Lwoga, E. T., Stilwell, C. and Ngulube, P. (2011). Access and use of agricultural information and knowledge in Tanzania. *Library Review*, **60**(5): 383-395.
- Lwoga, E. T., Stilwell, C. and Ngulube, P. (2011). Access and use of agricultural information and knowledge in Tanzania. *Library Review*, **60**(5): 383-395.
- Masuki, K. F. G., Kamugisha, R., Mowo, J. G., Tanui, J., Tukahirwa, J., Mogoi, J., and Adera, E. O. (2010, March). Role of mobile phones in improving communication and



- information delivery for agricultural development: Lessons from South Western Uganda. In *Workshop at Makerere University, Uganda* (pp. 22-23).
- Musungwini, S. (2018). Mobile phone use by Zimbabwean smallholder farmers: A baseline study. *The African Journal of Information and Communication*, 22, 29-52.
- Mwakaje, A. G. (2010). Information and communication technology for rural farmers market access in Tanzania.
- Nyamba, S. Y. and Mlozi, M. R. S. (2012). Factors Influencing the Use of Mobile Phones in Communicating Agricultural Information: A Case of Kilolo District, Iringa, Tanzania. *International Journal of Information Technology Research*, 2(7): 558–563.
- Oladele, O.I., (2011), Effects of Information Technology on agricultural information access among research Extension agents and farmers’ information access among researchers, Extension agents and farmers in Southwestern Nigeria. *Journal of Agriculture and Food Information*, 12: 167-176.
- Palmer, S. B., Wehmeyer, M. L., Davies, D. K., and Stock, S. E. (2012). Family members' reports of the technology use of family members with intellectual and developmental disabilities. *Journal of Intellectual Disability Research*, 56(4): 402-414.
- World Bank (2017). *Information and Communications for Development: Maximizing Mobile*. The World Bank Washington, DC.