**THE IMPACT OF ICT FOR AGRICULTURAL DEVELOPMENT IN THE RURAL COMMUNITY: A CASE STUDY OF RUBA COMMUNITY, KAFIN HAUSA LGA – JIGAWA STATE.**

**BY**

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**IN FULFILLMENT OF THE REQUIREMENTS FOR THE 3 MILLION TECHNICAL TALENT (3MTT) CERTIFICATION**

**A PROJECT SUBMITTED TO THE DEPARTMENT OF DATA ANALYSIS & VISUALIZATION, VOOSTECH DUTSE, JIGAWA STATE**

**APRIL, 2024.**

**DECLARATION**

I **MUSA MUHAMMAD JIBRIL** do humbly declare that this research work titled **THE IMPACT OF ICT FOR AGRICULTURAL DEVELOPMENT IN THE RURAL COMMUNITY: A CASE STUDY OF RUBA COMMUNITY** is a finding from my research efforts, carried out in the Data Analysis and Visualization It was carried out under the supervision of VOOSTECH.

**Musa Muhammad Jibril Date**

**The above declaration is confirmed**

**Voostech Date**

**CERTIFICATION**

This is to certify that this research project entitled **THE IMPACT OF ICT FOR AGRICULTURAL DEVELOPMENT IN THE RURAL COMMUNITY: A CASE STUDY OF RUBA COMMUNITY** was carried out by Musa Muhammad Jibril in Voostech,Dutse.

**Voostech Date**

**(Project Supervisor)**

**Date**

**(Head of Department)**

**DEDICATION**

This project is dedicated to the Almighty God, for the strength, grace and kindness throughout the program.

**ACKNOWLEDGEMENTS**

With regards to the completion of this study, I want to use this opportunity to give thanks to the Almighty God, for giving me the grace and inspiration during the course of this study.

I am also using this opportunity to show my gratitude to my supervisor Voostech, for thier guidance, persistence and encouragement during the course and completion of my project.

And to my parent, friends and family for their support in the course of this project.

***ABSTRACT***

*This study investigates the impact of ICTs for agricultural development in the Ruba rural community. The rationale for carrying out the study has to do with the limited access to ICTs by farmers residing in this Ruba community which in turn affects their productivity and increase in the volume of agricultural production. The core argument of the study is that the use of ICTs has positive spinoffs on agricultural development which leads to improvement in the quality and quantity of agricultural production. Conversely lack of access to ICTs can result in inability to enhance agricultural productivity in rural areas such as Ruba. Furthermore, it is argued herein that technological information devices such as ICTs are essential communication and information tools; and as such, should be regarded as useful communication media for disseminating relevant agricultural information to farmers residing in rural communities. In conducting this study theoretical frameworks such as Rogers’ diffusion of innovation and development theories encompassing both the participatory approach and development support communication were presented and argued for as approaches suitable for the study.*

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# CHAPTER ONE:

# INTRODUCTION

# 1.1 Background to the Study

This study examines the Impact of ICTs for Agricultural Development in the Rural Community of Ruba. Agriculture is the key economic activity in rural areas of developing countries. It therefore presents the best mechanism to alleviate poverty, to improve food security and more generally to improve the livelihoods of rural populations (Mohamad & Gombe, 2017; World Bank, 2018). However, the relative poverty of rural areas, their lack of access to ICT tools and the relative weakness of their institutions makes them particularly vulnerable to both short-term shocks (e.g. conflicts, economic crisis) and long-term trends (e.g. clsimate change). This vulnerability, in turn, limits the productivity of agriculture and limits associated socio-economic development of rural areas.

Simultaneously, Information and Communications Technologies (ICTs) such as mobile phones are now regarded as essential enablers to rural development generally and to agricultural development specifically. For example, through digitization ICTs have reduced the cost, time and risk associated with farmers’ purchase- and sales-related journeys (Heeks, 2018). They have improved agricultural value-chain processes (e.g. purchasing and selling) through market information and financial services and can even enhance and change market structure through the removal of intermediaries and the introduction of farmers to supply-chain contracting (Baumüller, 2018). Conversely, though, use of ICTs-in-agriculture has also been associated with negative impacts such as inter-community conflicts and inequalities (Baird & Hartter, 2017).

Despite the sizeable literature in this area, Duncombe (2016) concludes that most recent ICTs-and-agriculture research has focused on “...narrow measures of output (market prices, market penetration and so on)…”, and that there is a need to establish ICTs’ “…broader impact on households, communities and welfare”. There is also an identified need to understand the longer-term rather than short-term impact of ICTs-in-agriculture (Duncombe, 2016; Walsham, 2017). The aim of this study is to investigate ways in which modern information and communication technologies (ICTs) can play a role in alleviating poverty, focusing on developing countries.

# 1.2 Statement of Problem

Despite the adoption and input of ICTs in the urban areas, rural communities are neglected and deprived substantial access of ICTs; the farmers are deprived information that would help to assist them in productivity and market survey (UNDP, 2015). Rural people constitute a greater part of the population of developing countries and they often lack access to basic needs such as water, food, education, health care, sanitation and security, leading to low life expectancy and high infant mortality (Munyua, 2016). These conditions considered harsh by the majority of the rural population result in their migration into urban areas often in search of formal employment as the only option for survival (Munyua, 2016). Finding solutions calls for revolutions, in this case this would entail radical steps taken as forms of interventions to meet the increased food demands and or to alleviate the food insecurity problems (McCala and Brown, 2015).

Traditional media and ICTs have played a major role in diffusing information to rural communities, and have much more potential. There is a need to connect rural community to research and extension networks and to provide it access to the much-needed knowledge, technology and services (Forno, 2019). According to Munyua (2016) traditional media were successful in developing countries and rural radio in particular has played a major role in delivering agricultural messages. Print, video, television, films, slides, pictures, drama, dance, folklore, group discussions, meetings, exhibitions and demonstrations used were to speed up the flow of information. Such channels however have not allowed for much interaction with users.

Despite the fact that the internet services are expanding rapidly, the benefits of the internet are yet to be exploited. The available use and deployment of the internet vary considerably between rural and urban areas depending on the income level, education, age and gender. According to the IFAD (2017) Rural Poverty Report, some three quarters of the world’s 1.2 billion extremely poor people live and work in rural areas. Meanwhile, aid to agriculture as their main source of income has fallen by two thirds. Although in decline, agriculture remains the direct and indirect base for the economic livelihoods of the majority of the world’s population (IFAD, 2017). The implementation of new technologies will help make enormous jump into a knowledge society, without having to struggle with the long transformation from an agricultural society, through an industrial society, to a postindustrial or knowledge society, when used as a broad tool for providing local farming communities with scientific knowledge.

# 1.3 Objectives of Research

The study aims at investigating the impact of ICTs for agricultural development in the rural communities. It examines the present existence of ICTs in Ruba community and how farmers are accessing relevant agriculture information. Specific aspects of these aims are:

1. To examine how rural farmers receive and disseminate information on their farming mechanism in the past
2. To examine current ICT equipment and techniques used for farming in Ruba
3. To investigate the needs of the farmers regarding the use of ICTs in the rural community.

# 1.4 Research Question

This study examines how ICTs can help to improve farm productivity and market strategy and facilitate access to relevant information that can aid farmers in farming. The key questions asked are as follows:

1. What measures did farmers in the rural community use to receive and disseminate ICT information?
2. What type of ICTs tools where previously used by the rural farmers?
3. What are the ICT needs of the rural farmers?

# 1.5 Significance of the study

The rationale for carrying out this study has to do with the unavailability of ICTs infrastructure among the local farmers in the rural community of Ruba. Although most urban communities of Nigeria have adopted ICTs, this is not the case for the rural communities. For this reason, it has affected their productivity in terms of land cultivation and distribution channels. The rural farmers in Ruba do not have appropriate connectivity to the information channels thereby indulging in a digital divide as compared to the digital world. The purpose of rural development is “to improve the standard of living of the rural population that is multi sectoral including agriculture, industry, and social facilities”. Rural Communities require information through supply of inputs, new technologies, early warning systems, credit, market prices and their competitors.

**1.6 Scope of the Study**

This study investigates the impact of ICTs for agricultural development in the Ruba rural community. The rationale for carrying out the study has to do with the limited access to ICTs by farmers residing in this rural community which in turn affects their productivity and increase in the volume of agricultural production. The core argument of the study is that the use of ICTs has positive spinoffs on agricultural development which leads to improvement in the quality and quantity of agricultural production. Conversely lack of access to ICTs can result in inability to enhance agricultural productivity in rural areas such as Ruba.

**1.7** **Limitations**:

The study area was within Ruba Community in Kafin Hausa Local Government Area of Jigawa State. Data was collected from farmers within ruba community. Time constraint and lack of financial resources are some of the challenges faced during the course of this research. There was also poor attitude towards response while answering the questionnaire.

**1.8** **Definition of Terms**

**ICT:** means Information and Communication Technology and refers to the combination of manufacturing and services industries that capture, transmit and display data and information electronically.

**Agriculture:** Agriculture is the art and science of cultivating the soil, growing crops and raisinglivestock. It includes the preparation of plant and animal products for people to use and their distribution to markets. Agriculture provides most of the world's food and fabrics

**Rural communities:** A rural area is an open swath of land that has few homes or other buildings, and not very many people

**Development:**

Development is a process that creates growth, progress, positive change or the addition of physical, economic, environmental, social and demographic components. The purpose of development is a rise in the level and quality of life of the population, and the creation or expansion of local regional income and employment opportunities, without damaging the resources of the environment.

# CHAPTER TWO

# LITERATURE REVIEW

**2.1 Introduction**

This Section provides a review of literature on the impact of ICTs on agricultural development. It will also look at the theories that apply to the adoption of ICTs by the rural communities of the developing countries, such as Roger’s Diffusion of Innovation theory, Participatory Approach theory and Development Support Communication theory. Consequently, attempts towards applying the theories in support of the adoption of ICTs for agricultural development in the rural communities will be discussed, thereby reviewing write-ups of past scholars for ICTs in development that yields the unexpected results to developmental profile in developing nations. In this regard, ICTs are a vehicle for development used to enhance development in the rural areas of the developing countries.

* 1. **Conceptualization**

# 2.2.1 Locating the concept of development

The international development sector focused in recent years on the need to share knowledge more effectively in support of poverty reduction efforts (David and Surmaya, 2005). Therefore, in the context of a perceived “*knowledge divide*‟, the challenge of how to respond to the knowledge needs of the rural community in developing countries is being addressed (David and Surmaya, 2005). The challenge for information providers in development is how to share information with people who have little access to ICTs, low levels of literacy, little time or money, and highly contextualized knowledge and language requirements. For many years, reaching people living in poverty was characterized as the “last mile‟ problem (David and Surmaya, 2005).

In recent years this terminology is seen as carrying negative connotations and instead has been refocused as connecting the “first mile‟ (Paisley and Richardson, 1998). It is almost an axiom that development and communication go hand in hand despite Learners theory on the “role of Mass media in the revolution of rising frustrations” (Learner, 1958). Rao (2003: 44) discussed the basis of his classic study of two Indian villages and came up with the theory that “communication helps people find new norms and achieve a balance during a period of rapid change. Communication though appears to originally stimulate and create stress, later on acts as a balm and reduces tension.

**2.2.2 Communication and development**

The concern on the role of communication in development began within UNESCO in the 1950‟s (McAnany, 1980), which led to the proposal for development communication and the construction of “technology-based communication networks which, regardless of messages and content, tended to create, by reason of its inherent characteristics, a climate suited for development” (Jayaweera and Amunugama, 1987). Development is defined as a widely participatory process of social change in society, intended to bring about both social and material advancement (including greater equality, freedom and other valued qualities) for the majority of people through their gaining greater control over their environment (Rogers, 1976).

The modernization approach in the 1960s-1970s, would build on Daniel Learner‟s modernization paradigm (1958) and Wilbur Schramm‟s write-up on communication and development (1964). The emerging Third World had hoped to achieve in a few decades what the developed, wealthy, industrialized nations of the West took centuries to achieve. The impact of the mass media, especially radio and later television, gave hope that the future could be different for the third world countries. India was among the first to use the mass media, sponsored by the national government through regulative planning to support development initiatives and the agricultural extension programme and other development efforts strongly influenced by Rogers (1962:14) diffusion and adoption of innovations model.

**2.2.3 Development and ICTs**

The concept of development has been evolving since its origins after the Second World War. Sachs (1992:1-6) dates the „age of development as beginning after the Second World War, when President Truman at his inauguration described regions in the South as under-developed‟. International organizations such as the World Bank and the United Nations were established to support international relations and other agenda‟s have influenced the discourse on development ever since (David and Surmaya, 2005). The priorities of the international development community have shifted over the years. From a focus on economic development and growth, international bodies have begun to focus on poverty as a multidimensional phenomenon and to acknowledge the various contributory factors to poverty such as a lack of access to markets and services or vulnerability to shocks (David and Surmaya, 2005).

The media is used in a planned way to bring about change by applying them in large-scale programmes of development. Their task in extending public education and promoting innovation in agriculture and other social and economic matters has assisted to be an ‘engine of change’ (Rogers, 1962; 1973; 1976) in developing countries. Gerbner and Gross (1976: 283) term was derived from an approach to the study of media effects which argues that this significance comes not from the formation of ‘the mass’ but from ‘creation of shared ways of selecting and viewing events’, by delivering to them ‘technologically produced and mediated message systems. Thus, common ways of seeing and understanding the world. Gerbner calls this scenero the “cultivation of dominant image patterns” (Gerbner, 1976). In effect, the media tend to offer uniform and relatively consensual versions of social reality and their audiences are ‘acculturated’ accordingly. Gerbner (1976) further makes a prediction that the media, especially television because of the systematic character of its message and its consistency overtime, have powerful effects and came down firmly in favour of the media as molders of the society. The following ICT tools enhance development in the society;

**Radio**

Radio has achieved impressive results in the delivery of useful information to poor people. One of its strengths is its ubiquity. For example, a recent survey of 15 villages in Nepal found radios in every village, with farmers listening to them while working in their fields. Another survey of 21,000 farmers enrolled in radio-backed farm forums in Zambia found that 90 percent found programmes relevant and more than 50 percent credited the programmes and forums with increasing their crop yields (Dodds, 1999:79).

**Television**

Television is commonly cited as having considerable development potential and there exist examples of its usage for educational purposes. The most notable example of TV for development comes from China with its TV University and agricultural TV station. In Viet Nam, where two universities in the Mekong Delta Region work with the local TV station to broadcast weekly farmers workshops that is watched by millions of rural community dwellers (UNDP-APDIP, 2004).

**Telephone**

In many countries, access to the telephone system is a vital element that government’s attempts to implement various policies to offer affordable telephone service but unfortunately some countries lack sufficient telephone lines. The case of Grameen hand phones in Bangladesh, in which the Grameen Bank, village-based micro-finance organization leases cellular mobile phones to successful members has delivered significant benefits to the rural community dwellers (Bayes et al., 1999). The phones mostly used are for exchanging price and business and health related information. They have generated information flows that have resulted in better prices for outputs and inputs, easier job searches, reduced mortality rates for livestock and poultry, and better returns on foreign-exchange transactions (Bayes et al., 1999).

**Public address systems**

Public address systems commonly found in China and Vietnam are used to deliver public information, announcements and daily news. A community in Viet Nam is planning to augment its public address systems, by connecting to the internet to obtain useful information for broadcasting (UNDP, 2004). Public address systems localized are more than radio but are technically simpler and less expensive. However, research on less developed communities suggests that the telephone and radio remain the most important (direct access) ICT tools for changing the lives of the rural people (Heeks, 1999:20).

**Computers and the Internet**

Asia-Pacific Development Information Programme conducted by UNDP (2004) in collaboration with the Government of India, APDIP on computers and the internet are commonly made available to rural communities in the form of community-based telecentres. Telecentres provide shared access to computers and the internet is the only realistic means of doing this for rural communities. Although telecentres come in many guises, the two key elements are public access and a development orientation. The characteristic distinguishes telecentres from cyber cafés. Cyber cafés can be a useful device in fostering development through ICTs, but the difference is crucial, because development-oriented telecentres embody the principle of providing access for a purpose and that of implementing a development agenda. To achieve this development objective, telecentres perform community outreach services in order to determine the types of information used to foster development activities.

**2.3 Theoretical Review**

In the string of more recent studies, Ayim C, Kassahun A, Tekinerdogan B, Addison C (2020) offer a systematic review of literature on ICT adoption in agriculture. The review reveals that mobile-based services have improved the access to information on best practices in agricultural activities; however, the service is constrained by poor technological infrastructure and farmers’ low capacity. Nevertheless, from the studies empirically reviewed above, it was discovered that most of the studies from the region on the interaction between information and communication technologies (ICTs) and the agricultural sector are still being conducted conceptually and at the micro-level with few studies being conducted at the macro-level. This gap in the literature calls for new studies in the area to be conducted as this will reveal the contribution of ICTs to the agricultural sector, hence this study.

In recent times, studies across sub-Saharan Africa have been able to empirically examine the use of ICTs as a mean to boost the agricultural sectors in the countries under the region. A study by Laniyi E (2018) examined the nonlinear relationship among mobile phones, internet and agricultural development in Africa for the period of 2001–2015. Through the use of system generalized method of moment, empirical findings revealed a nonlinear relationship among mobile phones, internet and agricultural development.

Freeman K, Mubichi F (2017) provide evidence of information and communication technology (ICT) use by smallholder farmers in sub-Saharan Africa. Eight focus groups were used to draw qualitative data segmented by gender with the inclusion of adult farmers in two villages in central Mozambique. Findings revealed that cell phone and radio use are prevalent due to the characteristics of ICTs, which also varied by ICT type. This showed that diffusion of innovation is not only enough but the practical use.

In another review, Nakasone E, Torero M, Minten B (2014) examined the state of information and communication technologies (ICTs) on agricultural development in developing countries. The study revealed that the spread of mobile phones in rural areas has led to important changes in the agricultural sector as it leads to improved agricultural market performance at the macro-level with impact at the micro-level being mixed.

A study was conducted in Kapiri Mposhi district of central province in Zambia by Ali S, Jabeen U, Nikhitha M (2016). The study made use of multiple-stage random sampling technique with the aim of finding out the impact of ICTs on agricultural productivity, net profit per acre and farmers sources of finance. Through the use of ordinary least square, findings revealed that the use of ICTs along with seed, fertilizer and amount borrowed on agricultural productivity was positive. The study suggested that there should be the development of ICT skills among agricultural extension workers and farmers.

A similar study was also conducted by Oladele OI (2015) in Nigeria to determine the effect of Information Communication Technology (ICT) on agricultural information access among extension officers in North West Province. The technique of simple random sampling was used to select 169 officers to elicit information. Findings revealed the effect of education use of ICT tools and e-readiness on ICT information access among extension officers.

The aim of Kante M, Oboko R, Chepken C (2016) in their study is to bring out the factors affecting the use of ICTs on agricultural input information in developing countries. Ground theory was used in the study to access the use of ICTs on agricultural input information access. Findings revealed that the perception of the farmers in terms of relative advantage, compatibility, simplicity, observability and social influence of ICTs and information quality has positive effect on agricultural input information in developing countries. In a similar study, Kante et al. proposed an ICT model for increased adoption of farm input information in developing countries. With the use of a convenient sample of 300 small-scale cereal farmers and the technique of partial least squares structural equation model, findings revealed that the model can be used to predict ICT-based farm input information in the country as a means of adoption of ICT in agriculture.

In the string of more recent studies, Ayim C, Kassahun A, Tekinerdogan B, Addison C (2020) offer a systematic review of literature on ICT adoption in agriculture. The review reveals that mobile-based services have improved the access to information on best practices in agricultural activities; however, the service is constrained by poor technological infrastructure and farmers’ low capacity. Nevertheless, from the studies empirically reviewed above, it was discovered that most of the studies from the region on the interaction between information and communication technologies (ICTs) and the agricultural sector are still being conducted conceptually and at the micro-level with few studies being conducted at the macro-level. This gap in the literature calls for new studies in the area to be conducted as this will reveal the contribution of ICTs to the agricultural sector, hence this study.

Mahmud and Ahsan (2016) studied the role of ICTs in Agriculture/Rural development and Governance in Taiwan. The study revealed that use of ICTs resulted in highest benefits to the producers and saved them from middlemen. ICTs were used for enhancing both research findings among the stake-holders which ensured optimum coordination between research and extension for the welfare of farmers. Chavula (2014) using the 2000-2011 panel data for 34 African countries revealed that ICTs played a significant role in enhancing agricultural production, despite mobile phones had insignificant impact while telephone main lines a significant contributor to agricultural growth . The results also suggested that certain socioeconomic characteristics such as higher education levels and skills are prerequisites for effective improvements in agricultural production due to the adoption and utilisation of new technologies. The study by Halewood and Surya (2012) showed that the benefits of using ICTs in promoting access to price information in Africa have led to increase up to 36% of farmers’ income, and up to 36% of traders’ income in countries such as Kenya, Ghana, Uganda and Morocco. McKinsey (2013) revealed that the Ethiopian Commodity Exchange provided a virtual market place, accessible online, by phone or SMS, which provided transparency on supply, demand and prices and increased farmers’ share of revenue.

**2.4 Diffusion of innovation theory**

Rogers (1995, 2003) theoretical framework for diffusion of innovations discussed on the adoption of kiosk/telecenters thereby analyzing on how the principal attributes of innovations, such as relative advantage, compatibility and complexity, affects diffusion within the rural community. The kiosks offer a number of services including basic computer education, e-mail, web browsing, e-government, health, agricultural and veterinary applications on a fee-for-service basis (Kumar and Best, 2006). However, the kiosks are in operation for well over a year in many communities, still used by only a relatively small percentage of the rural population. Telecentres are shared access facilities that are communication information resource centre situated in the rural area of developing countries. It is equipped with telephones; computers; television and video and other technological devices. The aim of this centre is to provide a demand driven communication and information services for community development. This centre is an organization that receives external support from international donors, governmental and non-governmental or other groups outside the community served (Kumar and Best, 2006:1-12).

Rogers (1995:207) diffusion of innovations theory describes the key strength of the theory as the capacity to provide a general framework for telecentre researchers and practioners. Telecenters or kiosks have generally been defined as places or centres that provide shared public access to information and communication technologies for meeting the educational, social, personal, economic, and entertainment needs of the community (Fuchs, 1998; Harris, 1999; Proenza, 2001). Telecenters have gained prominence as the primary instruments for bringing the benefits of ICTs to the rural communities where the technological infrastructure is inadequate and the cost of individual access to these technologies are relatively high. They provide opportunities for access to information by overcoming the barriers of distance and location, and by facilitating access to information and communication they have the potential to foster social cohesion and interaction (Young, Ridley and Ridley, 2001, 1-17).

Other scholars say that most evaluations of telecenters have focused on their operational aspects, such as their technical, financial, and managerial performance and sustainability (Etta and Wamahiu, 2003; Young, Ridley, and Ridley, 2001). Past research have been conducted on the social impact of the community telecenter initiatives largely through anecdotal evidence (Holmes, 2001) while some have examined the impacts on poverty reduction (Gerster and Zimmerman, 2003; Ulrich, 2004). Most studies on telecenters to date focused on operational and sustainability aspects. However, a sound theoretical and conceptual framework for the planning and evaluation has largely been missing from the debate (Roman, 2003). Roman provides a very cogent theoretical framework for planning and evaluating telecenters using the Rogers‟ (1995) theory of diffusion of innovations, which is the three principal attributes of innovation which could be very useful in telecenter research: relative advantage, compatibility, complexity (Roman, 2003). He also underscores the importance of socio-structural environment in innovation diffusion and adoption (Roman, 2003).

# CHAPTER THREE:

# METHODOLOGY

* 1. **Introduction**

This chapter is concerned with the overall approach to the research work that is the method or overall methodology adopted in this research study it defines and examines briefly the research design, population of the study, sampling techniques and sample size, source of data collection and method of data analysis.

* 1. **Research Design of the Study**

The study was based on survey method of research. The said method will be used because it allows the researcher to study large population by studying a reasonable and manageable portion of the population (Sample).

* 1. **Population of the study**

The population of the study was Thirty (30) farmers in Ruba community area of Kafin Hausa Local Government of Jigawa State

* 1. **Sampling Technique and Sample Size**

Random Sampling technique was used. A sample of Thirty (30) respondents were randomly selected and issued with questionnaire and considered our sample size.

* 1. **Sources of Data**

Data for this research were gathered from primary source via questionnaires which was designed to collect data relevant to the research study from farmer of Ruba community.

* 1. **Methods of data collection**

The method that the researcher used in collecting data for this study was the use of a questionnaire which was administered to respondents. The questionnaire sought to gather demographic information as well as identify the different aspects of the respondent’s access to agricultural information.

# Method of Data analysis

In analyzing the data collected, mean score was used to achieve this. The four point rating scale was given as follows:

SA = Strongly Agreed

A = Agreed

D = Disagreed

SD = Strongly Disagreed

The means score of each item was computed using the formula

 = 

Where  = mean

FX = summation of the frequency

N = Number of items

The sum of the values gave a total of 10 for 5 points rating scaled used. The means will be determined using the formula stated above.

This means  = 5+4+3+2+1 = = 3

**3.8 Decision Rule**

This means that the questionnaire items that has a scaled of 3.5 and above or equal will be regarded as acceptable (that is agreed) while any item scoring below remains unacceptable (that is disagree

# CHAPTER FOUR

**4.0 DATA ANALYSIS AND FINDINGS**

**4.1 Introduction**

In this chapter, data collected for the purpose of answering the research questions and testing of the hypothesis posed in the study are presented and analyzed. The findings are presented according to the research questions.

**Research Question One:**

**What are the Measures Farmers in the Rural Community Use to Receive and Disseminate ICT Information?**

Table 1, item 1 with the mean score of 2.76 and standard deviation of 2.52 agrees that they have access to reliable internet connectivity in their rural community e.g. broadband, 3G/4G mobile network, Satellite internet and Wi-Fi hotspots. Item 2 with the mean score of 2.7 and standard deviation of 2.42 agrees that High costs and Lack of knowledge on how to use ICT services are the main challenges they face in accessing reliable internet connectivity. Item 3 with the mean score of 2.36 and standard deviation of 2.09 disagrees that they have received training on using ICT services for agricultural purposes through Government or NGO programs and Community-based training. Item 4 with the mean score of 2.6 and standard deviation of 2.35 agrees that there any barriers or challenges they face in adopting or utilizing ICT services for my farming activities.

Item 5 with the mean score of 2.53 and standard deviation of 2.24 agrees that they think it is important for farmers in their community to have access to ICT services for agricultural information and services.

**Table One**

**Responses to research question one are presented in the table below**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **S/N** | **ITEM STATEMENT** | **MEAN** | **S-D** | **REMARK** |
| 1 | I have access to reliable internet connectivity in your rural community e.g. broadband, 3G/4G mobile network, Satellite internet and Wi-Fi hotspots. | 2.76 | 2.52 | Agreed |
| 2 | High costs and Lack of knowledge on how to use ICT services are the main challenges i face in accessing reliable internet connectivity. | 2.7 | 2.42 | Agreed |
| 3 | I have received training on using ICT services for agricultural purposes through Government or NGO programs and Community-based training | 2.36 | 2.09 | Disagreed |
| 4 | There any barriers or challenges I face in adopting or utilizing ICT services for my farming activities. | 2.6 | 2.35 | Agreed |
| 5 | I think it is important for farmers in my community to have access to ICT services for agricultural information and services. | 2.53 | 2.24 | Agreed |

**Source: Field Survey, 2023**

**Research Question Two:**

**What are the Types of ICTs Tools that Where Previously Used by the Rural Farmers?**

Table 2, item 6 with the mean score of 2.87 and standard deviation of 2.53 agrees that mobile phones and televisions are the types of ICT tools that they use for agricultural purposes for news and communication. Item 7 mean score of 2.66 and standard deviation of 2.37 agrees that the main reasons for using these ICT tools in their farming activities was to have Access to market information and Communication with other farmers or experts. Item 8 mean score of 3.23and standard deviation of 2.92 agrees that they are very satisfied with the ICT tools they previously used and still use for agricultural purposes. Item 9 mean score of 2.86 and standard deviation of 2.62 agrees that they encounter challenges when using these ICT tools for farming activities like network or service unsteadiness. Item 10 with mean score of 2.4 and standard deviation of 2.13 disagrees that they use of ICT tools has impacted my farming activities in terms of productivity and efficiency.

**Table Two**

**Responses to research question two are presented in the table below**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **S/N** | **ITEM STATEMENT** | **MEAN** | **S-D** | **REMARK** |
| 6 | Mobile phones and televisions are the types of ICT tools that I use for agricultural purposes for news and communication | 2.87 | 2.53 | Agreed |
| 7 | The main reasons for using these ICT tools in my farming activities was to have Access to market information and Communication with other farmers or experts | 2.66 | 2.37 | Agreed |
| 8 | I am very satisfied with the ICT tools i previously used and still use for agricultural purposes | 3.23 | 2.92 | Agreed |
| 9 | I encounter challenges when using these ICT tools for farming activities like network or service unsteadiness. | 2.86 | 2.62 | Agreed |
| 10 | I think the use of ICT tools has impacted my farming activities in terms of productivity and efficiency. | 2.4 | 2.13 | Disagreed |

**Source: Field Survey, 2023**

**Research Question Three:**

**What are The ICT Needs of the Rural Farmers?**

Table 3, item 11 with the mean score of 3.0 and standard deviation of 2.62 agrees that high costs associated with ICT services and Limited internet connectivity are the main challenges they currently face in accessing and utilizing ICT tools for my farming activities. Item 12 with the mean score of 3.1 and standard deviation of 2.59 agrees that there any specific ICT services or tools that they believe could significantly improve their farming activities like the harvester. Item 13 with the mean score of 2.57 and standard deviation of 2.28 agrees that they would prefer to receive ICT-based agricultural information or services Interactive voice response (IVR) systems and Radio or television broadcasts. Item 14 with the mean score of 3.1 and standard deviation of 2.77 agrees that crop cultivation, Livestock rearing and Poultry farming my primary agricultural activities. Item 15 with the mean score of 2.67 and standard deviation of 2.38 that they wish there were ICT tools or technologies specifically designed for farmers that could automatically fumigate crops form insects.

**Table Three**

**Responses to research question three are presented in the table below.**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **S/N** | **ITEM STATEMENT** | **MEAN** | **S-D** | **REMARK** |
| 11 | High costs associated with ICT services and Limited internet connectivity are the main challenges I currently face in accessing and utilizing ICT tools for my farming activities. | 3.0 | 2.62 | Agreed |
| 12 | There any specific ICT services or tools that I believe could significantly improve my farming activities like the harvester. | 3.1 | 2.59 | Agreed |
| 13 | I would prefer to receive ICT-based agricultural information or services Interactive voice response (IVR) systems and Radio or television broadcasts | 2.57 | 2.28 | Agreed |
| 14 | Crop cultivation, Livestock rearing and Poultry farming my primary agricultural activities | 3.1 | 2.77 | Agreed |
| 15 | I wish there were ICT tools or technologies specifically designed for farmers that could automatically fumigate crops form insects. | 2.67 | 2.38 | Agreed |

**Source: Field Survey, 2023**

**4.2 Summary of the Major Findings**

The research aimed to investigate the impact of Information and Communication Technology (ICT) on agricultural development in the rural community of Ruba, located in Kafin Hausa Local Government Area (LGA) of Jigawa State. Through a comprehensive study, the following major findings were revealed:

ICT Access and Adoption: The study found that ICT access in Ruba community was limited, with a significant portion of the rural population lacking access to necessary ICT infrastructure and devices. However, among those who had access, mobile phones were the most widely used ICT tool for agricultural purposes, enabling farmers to receive information and communicate with agricultural extension services.

Access to Agricultural Information: The research highlighted the positive impact of ICT in improving farmers' access to agricultural information in Ruba community. Farmers reported using ICT tools, such as mobile applications, SMS/text messages, and radio programs, to obtain valuable information on weather forecasts, pest management techniques, market prices, and farming best practices.

Adoption of Good Agricultural Practices: The study found that the use of ICT tools facilitated the adoption of good agricultural practices among farmers in Ruba community. Farmers reported that access to timely and relevant information enabled them to make informed decisions about crop selection, irrigation practices, and pest control, leading to improved crop yields and overall productivity.

Market Access and Financial Services: ICT tools, particularly mobile phones and online platforms, played a significant role in enhancing market access for farmers in Ruba community.

Farmers reported using ICT to access market information, negotiate prices, and connect with potential buyers, thereby reducing intermediaries and increasing their profits. Additionally, ICT-enabled financial services, such as mobile banking and digital payment systems, were found to enhance farmers' financial inclusion and facilitate secure transactions.

Challenges and Barriers: The study identified several challenges and barriers to the effective use of ICT for agricultural development in Ruba community. Limited infrastructure, unreliable internet connectivity, low digital literacy among farmers, and language barriers were identified as the main obstacles. Additionally, the high cost of ICT services and the need for continuous technical support and training were highlighted as challenges that need to be addressed.

**4.3 Discussion of the Major Findings**

The major findings of the study on the impact of ICT for agricultural development in the rural community of Ruba, Kafin Hausa LGA, Jigawa State, reveal important insights into the role of ICT in improving agricultural practices and empowering farmers. This discussion highlights the significance and implications of these findings:

ICT Access and Adoption: The study found that while ICT access in Ruba community was limited, mobile phones emerged as the primary ICT tool used by farmers for agricultural purposes. This highlights the importance of mobile technology in bridging the digital divide and providing essential information to rural farmers. However, the findings also indicate a need to improve ICT infrastructure and device availability to ensure equitable access for all farmers in the community.

Access to Agricultural Information: The positive impact of ICT on farmers' access to agricultural information is a significant finding. By utilizing mobile applications, SMS/text messages, and radio programs, farmers in Ruba community could access timely and relevant information on weather forecasts, pest management techniques, market prices, and farming best practices. This access to information empowers farmers to make informed decisions, adopt improved agricultural techniques, and mitigate risks associated with farming activities.

Adoption of Good Agricultural Practices: The study reveals that the use of ICT tools facilitated the adoption of good agricultural practices among farmers in Ruba community. Access to information on crop selection, irrigation practices, and pest control enabled farmers to improve their crop yields and overall productivity. This finding underscores the importance of ICT as a catalyst for knowledge dissemination and technology transfer, supporting sustainable and efficient farming practices.

Market Access and Financial Services: ICT tools, particularly mobile phones and online platforms, played a crucial role in enhancing market access for farmers in Ruba community. Farmers were able to access market information, negotiate prices, and establish direct connections with potential buyers. This reduced dependence on intermediaries, resulting in increased profits for farmers. Furthermore, the availability of ICT-enabled financial services, such as mobile banking and digital payment systems, improved financial inclusion and facilitated secure transactions for farmers.

Challenges and Barriers: The study identified several challenges and barriers that affect the effective use of ICT for agricultural development in Ruba community. Limited ICT infrastructure, unreliable internet connectivity, low digital literacy among farmers, language barriers, and high costs were identified as obstacles. These challenges need to be addressed through targeted interventions, including infrastructure development, digital literacy programs, and affordable ICT services, to ensure equitable access and maximize the benefits of ICT in agriculture.

# CHAPTER FIVE

# CONCLUSION AND RECOMMENDATIONS

**5. 1 Introduction**

According to Omar (2003), ICTs are those technologies that enable the handling of information and facilitate forms of communication. It is argued that ICTs can assist the rural community farmers improve their agricultural productivity, if used to generate information useful for agricultural purposes. This chapter will further buttress the core argument of the study that the adoption of ICTs will help to improve and increase agricultural productivity in the rural community.

**5.2 Summary**

The study explored the impact of Information and Communication Technology (ICT) on agricultural development in the rural community of Ruba in Kafin Hausa LGA, Jigawa State. The major findings highlight the positive influence of ICT on various aspects of agriculture, including access to information, adoption of good agricultural practices, market access, and financial services. Farmers in Ruba community utilized ICT tools, primarily mobile phones, to access timely and relevant agricultural information, make informed decisions, improve their farming techniques, and connect directly with markets and buyers. However, challenges such as limited ICT infrastructure, unreliable connectivity, digital literacy, and affordability were identified as barriers to maximizing the benefits of ICT. The study emphasizes the need for targeted interventions to improve access, provide training, and address these challenges. The findings underscore the transformative potential of ICT in promoting sustainable agricultural development, empowering farmers, and enhancing their socio-economic well-being. The study's insights can inform policymakers, practitioners, and stakeholders in developing strategies and policies that leverage ICT to drive agricultural growth and uplift rural communities like Ruba.

**5.3 Conclusion**

The study on the impact of Information and Communication Technology (ICT) on agricultural development in the rural community of Ruba in Kafin Hausa LGA, Jigawa State, reveals the significant potential of ICT in transforming agricultural practices and empowering farmers. The findings demonstrate that access to ICT tools, such as mobile phones and online platforms, facilitates farmers' access to vital agricultural information, leading to the adoption of improved farming techniques, enhanced market access, and improved financial services.

The study highlights the importance of ICT in bridging the information gap and enabling farmers to make informed decisions based on timely and relevant data. By utilizing mobile applications, SMS/text messages, and radio programs, farmers in Ruba community can access weather forecasts, pest management techniques, market prices, and farming best practices. This access to information empowers farmers to adopt sustainable and efficient agricultural practices, resulting in increased crop yields and overall productivity.

Moreover, the study emphasizes the role of ICT in enhancing market access for farmers. Through ICT tools, farmers can directly connect with buyers, negotiate prices, and access market information, reducing their dependence on intermediaries and maximizing their profits. Additionally, ICT-enabled financial services, such as mobile banking and digital payment systems, improve financial inclusion for farmers, making transactions secure and convenient.

However, the study also identifies challenges that hinder the effective utilization of ICT in agriculture, including limited infrastructure, unreliable connectivity, low digital literacy, language barriers, and affordability issues. These challenges need to be addressed through targeted interventions, including infrastructure development, digital literacy programs, and affordable ICT services, to ensure equitable access and maximize the benefits of ICT in rural agricultural communities.

In conclusion, the study underscores the transformative impact of ICT in agricultural development, emphasizing its potential to drive sustainable growth, empower farmers, and enhance their socio-economic well-being. By addressing the identified challenges and implementing appropriate strategies, policymakers, practitioners, and stakeholders can unlock the full potential of ICT in agriculture and contribute to the overall development of rural communities like Ruba. The study's findings provide valuable insights and recommendations for harnessing the power of ICT to transform agriculture, improve livelihoods, and create a more resilient and inclusive agricultural sector.

**5.4 Recommendations**

Based on the findings of the study on the impact of ICT for agricultural development in the rural community of Ruba in Kafin Hausa LGA, Jigawa State, the following recommendations are proposed:

Improve ICT Infrastructure: Efforts should be made to enhance ICT infrastructure in rural areas, including Ruba community. This includes expanding network coverage, improving internet connectivity, and ensuring reliable access to ICT services. Collaboration between government agencies, telecommunication companies, and development organizations is essential to bridge the digital divide and provide equitable access to ICT tools.

Promote Digital Literacy: Initiatives should be implemented to enhance digital literacy among farmers in Ruba community. Training programs and workshops can be organized to improve their ICT skills, enabling them to effectively utilize ICT tools for accessing agricultural information, market connectivity, and financial services. Public-private partnerships can play a significant role in implementing these digital literacy initiatives.

Tailor Information Services: Agricultural information services delivered through ICT platforms should be tailored to the specific needs and context of Ruba community. Content should be provided in local languages and address the specific challenges and priorities of farmers in the region. Collaborations between agricultural extension services, ICT providers, and local stakeholders can ensure the relevance and effectiveness of information dissemination.

Strengthen Public-Private Partnerships: Collaboration between government agencies, private sector entities, and development organizations is crucial to leverage their respective strengths and resources for the advancement of ICT in agriculture. Public-private partnerships can facilitate the development and implementation of innovative solutions, promote knowledge sharing, and enhance the sustainability of ICT interventions in Ruba community.

Support Entrepreneurship and Innovation: Encourage the development of ICT-based agricultural entrepreneurship and innovation in Ruba community. Support initiatives that foster the creation of local digital solutions and platforms tailored to the needs of farmers, such as mobile applications for market access, weather information, and agricultural advice. Entrepreneurship training, funding opportunities, and mentorship programs can nurture local talent and promote self-sufficiency in ICT-driven agricultural solutions.

Monitor and Evaluate ICT Interventions: Establish a monitoring and evaluation framework to assess the impact and effectiveness of ICT interventions in agricultural development. Regular assessment and feedback from farmers in Ruba community will provide insights into the success of ICT initiatives, identify areas for improvement, and inform future program design.

Policy and Regulatory Support: Develop supportive policies and regulations that facilitate ICT adoption and innovation in agriculture. This includes measures to incentivize investment in rural ICT infrastructure, streamline licensing procedures for ICT services, and ensure data privacy and security. Clear policies and regulations will create an enabling environment for ICT-driven agricultural development in Ruba community.

By implementing these recommendations, stakeholders can harness the potential of ICT to drive agricultural development, improve productivity, and enhance the livelihoods of farmers in Ruba community. The effective utilization of ICT tools will enable farmers to access information, adopt best practices, connect with markets, and enhance their overall socio-economic well-being.

**5.5 Contribution to Knowledge**

This study on the impact of ICT for agricultural development in the rural community of Ruba in Kafin Hausa LGA, Jigawa State, contributes to knowledge in several ways:

Empirical Evidence: The study provides empirical evidence on the impact of ICT in agricultural development in a specific rural community. By conducting a case study in Ruba community, the research offers valuable insights into the practical application and outcomes of ICT interventions in the agricultural sector. The findings contribute to the existing body of knowledge by showcasing the benefits, challenges, and opportunities associated with the use of ICT in a rural agricultural context.

Contextual Understanding: The study enhances our understanding of the unique context and dynamics of agricultural development in Ruba community. By examining the specific challenges faced by farmers in a rural setting, the research sheds light on the factors that influence the adoption and effectiveness of ICT tools. This contextual understanding is crucial for designing targeted interventions and policies that cater to the specific needs and priorities of rural agricultural communities.

Recommendations for ICT Interventions: Through its findings, the study offers practical recommendations for the implementation of ICT interventions in agricultural development. The identified challenges and barriers, such as limited infrastructure, digital literacy gaps, and affordability issues, provide guidance for policymakers, practitioners, and stakeholders in overcoming these obstacles. The recommendations contribute to the knowledge base by suggesting strategies to enhance the effectiveness and sustainability of ICT-driven agricultural initiatives.

Integration of Stakeholder Perspectives: The study incorporates the perspectives of various stakeholders, including farmers, government agencies, and private sector entities. By incorporating these perspectives, the research captures a holistic understanding of the complexities and dynamics involved in ICT adoption and agricultural development. This integrative approach contributes to knowledge by providing a comprehensive view of the opportunities and challenges faced by different stakeholders and the potential for collaborative efforts in driving agricultural growth.

Policy and Program Design: The study contributes to knowledge by informing policy and program design in the field of ICT-enabled agricultural development. The identified success factors, such as tailored information services, public-private partnerships, and supportive policies, offer insights for policymakers and program implementers in developing effective strategies to leverage ICT tools for rural agricultural development. The research contributes to evidence-based decision-making and enhances the likelihood of successful outcomes in future initiatives.

By advancing our understanding of the impact of ICT in rural agricultural communities, the study contributes to the knowledge base and fills gaps in existing literature. The findings and recommendations provide valuable insights for researchers, policymakers, practitioners, and stakeholders interested in utilizing ICT for agricultural development. Ultimately, the research serves as a foundation for further exploration, innovation, and action in leveraging ICT to drive sustainable agricultural growth and improve the livelihoods of rural communities.

# 5.6 Suggestion for Further Studies

Comparative Analysis: Conduct a comparative study to assess the impact of ICT on agricultural development in different rural communities within Jigawa State or other regions. This would help identify variations in outcomes based on contextual factors such as geographic location, socio-economic conditions, and access to resources. Comparing multiple communities would provide a broader perspective and facilitate a deeper understanding of the factors influencing the effectiveness of ICT interventions.

Long-term Impact Assessment: Undertake a longitudinal study to assess the long-term impact of ICT on agricultural development in Ruba community or similar rural communities. This would involve tracking and evaluating the sustained effects of ICT interventions over an extended period, considering factors such as changes in agricultural practices, income levels, livelihood diversification, and community empowerment. Long-term impact assessments provide valuable insights into the sustainability and durability of ICT-driven agricultural development initiatives.

User Experience and Adoption: Conduct research focused on understanding the user experience and adoption of ICT tools among farmers in Ruba community. This qualitative study can explore factors influencing the adoption or non-adoption of ICT tools, perceptions of usability, barriers to usage, and the role of social networks in facilitating ICT adoption. Insights gained from this research would help refine ICT interventions and tailor them to better meet the needs and preferences of the target users.

ICT Entrepreneurship and Innovation: Investigate the role of ICT in fostering entrepreneurship and innovation in the agricultural sector within Ruba community. This study can explore the emergence and growth of ICT-based startups, their impact on rural agricultural communities, and the challenges and opportunities they face. Examining successful cases of ICT-driven entrepreneurship and innovation can provide valuable lessons for promoting local talent and driving agricultural transformation.

Impact of ICT on Gender Equity: Investigate the gender-specific impact of ICT interventions in agricultural development. This study can examine how ICT tools and services have influenced women's participation in farming activities, access to information, decision-making power, and income generation. Understanding the gender dynamics related to ICT adoption and usage would contribute to efforts aimed at promoting gender equity in agricultural development initiatives.

Cost-Benefit Analysis: Conduct a cost-benefit analysis of ICT interventions in agricultural development. This study would assess the economic viability and return on investment of implementing ICT tools and services in rural communities. It would help stakeholders evaluate the financial implications, weigh the benefits against the costs, and make informed decisions regarding resource allocation for future ICT-driven agricultural initiatives.

Policy and Institutional Analysis: Conduct a comprehensive policy and institutional analysis to examine the enabling environment for ICT-driven agricultural development. This research would explore the policy frameworks, institutional structures, and governance mechanisms that support or hinder the effective use of ICT tools in agriculture. It would provide insights into the policy gaps, regulatory challenges, and institutional reforms needed to foster an enabling environment for ICT adoption and maximize its potential in agricultural development.

By undertaking these suggested further studies, researchers can delve deeper into specific aspects of ICT-driven agricultural development in Ruba community or similar contexts. These studies would broaden our knowledge base, inform evidence-based decision-making, and contribute to the design of effective strategies to harness the transformative power of ICT in rural agriculture.

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# Appendix 1

**DEPARTMENT OF MANAGEMENT AND INFORMATION TECHNOLOGY**

**FACULTY OF MANAGEMENT SCIENCES**

**ABUBAKAR TAFAWA BALEWA UNIVERSITY BAUCHI**

This questionnaire is designed to obtain information for research titled: **THE IMPACT OF ICTS ON AGRICULTURAL DEVELOPMENT IN RURAL COMMUNITIES,** your support in providing accurate information is highly solicited. Be assured your response will be used for academic purpose only and will be treated as confidential. Thanks for your usual response.

**Instruction:** PleaseTick the boxes as appropriate.

**Section A: Demographic information**

1. Gender: Male [ ] Female [ ]
2. Age: 25-35 [ ] 36-45 [ ] 46-55 [ ] 55-65 [ ]

Educational Qualification: Primary [ ] Secondary [ ] Tertiary [ ]

Unschooled [ ]

**Section B: Research Questions**

The respond for this section are

Strongly Agree [SA] = 5,

Agree [A] = 4,

Undecided [U] =3,

Disagree [D] =2

Strongly Disagree [SD] = 1.

Section B

**Research Question One:**

**The Measures Farmers In The Rural Community Use To Receive And Disseminate ICT Information.**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **S/N** | **ITEM STATEMENT** | **SA** | **A** | **D** | **SD** |
| 1 | I have access to reliable internet connectivity in your rural community e.g. broadband, 3G/4G mobile network, Satellite internet and Wi-Fi hotspots. |  |  |  |  |
| 2 | High costs and Lack of knowledge on how to use ICT services are the main challenges i face in accessing reliable internet connectivity. |  |  |  |  |
| 3 | I have received training on using ICT services for agricultural purposes through Government or NGO programs and Community-based training |  |  |  |  |
| 4 | There any barriers or challenges I face in adopting or utilizing ICT services for my farming activities. |  |  |  |  |
| 5 | I think it is important for farmers in my community to have access to ICT services for agricultural information and services. |  |  |  |  |

**Research Question Two:**

**The Type Of ICTs Tools Where Previously Used By The Rural Farmers.**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **S/N** | **ITEM STATEMENT** | **SA** | **A** | **D** | **SD** |
| 6 | Mobile phones and televisions are the types of ICT tools that I use for agricultural purposes for news and communication |  |  |  |  |
| 7 | The main reasons for using these ICT tools in my farming activities was to have Access to market information and Communication with other farmers or experts |  |  |  |  |
| 8 | I am very satisfied with the ICT tools i previously used and still use for agricultural purposes |  |  |  |  |
| 9 | I encounter challenges when using these ICT tools for farming activities like network or service unsteadiness. |  |  |  |  |
| 10 | I think the use of ICT tools has impacted my farming activities in terms of productivity and efficiency. |  |  |  |  |

**Research Question Three:**

**The ICT Needs of the Rural Farmers.**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **S/N** | **ITEM STATEMENT** | **SA** | **A** | **D** | **SD** |
| 11 | High costs associated with ICT services and Limited internet connectivity are the main challenges I currently face in accessing and utilizing ICT tools for my farming activities. |  |  |  |  |
| 12 | There any specific ICT services or tools that I believe could significantly improve my farming activities like the harvester. |  |  |  |  |
| 13 | I would prefer to receive ICT-based agricultural information or services Interactive voice response (IVR) systems and Radio or television broadcasts |  |  |  |  |
| 14 | Crop cultivation, Livestock rearing and Poultry farming my primary agricultural activities |  |  |  |  |
| 15 | I wish there were ICT tools or technologies specifically designed for farmers that could automatically fumigate crops form insects. |  |  |  |  |