

**EXAMINATION OF IMPACT AND CHALLENGES OF INFORMATION AND
COMMUNICATION TECHNOLOGY (ICT) UTILIZATION FOR AGRICULTURAL
EXTENSION SERVICE DELIVERY IN RURAL AREAS OF KANKARA LOCAL
GOVERNMENT AREA, KATSINA STATE**

BY

IDRIS ISAH

SPS/12/MAD00006

**A DISSERTATION SUBMITTED TO THE DEPARTMENT OF ADULT EDUCATION
AND COMMUNITY SERVICES THROUGH SCHOOL OF POST GRADUATE
STUDIES BAYERO UNIVERSITY KANO IN PARTIAL FULFILMENT OF THE
REQUIREMENTS FOR THE AWARD OF MASTERS DEGREE IN ADULT
EDUCATION (EXTENSION EDUCATION).**

DECLARATION

I hereby declare that this work is the product of my own research efforts; undertaken under the supervision of Dr Idris Wada Aujara. All sources have been duly acknowledged.

.....
Signature and Date

IDRIS ISAH

SPS/12/MAD/00006

CERTIFICATION

This is to certify that the inquiry work for this dissertation and the subsequent write up of the dissertation by Idris Isah (SPS/12/MAD/00006) was carried out under my supervision.

DR. IDRIS WADA AUJARA
(Supervisor)

Date

DR. IDRIS WADA AUJARA
(Head of Department)

Date

APPROVAL PAGE

This is to certify that this dissertation has been examined and approved as meeting the requirement for the award of Masters Degree M ED. Adult Education and Community Development (Extension Education).

Prof Yusuf Gana Balani
External Examiner

Date

Dr Yau Haruna Usman
Internal Examiner

Date

Dr. Idris Wada Auajara
Supervisor

Date

Dr. Idris Wada Auajara
Head of Department

Date

Dr. Bala Zakari
Faculty Representative

Date

Prof Mohammad Ibrahim Yakasai
Dean School of Postgraduate Studies

Date

ACKNOWLEDGMENTS

I acknowledge my deepest gratitude to the almighty ALLAH (S. W. T), the most Gracious, the most merciful who spared me his grace to envision and undertake this study ALHAMDULILLAH.....

I am also grateful to my supervisor, Dr Idris Wada Aujara for thorough supervision. Each meeting added invaluable benefits to the execution of the research. Dr Aujara has taught me to think critically to identify problems, to solve them and to present their solutions. He is more than just a supervisor, he is indeed a father. His act of magnanimity will never be left unrewarded. Special thanks go to all lecturers in the Department Dr. Idris Wada Aujara Head of the Department, Prof M B Shitu, Prof Abba Haladu, Dr. Bala Zakari, Dr Yau Haruna Usman, Dr Gali Saidu, Dr Babangida Ladan, Dr Auwal Halilu, Dr Usman Abba Idris and other Leturers in the Department for their comments, suggestions, advice and wealth of experience which really helped in no small way to put this research work into its present shape. In actual fact, this research work would have been impossible without their kind disposition and encouragement. They all contributed immensely to my academic growth and forever I remain loyal and grateful. Thank you Jazakumullahu bilkhair.

The researcher's deepest appreciation also goes to Late Dr Isah Mudi Malumfashi, Engineer Abubakar Saleh Yargoje, Alhaji Shehu Sale CBN Abuja, Sulaiman Isah, Hassan Isah, for their valuable contributions, I also appreciate the effort of the following people: Alh Kamal Ibrahim Kankara, Alh Aminu Dayyabu Gwarzo Malam Balarabe Buk, Malam Umar Kabir Tsiga, Dr Ahmad Mohmd NECO, Ahmad Tijjani Hamisu Matazu (NECO).

TABLE OF CONTENT

Contents

TITLE PAGE.....	I
DECLARATION.....	iii
CERTIFICATION.....	iii
APPROVAL.....	iv
ACKNOWLEDGMENT.....	v
ABSTRACT.....	xi
CHAPTER ONE INTRODUCTION.....	1
1.1 Background to the Study.....	1
1.2 Statement of the Problem.....	5
1.3 Objectives of the Study.....	6
1.4 Research Question.....	7
1.5 Significance of the Study.....	7
1.6 Scope and Delimitation of the Study.....	8
CHAPTER TWO REVIEW OF THE RELATED LITERATURE.....	10
2.0 conceptual framework.....	10
2.1.0 Conceptual of Information and Communication Technology (ICT).....	10

2.1.1 Information and Communication Technology (ICT) as Tools for Higher Technological Development.....	11
2.1.2 Use of Information and Communication Technology (ICT) in Agricultural Extension Service Delivery in Nigeria	12
2.1.3 Use of Information and Communication Technology in Agricultural Extension Service Delivery in rural areas.....	15
2.1.2. Type of ICT facilities use in agricultural extension service programmes.....	23
2.1.5 Impact of Information and Communication Technology in Agricultural Extension Services	26
2.1.6 Challenges of Agricultural Extension Services using in rural area of Katsina state	27
2.2.1 Concept of Extension.....	31
2.2.2 Forms of Extension Service	33
2.2.3 Health Extension:.....	34
2.2.4 Legal Extension:	34
2.2.5 Market Extension:	34
2.2.6 Non-Farm Rural Microenterprise Development.....	35
2.2.8 Technical Extension.....	35
2.2.9 Farmers' Associations.....	36
2.2.10 Emerging Purposes	36
2.3.1 Agricultural Extension:.....	37
2.3.2 Philosophy of Agricultural Extension.....	38
2.3.3 Principle of Agricultural Extension	39
2.3.3 World History of Agricultural Extension	41

2.3.4 Agricultural Extension in Nigeria.....	43
2.3.5 The Pre-Colonial and Colonial Periods	46
2.3.6 The Post-Colonial Period.....	48
2.3.7 Summary of Literature Review and Uniqueness of the Study.....	49
CHAPTER THREE METHODOLOGY.....	51
3.1 Research Design.....	51
3.2 Population and Sample for the Study.....	51
3.2.1 Population for the Study	52
3.2.2 Sample Size.....	53
3.3 Research Instrument.....	54
3.4 Validity of the Instrument.....	54
3.5 Reliability of the Instrument	55
3.6 Procedure for Data Collection	55
3.7 Method of Data Analysis	55
CHAPTER FOUR DATA ANALYSIS RESULTS AND DISCUSSION.....	56
4.0 Introduction	56
4.1 Data Analysis	56
4.2 Data Presentation.....	57
4.2.1 Analysis the Research Question	58
4.3 Summary of Findings.....	63
4.4 Discussion of Findings.....	64
CHAPTER FIVE SUMMARY, CONCLUSION AND RECOMMENDATIONS.....	66

5.1 Summary.....	66
5.2 Conclusion.....	67
5.3 Recommendation.....	68
Reference.....	70
Appendix.....	72
Research Adviser Table.....	78

LIST OF ABBREVIATION

ICT	Information and Communication Technology
GSM	Global Mobile System
GES	Growth Enhancement Scheme
DSC	Development Support Communication units
FAO	Food and Agricultural Organizations
ADP	Agricultural Development Projects
FFS	Farmers Field School
KTARDA	Katsina Agricultural Rural Development Authority
DFRRI	Directorate of Food Roads and Rural Infrastructures
NAIS	Nigerian Agricultural Insurance Scheme
NGO	Non-Governmental Organizations
RBRDA	National Accelerated Food Production Project
NFDP	National Fadama Development Project
PAP	Poverty Alleviation Programme
GRP	Green Revolution Programme

ABSTRACT

This research investigated the Impact and Challenges of using Information and Communication Technology (ICT) in Agricultural Extension Service Delivery in Rural Areas of Kankara Local Government, Katsina state. The research was guided by four (4) objectives: to identify ICT facilities used in Agricultural extension service delivery, to determine the scope of utilization of ICT facilities in Agricultural extension service delivery in rural area, to examine the impact of ICT facilities in Agricultural extension service delivery in rural area, to examine the challenges of the use of ICT facilities in Agricultural extension service delivery in rural area. Descriptive survey research design was adopted. The population of the study consisted of 18,869 rural farmers out of which three hundred and fifty five (355) was used as sample of the study based on Research Advisor (2006) table of determining sample. The data collected were analyzed using frequency tables and simple percentages. The findings of the study revealed that the ICT facilities used in Agricultural Extension Service Delivery were Handset/GSM and Radio. The Scope of ICT utilization in Agricultural extension service delivery in rural areas involved distribution of inputs, price information, contact and coalition. The impact of the use of ICT in Agricultural extension service delivery included rapid spread of information, giving information on inputs and supply, assisting rural people to get information in a simple way, easy access to rural farmers and extension agent and giving opportunities of learning information and new ideas. Some of the challenges of using ICT found by the study included: high cost of ICT facilities, limited network coverage, illiteracy and poverty of the rural farmers, lack of skills and community awareness. Based on these findings, the study recommended that: Government should improve and extend the provision and utilization of ICT facilities in rural areas, extend the scope of ICT facilities utilization in various Agricultural extension programmes in rural areas, Extension agents should also make more effort in guiding, advising and training rural farmers on how to use ICT facilities effectively, Soft loans and other ICT facilities should also be provided by governments and other organizations to rural farmers for improved production.

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

Information Communication Technology (ICT) has revolutionized human thinking, capability, capacity, all life processes and activities. It has found application in all fields of endeavor and enterprises of men (Maximo & Braun, 2006). Information and Communication Technology (ICT) deals with the use of information and communication technologies in teaching, learning, data processing and storage, research and publication (Allen, 2008). It also involves increasing information storage capacity for enhanced learning, making for greater availability of information and wider reach of audience (Greenidge 2009). The education function of extension service delivery, however, makes it essential for education agents to develop good teaching and communication skills for effective message delivery (Adebayo, 1995). The ability to communicate effectively determines, to a large degree, the extent of success or failure of an extension worker. Therefore, the technologies adopted in the conduct of extension work are very important. Over the years, the common practice among extension workers in reaching out to farmers had been through direct house to house visit or site visit, meetings, discussion sessions, workshops and local training sessions. More often than not, meeting the farmer at home or at site could only be unpredictable in that situation. Sometimes, meetings, lectures, group discussion sessions, seminars, workshops and local training sessions are held for farmers by extension workers using Information and Communication Technology (ICT) tools such as, computer, photographs, and slides (Isife & Ofuoku, 2008). However, the output of some participants after such training sessions and field result as well, had sometimes elicited doubts as to complete realization of set objectives of the various training sessions. Emah (2004) observed that an

individual at best retains 20 percent of what he or she hears in any learning activity or in any teaching and learning session. Worst still, sometimes a proportion of the audience might have poor vision or temporary auditory impairment due to stress or psychological state of mind. With this scenario, some trainees emerge out of training sessions without any knowledge acquired to apply on the farm. The use of ICT such as the GSM phone will help to reduce or eliminate the deficiency, when the extension worker uses his/her GSM phone to follow-up the farmer on the taught technology or send photographs of the technology to the farmer's phone. Using Information and communication technologies (ICT) in rural agricultural extension services will provide both new and unique opportunities of effective farming with new appropriate information and knowledge they need on demand in good time and it will help extension agent to spread information to many people within short possible time.

Also, Information and Communication Technology (ICTs) can be defined as technologies used to exchange, process, manage, and communicate information and knowledge by electronic means ranging from Radio and television to telephones (fixed and mobile), computer and internet. Based on the above definition of Information and Communication Technology (ICT) only Radio and Handset are available in rural areas, and can best be used in rural agricultural extension program to rural farmers of Kankara Local Government area of Katsina State, The role of Information and Communication Technology (ICT) is rapidly becoming one of the most important and widely discussed issues in Agricultural extension services (Rosen Well, and Thierer, 2000). Most experts in the field of education agreed that, when properly used ICT holds great promise to improve teaching and learning in addition to shaping workforce opportunities. Poole (2006) has indicated that computer illiteracy is now regarded as the new illiteracy. This has actually gingered a new and strong desire to equip agricultural extension services with ICT

facilities and qualified personal necessary to produce technologically proficient and efficient people in developed countries of the world. There is no doubt that ICT can aid the instructional process and facilitate clients' learning. Many studies have found positive effect associated with technology aided instruction (Burnett, 2004 and Fitzgerald and Warner, 2006). In this age of globalization there is a shift in global development agenda and the Nigerian government is introducing some reforms in our educational system with a view to repositioning it in line with the vision of ICT (Adamu & Ubogu, 2009). Information and Communication Technology (ICT) are computer based tools used to meet the Information and Communication needs of individuals and organizations. They comprise computer hardware and software, network and several other devices (video, audio, photography, camera, etc) that convert information, images, sound motion, among others into common digital form (Milken Exchange on Education Technology, 2009). Oliver (2010) sees Information and Communication Technology (ICT) as the science that investigates the properties and behavior of information, the force governing the flow of information and the means of processing information for optimum accessibility and usability. The process includes the origination, collection, storage, retrieval, interpretation, dissemination and use of information.

Information and Communication Technology (ICT) involves the use of hardware, software, networks and media for the collection, storage, processing, transmission and presentation of information (voice, data, text, images) as well as related services (World Bank,2014). It is a broad term that has to do with the harnessing of process, the methods and the product of electronic communication related technologies and other related resources in today's knowledge driven society, for enhancing the productivity, the spread and efficiency of set program activities geared towards the achievement of clearly defined goals (Obanya, 2012). Information and

Communication Technology (ICT) is an electric application of computing, communication, telecommunication and satellite technology (Yusuf, 2015). Therefore, Information and Communication Technology (ICT) can be defined as an electronic device for managing and processing information with the use of soft and hard wires to convert, store, manipulate, protect, transmit, manage, control and retrieve information for the enhancement and productivity of personal and organizational activities. Also, can be defined as technology use to exchange, process, manage, and communicate information knowledge by electronics means, ranging from radio and television, GSM, telephone (fixed and mobile), computers and the internet.

Kankara Local Government of Katsina State was among the Local Government that established Video/TV viewing centers as well as provide free air time for the radio and TV farm broadcasts for the ADPs. The Agricultural Development Projects (ADPs) also took advantage of the free air waves of the State Radio and TV station in the state. The Development Support Communication units (DSC)outfits of the ADPs reached their highest development under the National Agricultural Technology Support Project (NATSP), which was the second phase (1991-1996) of the World Bank assistance to the ADPs (Arokoyo, 2013) virtually all of them produced an aired Radio and TV agricultural programs. With the commercialization of both State and National broadcasting networks, compounded with the withdrawal of the World Bank support, the frequency of both the ADP radio and TV programs dropped substantially.

The use of Information and Communication Technology (ICT) facilities cannot be stated in a single line. However, using ICT facilities in agricultural extension services will enhance the efficiency and effectiveness of extension programmes to the many rural farmers. And it will help toward dissemination of information to the rural farmers to get information easily while they are at home, market or in their farm by the use of facilities like Handset, or Radio. However, there

are several challenges to the successful use of ICT in agricultural extension services in rural area of Kankara Local Government area of Katsina state because it is new to the community. To address the challenges of using ICT in rural areas, Extension agent and policy makers need to be equipped with analysis and arguments to boost the case for agricultural extension programmes and play a broader role in helping the use ICT in extension service programmes. The policy that is using ICT facilities in Agricultural Extension Services in rural area of Kankara Local Government areas of Katsina State was Gross Enhancement Schemes (GES) introduced by the Federal Ministry of Agriculture 2012, the body and beneficiaries of the programmes are Rural Farmers. For example the use of mobile phone GSM Handset for sending text messages to rural farmers to come and collect fertilizer, seeds, from a particular programmes popularly known as Growth Enhancement Scheme (GES) Were by the body gives chance to all rural farmers to participate in the programmes and giving them chances to have access on mobile phone to request their token and complete their redemption, and the registration is free by all farmers.

1.2 Statement of the Problem

The application of Information and Communication Technology (ICT) systems in agricultural extension services provide a very good development platform in terms of information sharing with regards to Agricultural extension services and provide information rapidly to a large number of people by the use of Information and Communication Technology (ICT) facilities in agricultural extension programmes. The use of Information and Communication Technology (ICT) in Agricultural Extension Services is a new system and it is faced with a lot of challenges that are handicapping agricultural extension services in rural areas, this is happening as a result of illiteracy and lack of awareness about the Information and Communication Technology (ICT) facilities and how to handle and operate such new ICT facilities like Mobile phone, Radio

computer and Internet. Mobile phone is the only Information and Communication Technology (ICT) devices that are available in rural areas and majority of the rural farmers are only aware of old model means of Information and Communication Technology (ICT) Facilities like Radio which is common and easy to operate even among the rural people.

However, the involvements of Information and Communication Technology (ICT) in rural agricultural extension services help immensely toward the successful implementation of the programmes and help rapidly in the direction of sending information to a large number of people. Therefore, this study seeks to identify the use of Information and Communication Technology (ICT) facilities in rural areas of Kankara Local Government area of Katsina State, and related problems and their solutions in using Information and Communication Technology (ICT) facilities in rural Agricultural extension; because use of Information and Communication Technology (ICT) in agricultural extension services in rural area of Kankara Local Government is inadequate in improving the quality of Agricultural Extension Services in rural Area.

1.3 Objectives of the Study

The objectives of this study are:

- i. To identify Information and Communication Technology (ICT) facilities used in Agricultural Extension Service Delivery in rural areas of Kankara Local Government Area of Katsina State.
- ii. To examine the scope of usage of Information and Communication Technology (ICT) facilities in Agricultural extension service Delivery in rural Areas of Kankara Local Government Area of Katsina State.

- iii. To determine the impact of the use of Information and Communication Technology (ICT) facilities in Agricultural extension service Delivery in rural Areas of Kankara Local Government Area of Katsina State.
- iv. To examine the challenges of the use of Information and Communication Technology (ICT) in Agricultural extension service Delivery in rural areas of Kankara Local Government Area of Katsina State.

1.4 Research Questions

The study was guided by the following research questions:

- i. What are the Information and Communication Technology (ICT) facilities used in Agricultural extension service Delivery in rural areas of Kankara Local Government Area of Katsina State?
- ii. What are the scopes of usage of Information and Communication Technology (ICT) facilities in Agricultural extension service Delivery in rural areas of Kankara Local Government Area of Katsina State?
- iii. What are the impacts of the use of Information and Communication Technology (ICT) in Agricultural extension service Delivery in rural areas of Kankara Local Government Area of Katsina State?
- iv. What are the challenges of the use of Information and Communication Technology (ICT) in Agricultural extension service Delivery in rural areas of Kankara Local Government Area of Katsina State?

1.5 Significance of the Study

The study is of benefit to Farmers, in getting firsthand information by getting latest development on their Agricultural activities within their areas and outside their areas, And it help them in getting themselves in touch with each other in various areas, and it is also as a medium for channeling their grievances and difficulties that they are facing. It is also of benefit to the Student for further research and academic purposes and help them to carry an additional research about Farmers utilization of Information and Communication Technology (ICT) facilities in rural areas. Furthermore it is of benefit to the Expert, Researchers and policy makers in Agricultural Extension Services which will help them to know the actual condition of farmers especially rural people in utilizing the Information and Communication Technology (ICT) Finally, it helps Government in allocation of resources, carrying out policy makers in Meeting the farmers in their various destinations.

The study is also of significant importance because it revealed the entire agricultural extension services program using Information and Communication Technology (ICT) that are available in Kankara Local Government of Katsina state and provide insight into the impact and challenges of using Information and Communication Technology ICT in agricultural extension service delivery in rural areas of Kankara Local Government

1.6 Scope and Delimitation of the Study

This study is limited to the utilization of Information and Communication Technology (ICT) facilities in agricultural extension service delivery in rural areas of Kankara Local Government area of Katsina State, there are various extension services programmes in the areas but this study is limited to the utilization of ICT facilities in Agricultural Extension Services programme in

rural areas and not the whole Local Government area. It is restricted to rural farmers in rural areas of Kankara Local Government Area.

1.7 Operational Definition of the Terms

Agricultural Extension Services: Agricultural Extension is a service or system which assist farmers, through educational procedures in improving farming methods and techniques, increasing production, efficiency, income and bettering their standard of living and raising the social and educational standards of rural community of Katsina state.

Extension Services: Are services carried out by educational establishments, government or Non-Governmental Organizations (NGOs) example of these includes adult literacy classes, extra - mural classes, distance learning programs and continuing education programs.

ICT Facilities: In this study refers to Computers, Handsets, Telephones, Internet, Radio, Television (TV),

Challenges: This refers to difficulties facing rural farmers in applying Information and Communication Technology (ICT) facilities in Agricultural Extension Services activities in Kankara Local Government Area of Katsina State.

Rural Area: Refers to all the villages in Kankara Local Government Area excluding the Local Government headquarter

CHAPTER TWO

REVIEW OF RELATED LITERATURE

This chapter review literature found relevant to these research work. Thus, this chapter gives insight into the conceptual frame work of the concept of Information and Communication Technology (ICT); Information and Communication Technology (ICT) facilities used in Agricultural Extension; Impacts of ICT in rural Agricultural extension services in rural area; Challenges and impacts of Information and Communication Technology (ICT) in rural Agricultural extension services; The concept of Agricultural extension services; Historical background of agricultural extension services in general. Forms and types of extension services programmes in the area of study.

2.0. Conceptual Framework

2.1.0 Concept of Information and Communication Technology (ICT)

Information and Communication Technology (ICT) has been defined by food and agricultural organization (FAO 1993) as technologies involved in collecting, processing, storing retrieving, disseminating and implementing data and information using microelectronics, optics and telecommunication and computers.

According to technical center for agriculture and rural cooperation (CTA 2003) ICT are technologies that facilitate communication, processing and transmission of information by electronic means. This definition suggests that the concept of ICT embrace a multitude of other simple communication devices such as telephone, (global system for mobile communication (GSM) or fixed line). Like Radio, Television, audio compact disc or cassette recorder/player, video tape or compact disc (VCD/DVD), faxes, and TELEX (Warren 2003). The ICT tools that

have great potential for use in extension education include: Radio, Television, Telephone (fixed and mobile) the camera, Web, Video. However, regardless of tools, the focus must to be on the people who will use the technologies and the context rather than the technologies themselves. Information and communication technologies are also use of printed facilities like: Photographs question and answers services, group contact, meeting and workshop (Richardson 2006).

2.1.1 Information and Communication Technology (ICT) as Tools for Higher

Technological Development

In today's world, not only are we surrounded by technology, but our primary means of reaching others in far and near places are mediated by technology. According to Elluh (2009), "technology is progressively effacing the two previous environments: nature and society" (p.134). The environment Elluh talked about is that which enables us to live, sets us in danger and it is immediate to us and mediates all else. He asserted that modern man cannot live without our gadgets. This is what makes human subservient to technology rather than technology being subservient to humanity.

There is no doubt that one of today's realities is an extremely fast development of high-technology. This has resulted in a huge change of the individual's life in business and private settings. There is strong need to know and use modern technology in our social life, the Agriculture, Economy, the Business and Education. New and sophisticated breakthroughs in high technology encourage companies to introduce technological innovations rapidly into their business practices. The United States Space Programme has benefited immensely from rapid development in high-tech and today's. In many parts of the developed world, cellular, satellite, and wireless technologies combined with innovative business practices are beginning to make up for the shortcomings of the traditional wire line technologies. Nigeria was introduced to cellular

technologies a little over twelve (12) years ago and this has revolutionized the communication industry in the country, though majority of rural farmers in Nigeria are yet to benefit from the services due to high cost of ICT facilities.

If Nigeria must be part of developed world in the near future, it must embrace technology and discard some of the old habits and perspectives and retool completely. There is need for the country to re-strategize and expand its vision so as to cope with the challenges of a technological society.

2.1.2 Use of Information and Communication Technology (ICT) in Agricultural Extension Service Delivery in Nigeria

Developing agriculture and rural economy is one of the most important orientations of any Government. In Nigeria, the vigorous development of ICT has strongly influenced every socio-economic aspect to become the most significant motivation of the socio - economic development and poverty reduction. According to 2006 census nearly 75 % of Nigerians live in rural areas and are predominantly farmers. Information and Communication Technology (ICT) has been creating not only opportunities but challenges to business in rural areas to narrow the gap between different regions; realize gender equality and the advancement of women to promote sustainable growth and poverty reduction through Agricultural extension Programmes. The potential benefit of computerizing data input and information management is well known and apparent to all market sectors and industries including agriculture. Information promotes competition and improves market. Accurate and complete information is vital to performance (Thompson and Sonka, 2003). At the firm level, information promotes the efficiency and effectiveness of production and customer service. Information may also increase the level of trust consumers have in a product or firm leading to increased demand. It is readily accepted that

increased information flow has a positive effect on the agricultural sector and individual firms. However, collecting and disseminating information is often difficult and costly. Information technologies (IT) offer the ability to increase the amount of information provided to all participants in the agricultural sector and to decrease the cost of disseminating the information. Research and literature already conducted regarding IT and the food and agribusiness industry have predominately focused on the effects that IT will have on the industry (Cragg, 2008). Fewer works can be found that attempt to understand the factors that cause the adoption and use of ICT in agricultural extension services. Therefore, the need exists to understand why some agricultural extension agents and client adopt use of Information and Communication Technology (ICT) faster and more readily than others.

However, Agricultural extension services include transferring knowledge to farmers, advising and educating farmers in their decision making, enabling farmers to clarify their own goals and possibilities, and stimulating desirable agricultural developments. Traditional public-sector extension services use a variety of extension programs to overcome barriers to technological adoption without much success (Anderson and Feder 2004). Historically, agricultural service delivery in developing countries started with production-oriented limited extension services for export crops. In the 1960s US-led 'technology transfer model' employed a large number of extension agents to provide extension services. Since then, with the rise in the demand for agricultural services, many variants of approaches, models and methods have been evolved to connect researchers, extension agents, producers and consumers (Leonard 1999; Garforth 2001; Feder, Just and Zilberman 1986; Axinn 1988; Anderson and Feder 2004). The World Bank Sponsored Training and Visit (T&V) extension model, Farmers Field Schools (FFS) and fee-for-services are the most common approaches. In the T&V and FFS systems, extension workers

passed information to selected contact farmers who shared information with other farmers (Anderson and Feder, 2004). It is widely accepted that extension services are an important element in farming but poor and marginalized farmers in remote villages remain beyond the reach of appropriate services. Information and Communication Technology (ICT) allows efficient and transparent storage, processing and communication of information and that entrepreneurial innovation in this field may affect economic and social change (Kaushik and Singh, 2004). Growth in Information and Communication Technology (ICT) investment is found to be positively associated with growth in both GDP and productivity in Asia-Pacific countries for the period 1984-1990 (Kraemer and Dedrick, 1994). It is increasingly recognised that Information and Communication Technology (ICT) is necessary for accessing required information and knowledge (Richardson 1997; Chapman et al. 2004; McNamara 2009; Aker 2010).

Information and Communication Technology (ICT) kiosks, ICT-equipped intermediary organisations and mobile phones are expected to play an important role in strengthening the more complex and time-urgent pathways of information and knowledge-sharing on which agricultural innovations depend. A workshop organised by the World Bank found Information and Communication Technology (ICT) was under-utilised in extension services delivery and hence the need to support policy environments and programmes that use Information and Communication Technology (ICTs) (Alex et al. 2004). Moreover, Heeks and Molla (2009) found in their Information and Communication Technology (ICT) evaluation compendium that Information and Communication Technology (ICT) is not fully utilized in agriculture. Scaling up of delivery still remains at experimental stage. Although farmers have the real need to access to market information, land records and services, accounting and farm management information,

management of pests and diseases, rural development programmes and Information and Communication Technology (ICT) could help accessing these services, Information and Communication Technology (ICT) projects dealing such services are extremely limited (Meera et al., 2004). Poor, marginalized and illiterate farmers and females are excluded, and marginal areas are excluded.

Of course, Information and Communication Technology (ICT) is not always found to deliver its promise as expected. Chowdhury (2006) found a negative effect of Information and Communication Technology (ICT) investment on the labor productivity of East African small and medium-size enterprises, which is likely due to the low cost of labor relative to capital in East Africa which prevents substitutability being a profit maximizing approach. Moreover, a lack of knowledge of best practices in IT usage as well as IT-related skill deficiencies in the workforce will also constrain the benefits from Information and Communication Technology (ICT), as argued by Kaushik and Singh (2004) based on case studies of two projects in North India. The digital divide is not merely a problem of access to Information and Communication Technology (ICT), it is part of a larger developmental problem in which vast sections of the world's population are deprived of the capabilities necessary to use Information and Communication Technology (ICTs), acquire information and convert it into useful knowledge. Balanced growth is needed and deep structural problems must be solved to make Information and Communication Technology (ICT)-induced development more inclusive (Parayil, 2005).

2.1.3 Use of Information and Communication Technology in Agricultural Extension

Service Delivery in rural areas.

Various forces are at work to change agricultural extension from a process of technology transfer

(research institution to farmer) to a process of facilitating a wide range of communication, information, and advocacy services (demand-driven, pluralistic and decentralized extension). The focus of this change is on the improvement of overall rural livelihoods versus a specific focus on agriculture. In the midst of this change, extensionists are grappling with the question of how best to harness information and communication technologies (ICTs) to improve rural livelihoods. By focusing on how agricultural extension can harness Information and Communication Technology (ICTs) for improving rural livelihoods, we need to move beyond narrow understandings of agriculturally specific Information and Communication Technology (ICT) applications. This change in focus causes us to recognize that: Any Information and Communication Technology (ICT) intervention that improves the livelihoods of poor rural families will likely have significant direct and indirect impacts on enhancing agricultural production, marketing and post-harvest activities – which in turn can further contribute to poverty reduction.

There are no blueprint approaches for Information and Communication Technology (ICT) or magic bullet Information and Communication Technology (ICT) that will automatically improve rural livelihoods. Developing countries each have location-specific agricultural and rural development constraints and opportunities, and country-specific telecommunication constraints and opportunities. The skills and resources of stakeholders need to be harnessed to determine, plan and implement appropriate Information and Communication Technology (ICT) interventions to improve rural livelihoods. This is particularly important given two important trends: 1. the trend toward decentralizing, privatizing and pluralizing the delivery of extension, and 2. the trend toward liberalizing telecommunication market places in favor of competitive, multi-service provider, multi-service marketplaces. These two trends combine to provide

opportunities to more effectively harness Information and Communication Technology (ICT) for extension and rural development policy, program and delivery synergies, provided that extension agents are able to move beyond an agriculture-specific role. Re-thinking organizational end goals in this way could prove a challenge for agricultural extension decision-makers and their organizations, but that the challenge must be faced if Information and Communication Technology (ICTs) are to be used effectively. Information and Communication Technology (ICT) interventions do not have to be specific to agriculture in order to enhance rural livelihoods or contribute to improved agricultural production. Indeed, a simple ICT intervention such as provision of an accessible rural payphone can play a significant role in enhancing the ability of poor rural families to continue, and perhaps enhance their contribution to national agricultural production and post-harvest activities. Information and Communication Technology (ICT) interventions that improve the general livelihoods of poor rural families have the potential to enable those families to: Free up time for agricultural work through information or services which help improve family health and well-being; Provide access to household capital which can be leveraged for agricultural production or post-harvest improvements; and enable rural families to better take advantage of remittance economies for enabling family members to live elsewhere and send capital home to improve agricultural work and other livelihood activities.

Improved access to credit, educational activities, health care services, or improved non-agricultural rural business activities can also yield significant improvements in the agricultural sector when families are able to enhance their overall livelihood strategies. The end goal of these ICT interventions is not improved agricultural production or post-harvest activities. The end goal is poverty reduction in the context of improved livelihoods, recognizing the clear importance of the rural family as the hub of agricultural production in areas of poverty, and

within national economies. An increasing diversity of stakeholders in extension programs places a heightened importance on coordination and communication, neither of which is possible without access to basic telecommunications services like the telephone. This widening group of “new” actors in extension systems includes:

- Farmer as both extension client and extension provider
- Linkage, learning and knowledge management facilitators
- Private sector players
- Market players and market information providers
- NGO, CBO, and private sector providers
- Health, education, environment, and other sector players
- Telecommunication players

Extension organizations have a key role in brokering between communication technologies, providers of those technologies and services, and the client groups they serve. In this role, they must be able to examine the appropriateness of various ICTs, the accessibility of ICTs in rural and remote areas, how to best to reconcile costs and benefits, and how to insure that ICT access includes a diversity of cultures, languages, social strata, and age groups, and is gender sensitive.

It thus becomes important to better understand the specific actors who play (or should play) a role in establishing basic telecommunication services in rural areas. Identifying the actors can help orient projects and programs that would lead them to effectively and collectively engage in

dialogue around telecommunications policy reform and other ICT policies and programmes.

These actors include:

- 1 Telecommunications service providers (also known as operators);
- 2 Regulators and policy-makers;
- 3 Telecommunications policy reform advocates (most often found in, and focused on urban service issues, and sometimes nascent in rural areas);
- 4 Rural clients (current and potential);
- 5 “Last Mile” entrepreneurs – phone shop operators and cybercafé/tele Centre operators;
and
- 6 Extension managers and other professionals who deliver rural services.

Addressing Connectivity Constraints in Rural Areas – Key Policy Role for Extension

The call for demand-driven extension opens the door for examination of how ICTs can be cost-effective and practical tools for facilitating and channeling farmers’ demands, and addressing those demands. But when so many rural areas of developing countries lack basic telecommunications services that support so many key ICTs like the telephone and the Internet, this examination is severely challenged. Any resulting programs and projects remain totally dependent on the strength of national policies and programmes that support universal access to

telecommunication services. Telecommunication policy rises to the surface as a primary enabler or obstacle – to improving agricultural extension services.

While there are many uses for ICTs for facilitating communication, information and advocacy services in the context of improving rural livelihoods, connectivity constraints in rural areas of developing countries are still enormous barriers to the uptake of even basic ICTs such as the telephone. In that regard, extension has an important role to play in facilitating and brokering the participation of rural and agricultural organizations in policy dialogue on telecommunications reform in order to shape national telecommunications policies and programs to meet the needs of rural areas. This is a very new role for extension.

There are many Information and Communication Technology (ICT) related questions that extensionists are now addressing. Some of these are listed below, with responses drawn from the literature:

- What role will the Internet and other new Information and Communication Technology (ICT) play in rural and agricultural development given the changes facing agricultural in general and agricultural extension specifically?
- Response: Local organizations and groups require a voice to highlight their judgment on Information and Communication Technology (ICT) priorities and implementation of policies, programmes and projects so as to negotiate on equal footing with outsider institutions in choices of communication for development approaches and media choices (Ramirez, 1998). Extension can play a role in helping catalyze and support this voice;
- Response: Cultural and social sensitivity to the use of Information and Communication

Technology (ICT) tools for educational and informational purposes are critical. The launching of Information and Communication Technology (ICT) projects needs to be accompanied by advocacy so that communities are aware of the purposes and people have a clear understanding of their roles, and in particular how they will part of decision making about objects, applications, content, etc. (Michiels & Vann Crowder, 2001). Extension can support and advocate for rural stakeholder participation in ICT project planning, implementation and evaluation.

- Who will benefit? Who should benefit?
- Response: Local people and their needs should be the driving force behind Information and Communication Technology (ICT) projects and not the projects, or the technology (Richardson, 1996). Participatory extension planning techniques have a very important role to play.
- Response: Information and Communication Technology (ICT) programme design should reflect an understanding of the different ways in which individuals and groups learn, communicate and use information; without incorporating this understanding, programmes are likely to fail (Anderson et al., 1998);
- Response: Choices of communication technologies and methods to employ them can only be determined with the participation of all relevant stakeholders (Michiels & Vann Crowder, 2001; Ramirez, 1998; Batchelor & Sugden, 2003);
- Response: Identifying and supporting local champions who support information sharing,

is key to the success of communication for development efforts (Richardson, 1998).

- What is the role for agricultural extension as a broker between rural and agricultural client groups and telecommunication infrastructure providers, regulators, and policy makers?
- Response: External institutions seeking to enable local organizations and groups to participate in Information and Communication Technology (ICT) initiatives need to establish a rapport with the local groups to enable a trustful, learning relationship to emerge (Ramirez, 1998). Extension is well placed to play the role of convener in the establishment of Information and Communication Technology (ICT) infrastructure.
- Marry the use of new Information and Communication Technology (ICTs) with existing technologies, especially rural radio (Richardson, 1997).
- Response: Collaboration among agencies supporting traditional media and new Information and Communication Technology (ICTs) can achieve important multiplier effects as agencies harmonize their efforts (Richardson, 1997).
- Are there adequate software and hardware, and support, available in the countries or regions we serve?
- Response: Simpler technology often produces better results. Telephone access and use can add considerable value to the communication systems of the poor in developing countries (Batchelor & Sugden, 2003; Richardson, 2003). Basic telephone connectivity to

rural areas remains a huge need and priority;

- Response: Using Internet technologies as a stand-alone communication medium is not usually a cost-effective choice for effective communication for development initiatives (Batchelor & Sugden, 2003).
- What types of training, planning, and financing is required to advance appropriate Information and Communication Technology (ICT) access?
- Response: Local organizations and groups capable of acting on rural and agricultural development plans require new skills and knowledge to make informed choices about communication for development approaches and media choices. Capacity building and institutional strengthening for intermediary organizations that serve rural and agricultural development is necessary so that they can make the most appropriate and creative use of traditional media and new Information and Communication Technology (ICTs) (Michiels & Vann Crowder, 2001); (Richardson, 1997).

The use of Information and Communication Technology (ICTs) in extension provides for several key benefits in relation to traditional media. However, Information and Communication Technology (ICT) projects also come with a range of weaknesses. A brokering role for agricultural extension could help balance strengths and weaknesses. Potential strengths and weaknesses are listed below.

2.1.4 Types of Information and Communication Technology Facilities used in rural agricultural extension programmes include;

- ⇒ Mobile Phone
- ⇒ Television (TV)
- ⇒ Radio
- ⇒ CD tapes
- ⇒ Film Projector
- ⇒ Computer
- ⇒ Telegram
- ⇒ Telex

Use of Information and Communication Technology (ICT) has been spread rapidly in the rural area of Kankara Local Government area especially mobile phone technology. It has the advantage over other Information and Communication Technology (ICT) tools in terms of its appropriateness for the under-developed local conditions. Other than mobile phones, other Information and Communication Technology (ICT) tools suffers from the problem of feasibility for the poor in geographically disadvantaged areas because of lack of enabling environments such as infrastructure, power supply and capital especially rural people. Internet technologies are not appropriate in the rural areas lacking electricity and network infrastructure. On the contrary, mobile phone technology has much less requirement on the infrastructure and hence wider applicability especially in rural areas. Mobile phones enable both audio and video functions which can meet most of the basic needs of the poor. It also has greater affordability for the farmers than internet. In many developing countries more than 80% population have access to mobile phones. Jensen (2010) demonstrated that the Information and Communication Technology (ICT) helped rural people to learn about prices at different locations and decide where to sell their products profitably. As a result, price volatility and variation dropped;

producer prices rose and at the same time consumer prices dropped. Aker (2011) studied the impact of the mobile phone rollout on grain markets and showed that mobile phone service has reduced grain price dispersion across markets by a minimum of 6.4 percent and reduced intra-annual price variation by 10 percent. However, in case of "Farmer-Group Approach" Information and Communication Technology (ICT) help in a replacement for one-to-one extension-farmer visits, which are described as too costly. Advantages of groups include: farmer-to-farmer contact; the extension agent as a catalyst (to mobilize farmers to experiment on an identified need/solution, recognise local innovations, and help to assess and encourage them); and sustainability by using ICT facilities like GSM or internet network.

Also in "Farmer Field School (FFS) Approach", Information and Communication Technology (ICT) described it is a participatory method of technology development and dissemination, based on adult learning principles and experimental learning. As stated here, "The operation of the extension delivery approach is that developmental organizations partner with extension personnel to form farmer groups based on particular topics. This provides an opportunity for each participant to teach others what they have learned. At the end of the FFS cycle, certain farmers are chosen by the group to be farmer facilitators. They can then lead their own farmer field school the following season.... The FFS methods have transformed farmers from recipients of information to generators and manipulators of local data....One important issue in FFS are that of sustainability without outside funding."

Use of Information and Communication Technology (ICT) in agricultural extension services is that it helps to energize the collection, processing and transmission of data, resulting in faster extension of quality information to more farmers in a bottom-up and interactive channel of communication. Also, the use of Information and Communication Technology (ICTs) in

agricultural extension will narrow the gender disparities in terms of access to agricultural information. The internet could be used to enable farmers to become part of the information flow process and even to instigate the process of information flow rather than waiting for the information to be presented to them via radio, TV, newspapers, newsletters, bulletins, or other Information and Communication Technology (ICT).

2.1.5 Impact of Information and Communication Technology in Agricultural Extension Services

There are so many impacts of using ICT in agricultural extension services especially in disseminating useful and practical information relating to people living through various means of communication technologies and electronic means to improve their live situation. It also fosters general awareness and interest in a new technology in extension activities or programs. And it is important toward conveying information to many people within shortest possible time. It also increases the impact of extension staffs in the field by rapid spread of information. It also helps in influencing many people in extension program over a period of time. By using Information and communication technologies it helps in providing information to the people who cannot attend extension meeting to get information while they are at home office, market, farm etc. However, Information and communication technologies help people to communicate effectively, over a limitation of time and space, empower people by providing information and knowledge provide income generating and learning opportunities, and increase transparency and efficiency in governance and enable people to express their concerns and to actively participate in decision making processes. On the contrary, mobile phone technology has much less requirement on the infrastructure and hence wider applicability especially in rural areas. Mobile phones enable both audio and video functions which can meet most of the basic needs of the poor. It also has greater

affordability for the farmers than internet. In many developing countries more than 80% population have access to mobile phones. Jensen (2010) demonstrated that the ICT helped rural people in India to learn about prices at different locations and decide where to sell their products profitably. As a result, price volatility and variation dropped; producer prices rose and at the same time consumer prices dropped. Aker (2011) studied the impact of the mobile phone rollout on grain markets and showed that mobile phone service has reduced grain price dispersion across markets by a minimum of 6.4 percent and reduced intra-annual price variation by 10 percent. However, in case of "Farmer-Group Approach" ICT help in a replacement for one-to-one extension-farmer visits, which are described as too costly. Advantages of groups include: farmer-to-farmer contact; the extension agent as a catalyst (to mobilise farmers to experiment on an identified need/solution, recognise local innovations, and help to assess and encourage them); and sustainability by using ICT facilities like GSM or internet network.

2.1.6 Challenges of Agricultural Extension Services using ICT in rural areas of Kankara

Local Government Katsina state

The challenges of agricultural extension services using in rural area of Katsina state According to Usman Funtua KTARDA (2013) Director extension Program said that the challenges are: Crushing rural poverty and high illiteracy level of target group, Lack of technological know how to use Information and Communication Technology (ICT) facilities by rural farmer, Lack of qualified extension agent who, Lack of enough funding about the programmes Political intervention (Aker, 2010) point out the general problems facing use of ICT in agricultural extension services in rural area include; High cost of Information and Communication Technology (ICT), Lack of local content and language barrier , Lack of infrastructure, Policy

consideration, Low level of Information and Communication Technology (ICT) readiness, Limited and high cost of telephone services either by landline or GSM, Lack of power supply.

1. Crushing rural poverty and high illiteracy level of target group According to Prof. Fabian 2013 Osoji, Nigeria has been rated as one of the nine countries in the world that have highest level of illiteracy in their population especially rural people.

1. High cost of ICT: the high cost of ICTs such as computer and internet remain a strong factor that can be a deterrent in the adoption and use of such facilities in many developing countries like Nigeria.

2. Lack of local content language barrier: information available through Information and Communication Technology (ICT) is mostly English, which the majority of rural resident cannot read. Indeed, there is a market shortage of relevant facilities in local language that responds to their needs.

3. Lack of infrastructure: the telecommunication and electricity infrastructure in developing country are lacking or poorly develop, especially in the rural areas where most of the extension services program is done. These infrastructures should serve as a prerequisite to many of the modern ICT for optimum performance and to achieved the desired objectives (Richardson 2006) Though satellite and wireless technologies are now in use in the country, they are developed around urban cites.

4. Policy consideration: the formation and implementation of policies in the ICTs sectors is still rudimentary and relatively new and therefore calls for an integral set of laws. Regulations and guidelines that shape the generation, acquisition and utilization of ICT, lack of policies and

strategies that facilitate the harnessing of new ICT for rural development programs and extension education and where policies have been formulated, proffer implementation plans needed (Seyed et al, 2011).

5. Limited and high cost of telephone services: it has been estimated that Nigeria has the highest GSM call rate in all developing countries that have the facilities (Usman D G. 2013), whereas the telephone is part of everyday normal life in developing countries and ordinarily for granted, and the telephone services (Network) is limited or absent in the rural areas.

6. Lack of power supply: there is erratic and unstable power supply and high cost of alternative power through stand by generators and other sources of power supply.

7. Limited coverage: the limited coverage of state and National Radio station (AM/FM) broadcasting is compounded by the near absence of rural radio in the country.

Gender insensitivity: In developing countries like Nigeria, Men and Women play the different productive roles in rural development and extension education. Women produce more than half the world's food (Ani, 2004,) and face many problems in addressing food security and rural development issues. These include weak extension services, non –adoption of technologies, low status and therefore, noninvolvement in decision making and policies making etc.

8. Lack of access to ICT that supplement and enhance face to face relationship (horizontal and vertical).

There are numerous and good impacts for the use of ICT in agricultural extension services in rural area of. First, ICT can enhance extension efficiency. The efficiency in agricultural extension could be improved by using ICT facilities. For instance, many extension agents are

already teaching large number of farmers in rural area. Furthermore, it is possible to use carefully prepared by Radio programs to ensure that learners are accurately and systematically instructed and guided about their day to day activities. Also, the ICT facilities can enhance problem-solving skills of the rural farmers especially radio programs

Second, ICT facilities like GSM, Computers, and Internet can serve administrative functions by extension agent. They can replace the laborious exercise of filing papers in filing cabinets and shelves where records accumulate dust over a long period of time. Another administrative application of the computers is their use for budget planning, accounting for expenditure, which help to reduce paper work. It is true that many of the tasks above are not effectively and efficiently done in agricultural extension services in rural area due to lack of access of Information and communication (ICT) facilities.

Third, Handset (GSM) can be used for individualized learning in agricultural extension services to the rural farmer's example in distribution of fertilizer and seeds. Due to large numbers of rural people and differences in individual learning style and pace, Handset (GSM) and Radio will enable the rural farmers to progress at his or her own pace and receive continual evaluation feedback and corrections for errors made. In this way, ICT facilities allow the development of partner-like interactive and individualized relations with the user. ICT play the role of the tutor and present the learner with a variety of contents and symbolic modes. Fourth, Use of ICT in agricultural extension services can change current Andragogical practices in rural area of the Kankara Local Government area of Katsina State, which depended heavily on the traditional lecture method. It is universally accepted that ICT facilities allow more independent exploration, more personally tailored activities, more teamwork, and more significantly, less educational instruction. The role of the facilitator, therefore, changes from information dispenser to that of

information manager, from authoritative source of information to a guide of self-propelled exploration (Smith, 1989).

Fifth, use of ICT facilities offers the Katsina state extension agent improvement in the techniques of research. The agricultural extension programs done traditionally is now change to modern ways by using ICT facilities in to the programs which make it simple and easy to pass information to the large number of the participant.

2.2.1 Concept of Extension

The term “extension” is derived from Latin word, “extendere” which means, “to extend” The oxford Dictionary of current English defines extension as: an “addition or continuance” or “enlargement”. Williams (1978) defines extension educations as an out – of school voluntary adult education program, using teaching and learning principles, concerning peoples’ livelihood, carried out in systematic way in an atmosphere of mutual trust and respect the term ‘voluntary’ is use because the people (clientele) are not under compulsion to use what they are taught. They need to be motivated. It is “out - of school” because it does not involve a class room exercise .it taken to farmers in their farm or home.

‘Extension Education’ was first introduced in 1873 by Cambridge University in England to describe a particular system dedicated to the dissemination of knowledge to rural people where they lived and worked. Within a short time, the idea had spread to other parts of Britain, Europe and North America. Extension work is an out of school system of education in which adults and young people learn by doing. It is a partnership between the government, the land-grant institutions, and the people, which provides services and education designed to meet the needs of the people (Kelsey and Hearne, 1966).

Extension education as an aspect of adult and non formal education can take place in the field of all human endeavors. Even though some people do restrict in the field of agriculture which is much more than that field. However, it is therefore important to understand that extension education goes beyond that and can be used effectively and applied in non-agricultural programmed such as social work community development home science, health, family planning. Based upon its application and use, various activities have been given to it like agricultural extension, diary extension, home science extension, public health extension.

However, the main aims of extension education programmer are to bring about desirable change in an individual which could be successfully achieved through effective communication. Extension education organization has been concern with what should be the appropriate means and approaches to use to get the right information to the clientele. Extension organization has been concern with what should be the appropriate means and approaches to use to get the right information. Extension education there for is communication process where by various participants and stake holders are linked and exchange information which is necessary be requirement for sustainable development.

However, the main concern of this study is on agricultural extension services, it definition is interpreted differently by several scholars for the past. The examples given below are taken from a number of books on extension published over a period of more than 50 years:

- 1949: The central task of extension is to help rural families help themselves by applying science, whether physical or social, to the daily routines of farming, homemaking, and family and community living

- 1965: Agricultural extension has been described as a system of out-of-school education for rural people
- 1966: Extension personnel have the task of bringing scientific knowledge to farm families in the farms and homes. The object of the task is to improve the efficiency of agriculture.
- 1973: Extension is a service or system which assists farm people, through educational procedures, in improving farming methods and techniques, increasing production efficiency and income, bettering their standard of living and lifting social and educational standards.
- 1974: Extension involves the conscious use of communication of information to help people form sound opinions and make good decisions.
- 1982: Agricultural Extension: Assistance to farmers to help them identify and analyze their production problems and become aware of the opportunities for improvement.
- 1988: Extension is a professional communication intervention deployed by an institution to induce change in voluntary behaviors with a presumed public or collective utility.
- 1997: Extension is the organized exchange of information and the deliberate transfer of skills.
- 1999: The essence of agricultural extension is to facilitate interplay and nurture synergies within a total information system involving agricultural research, agricultural education and a vast complex of information-providing businesses.

2.2.2 Forms of Extension Service

Extension services are carried out by educational establishments, government or Non-Governmental Organizations (NGOs) example of these includes adult literacy classes, extra –

mural classes, distance learning programs and continuing education programs. It started as the extension of university education to the less privileged in Cambridge but over time, metamorphosed into agricultural extension in the United State of America (Maunder,1987). Depending on the objectives of the organization, it may not led to the ward of diplomas or certificates. The basic philosophy is to educate the rural poor so that they can make better decisions for themselves and their families.

2.2.3 Health Extension:

This is a form of extension which is crucial in area where there is a dearth of qualified medicals personnel. The rural people are given basic training on preventive diseases such as HIV/AIDS, Bird flu, Malaria and Ebola. This is carried out by governmental or NGOs.

2.2.4 Legal Extension:

This is another form of extension which is attempted to educate the poor and the oppressed on their fundamental rights, especially in democratic government. This system of extension often empowers the agency to enforce the rights of the oppressed, and is often provided by NGOs. The Federal Government of Nigeria, through the Legal Aid Council also provides the services. This form of extension is important in rural areas, especially where the rural producers, such as farmers seek to exercise their rights over the use of agricultural resources (Example, Land)

2.2.5 Market Extension:

This form of extension is important in market strategy because the world is fast becoming a global village by the use of new modern technological facilities in all sectors. The producers especially in agricultural product have been exploited by middle –men, hence the need for marketing extension. And this form of extension couple with extension education and

advancement in the world's information technology would open up more markets for the rural farmers to sell their products at competitive price.

2.2.6 Non-Farm Rural Microenterprise Development

Most rural people depend upon multiple sources of income, such as petty trade, primary production, remittances, and casual employment. In short, rural people are not dependent solely on agriculture or natural resources for their livelihoods. As Carney (1998) points out, these might provide the basis for their survival but it may well be that the best impacts for significant livelihood improvement lie outside the natural resources sector in the generation of off-farm income. In addition to microenterprise development there is also the option of reaching the poor through rural public employment, i.e., labor-intensive rural public works projects (Ravallion, 1990). Since the AKIS/RD document combines rural with agricultural goals, and since rural development involves both farm-related and non-farm-related activities, it seems appropriate for certain extension programs to be engaged in activities beyond those already mentioned. Food and Agricultural Organization (FAO) could promote the development of agriculture-related micro-enterprises in rural areas where such a priority would make sense for extension programs, and in this regard it might launch a special alliance with relevant organizations such as the Inter-American Development Bank.

2.2.7 Technical Extension

Agricultural and rural extension is the responsibility of various technical and service units, and serves many purposes. The various technical units within Food and Agricultural Organization (FAO) indicate that agricultural extension is a function pursuing many different purposes: livestock development, forest use and conservation, fisheries engineering and capture, food and

nutrition education, as well as crop development. Even in programs designed to foster agricultural crop production, extension may be concerned with providing information on other crucial issues such as food storage development, processing, farm management, and marketing. Food and Agricultural Organization (FAO) has advocated and pursued all the above purposes of agricultural and rural extension at some time or another.

2.2.8 Farmers' Associations

Agricultural and rural extension services can also help farmers and produce processors to organize themselves to meet their mutual agricultural interests. A long tradition in extension is group promotion and group organization, and FAO's commitment to these purposes is well known. Indeed, one of the Organization's many ways of promoting people's participation in development is through independent agricultural and rural development group associations (FAO 1994, 1995, 1997, 1998, 2000; Van Heck 1990). Financing economic self-reliance and the participation of the members in their organization's activities is of central importance in such efforts to promote farmers' organizations (FAO 1995; Rouse 1999). Some argue that extension can most effectively carry out its mandate, not by working directly with individual farmers but by working indirectly with and through farmers' groups or organizations (Byrnes 2001). In «Cotton, democracy and development in Mali» Bingen (1998) recounts the emergence of the National Union of Cotton and Food Crop Producers (Syndicat des Producteurs de Coton de Vivriers, SYCOV), and highlights the connection between small farmer organization, democracy and development.

2.2.9 Emerging Purposes

As populations grow and rural peoples flock to the cities, extension may (and already does in some countries) have to deal with urban and suburban clients (FAO 2000). What is currently

considered «agricultural and rural extension» may eventually become food and agriculture, rural and urban extension, In fact, extension in high-income countries is already providing information and education services in urban areas, extending beyond technical agriculture and rural development, urban extension is a potential growth area for information transfer. As such, it addresses new audiences and new programmes, and reflects the world's rapid urbanization. In Latin America, for instance, urbanization (74% in 1998) will affect 83 percent of the population by the year 2020 (Sanchez-Griñan 1998). This process will involve socio-economic and demographic changes that will affect food and nutrition, as well as epidemiological, institutional and socio-demographic changes. The same process is apparent in Asia and Africa, as well as in North America and Western Europe. Food security, the employability of youth in the food industry, environmentally sound practices by small urban businesses, and other food and agriculture-related programs are likely to demand the attention of governments which are currently dismantling extension programs. Conceiving of extension purely as an agricultural production, rather than an educational service is short-sighted and limited.

2.3.1 Agricultural Extension:

The concept of agricultural extension is a broad term and it is differing from one country to another and from one Agricultural extension to another. Consequently, its definition depends on the objectives of the organization providing services. Base on the above the following are some of the definition of agricultural extension services defined by different scholars.

According to Maunder (1978), agricultural extension is a service or system which assist farm people, through educational procedures in improving farming methods and techniques, increasing production efficiency and income and bettering their levels of living and lifting the

social and educational standards of rural life. By considering this definition the client of agricultural extension is the farmers and the ultimate goals of this definition is to lift the social and educational standards of rural life.

Ghouri (1985) conceives agricultural extension as activities mainly concerned with improvement that can be brought in a people's resources use and practice. He also described it as extending the findings of agricultural research to the farmers. By "resource use and practices" it is assumed he is thinking of "agricultural resources". The definition fails to indicate the "how" of extending research findings to farmers which is critical given the democratic nature of extension.

Swanson and Claar (1984) view agricultural extension as an ongoing process that can communicate useful information to the people and assist them to use the information or technology to improve the quality of their lives, their families, and communities. The questions that may arise from this definition are: How can agricultural extension assist the farmers to improve the quality of their lives, bearing in mind that this is not solely an issues of an improvement in agricultural production? Can agricultural extension Worker in practice assist farmers in their entire farm and non –farm problems? What form of education will the extension worker have to enable him be a generalist, covering both farm and non-farm aspects of the farmers live?

According to Van den Ban and Hawkins (1998), agricultural extension involves the conscious use of communication of information to help the farmer to form sound opinion and make good decisions. This definition noted that agricultural extension is not always concerned with decision- marking. It should create awareness of problems and clarify goals and means available to them.

However, based on the above definition of Agricultural extension can be synthesized as a services which assist farmers educationally to improve their farming method and techniques through an increase in their production efficiency with a view to improve their living standards and that of the community through extending research finding to them, using desirable channels of communication, that is, improving teaching methodologies.

2.3.2 Philosophy of Agricultural Extension

The importance of the individual in the promotion of progress is the basis of the philosophy of agricultural extension. Williams (1978) point out that the basic philosophy of agricultural extension is to work with farmers, to help them to help themselves to achieve better standards of living or personal well-being. It is important to note that, the focal point in the agricultural extension by this view is the individual farmer. Agricultural extension should not stop at increasing the field of the farmers. Increasing their standard of living is also important in the farmers, the policy objectives of agricultural extension include: the achievement of farming efficiency; conservation and wise of natural resources; efficient farm management; family welfare and social and economic improvement of community. For those to be realize, Ghouri (1985) observes that, the core philosophy in agricultural extension should teach the farmers “how to think” and not “what think”. This is because the farmer as the man who puts the information into production machine should be educated by learning the “why” to the “how” The idea here is that, once the farmer knows how to think, he would be able to know what he wants, where to get it and how.

2.3.3 Principle of Agricultural Extension

The principle of extension differs with respect to the kind of community in which extension education is carried on. Extension workers therefore, should endeavor to follow democratic

method in their dealing with farmers. The main essence of extension work is to initiate actions that might lead to improvements on the farms, in the homes and within communities. Extensions principles have been defined as guidelines for the conduct of extension work (Roling et al 2007) the principles include the following:

- 1 Extension starts where the people are: Extension teaching must start at the learner's (farmer's) level that is at his level of knowledge, understanding, interest and degree of readiness. This means to succeed with farmer new ideas must related to what the farmer already knows and that which he is familiar. Williams et al (1984) indicated that, in order to be able to assist the people to move to high levels of aspiration, it is important that the extension worker should know what their condition are.
- 2 Extension workers must gain the confidence of their audience: Farmers are said to be conservative. They are wary to thread on unsure grounds, and are unlikely to take action without conviction. This is why it is necessary that extension agent or workers should gain their confidence.
- 3 People have unsatisfied wants: An extension agent or worker cannot go far with people unless they want to help themselves. There for programs must start with the felt needs of the people and proceed to others that are also needed by them. For example, people may want more food or a different kind of food. Extension education ties those to new and desired programs and translates these in to action. In this way, extension can take the people from the present undesirable condition to new condition which they desire. This means that the initial step for extension worker is to discover the real needs of the people because people in the community do not want the same thing at the same time, and in the same fashion, their value differ and so do their goals and the ability to achieved them.

- 4 The best programs are those determined by the local people and extension staff working together. Planning programs with the people is an important part of extension teaching because people understand a program better and more likely to support if they participate in its creation, and also by participation in program planning people learn to work together.
- 5 Participation in extension programs is voluntary and therefore the programs must to meet the varying needs of individuals: Participants in extension program differ significantly in age, sex, education, attitudes, interest, needs, economic and social values; this means programs must to be attractive and tailored to meet the needs and interest of the baring groups.
- 6 Subject matter in extension must to have a definite purpose and must make sense and be useful to the people.

However, the agricultural extension workers can take a cue from relevant principles of extension propounded by North house (1992). Other principles are:

- a. Extension agents should help farmers to make decision which are beneficial to them.
- b. They should not be paternalistic. That is they should only provide help which the farmers want.
- c. They should promote farmers' autonomy to enable them to decide for themselves how they want to develop their farms.
- d. They should also be honest and dedicated to all their activities.

2.3.4 World History of Agricultural Extension

The term "Agricultural Extension" was only adopted in 1914 when the United States Federal Smith-Lever Act of 1914 formalized a nationwide cooperate federal-state-county programs and gave operational responsibility for this to the land grant colleges and Universities. In the

beginning, agricultural extension was concerned primarily with the improvement of agriculture, using conventional teaching methods. As time went on, home economics, youth programs and rural community resource development were included. Agricultural extension spread to tropical Africa, the Caribbean, Asia and Latin America following the involvement of the United States of America (USA) in bilateral AID programs after the Second World War. Agricultural extension now has three main facets:

1. As a discipline it deals with the behavior of people. It is educational in content and purposive in approach. Whether the content consists of agriculture, medicine (preventive and social medicine), public health, education, engineering, etc., extension is always dependent on a firm knowledge and expertise in sociology, anthropology, psychology, administration, economics, communication arts, political science and so on.

2. As a process, agricultural extension seeks to influence the behavior of rural people through education and information exchange. The aim is to assist them in gaining a livelihood, improving the physical and psychological level of living of rural families, and fostering rural community welfare. The success of the extension process requires an atmosphere of mutual trust, helpfulness and respect on the part of both extension worker and rural people.

3. As a service, agricultural extension makes the government ministry, the university or voluntary agency as useful as possible to the people who support it through taxes and donations.

The concept that the broader function of extension work is to help people to solve their own problems through the application of scientific knowledge is now generally accepted.

2.3.5 Agricultural Extension in Nigeria

Agriculture has been in existence from time immemorial. In fact, it is as old as man. Anyanwu, V. (1978) recorded that according to history, the early man was a wander and fruit gatherer, and depended on wild fruits and animals killed during his hunting expedition for his food. At the same time there was also a desire in man to settle down in a permanent home. So man started planting some of the seeds of the fruits he ate and keeping and taking care of the young of some of the animals he had caught. Initially, agriculture was only concerned with the tilling of the soil for crop production and rearing of animals, but in the contemporary age, agriculture has passed many stages in development. According to Akinsanmi, (1991) "today, however, the term Agriculture is usually more broadly defined as the production of plants and animals which are useful to man. It covers not only the cultivation of the soil and the feeding and management of crops and livestock, but also the preparation of plant and animal products for use by man, and the disposal of these products by marketing". Agriculture attains this glorious stage through schools and Agricultural Extension Services to the rural farmers.

Agricultural Extension is a system of disseminating agricultural information from the research institutes to the farmers within the shortest possible time (Erebor, 1997). More so, rural farmers are trained so as to acquire the necessary skills and knowledge required.

According to Adeniji, (1991) Agricultural Extension programmes in Nigeria started during the colonial era when the country was under British rule. They were initially done using mass methods of extension communication through campaign to encourage people to grow cash crops for export. One of such methods was issuing instructions to the people through their chiefs and village heads. Agricultural research stations were introduced at Moor Plantation, Ibadan by

Agricultural Development Project to cover the western parts of the country, at Samaru Zaria to cover the Northern parts of the country and Umudike to cover the Eastern parts of the country. These stations were charged with the task of developing crop based on technologies for adoption by the farmers in the various areas. The agricultural extension Service was then based in the various ministries of Agriculture of the three, former four regions of the country namely, Eastern, Northern, Western and Mid-Western regions. Actual Extension work was located in the field services division or the Ministry headed by a chief Agricultural Assistants and attendants located in the villages. These assistants and attendants were trained in various schools of Agriculture and farm institutes. Apart from extension organization under the ministries of Agriculture, farm settlement schemes and mixed farming schemes were also initiated. These were concerned with teaching groups of farmers to adopt more profitable farming methods and technologies, such as the use of ox-drawn ploughs and fertilizers. Most of these schemes had however failure rate. Extension organization and the ministries became very bureaucratic and relatively ineffective. New methods of extension organization were required. This emerged with the setting up of Agricultural Development Projects (ADP) and River Basin and Rural Development Authorities (RBRDA) in the middle of the 1970s. The Agricultural Development Projects were concerned with raising the productivity of farmers by distributing Agricultural inputs from farm service centers located in rural areas. This was backed up by an extension system that teaches the farmers the best way to use the inputs supplied. The Agricultural Development Projects started as pilot projects, but they are now currently projected to cover all parts of the country.

The Agricultural Development Projects have recently adopted the Training and Visit (T&V) system of extension. This involves constant monitoring of farm activities and training of both the

extension agents and the farmers. Adeniji, (1991) further explained that the extension agents undergo training workshops every fourth night. They spend the other two weeks training the farmers. It is hoped that both the farmers and the workers become up to date about current farm practices and technologies. The training season are also supposed to provide a forum for the village level extension workers to present the problems of farmers in their area so that appropriate and immediate solutions can be provided. The River Basin and Rural Development Authority were established to develop agriculture and the water resource of the country. They were later assigned the task of making contributions to the rural development of the country. They were expected to lay the foundation for agricultural self-sufficiency by promoting both rain fed and irrigated agriculture. Adeniji (1991) emphasize that extension programs be brought to the rural farmers by Agricultural Extension agents at their homes or villages. He further listed out the aims of Agricultural Extension as follows:

- a. To bring information to the farmers concerning new innovations which can be applied to increase Agriculture production, such as the use of fertilizers, improved breeds of livestock, improved crops varieties, animal feeds, pesticides, herbicides, fungicides and farm mechanization.
- b. To instruct farmers on new farming techniques such as the most ideal time of planting, fertilizer application, drainage and irrigation, crop rotation and livestock production and basic soil conservation principles.
- c. To teach farmers good farm management practices, efficient marketing channels, better processing, storage, grading and transportation of Agricultural produce.

- d. To encourage leadership qualities and co-operative living among farmers to enable them adopt new ideas.
- e. To raise the social status of the farmers through basic health education. This study is necessary by the obvious fact that food is one of the basic necessities of life and Agriculture is wholly and entirely concerned with the production, processing and distribution of food for man.

However, the history of agricultural extension in Nigeria is interwoven with that of agricultural development in general. This is because Agricultural extension is concerned with all areas of agriculture.

2.3.6 The Pre-Colonial and Colonial Periods

During the pre-colonial era by the British, conscious efforts were made in selection, introduction and teaching of the practices involved in producing good varieties of crops and breeds of animals. Farmers selected the best seeds for multiplication, from which the seedlings are been transplanted to their farms. Similarly farmers introduced to their farms improved seeds and animals from their neighboring communities and from trans-Saharan traders from neighboring countries. The farmers themselves experimented upon and projected their production methodologies without the assistance of formally designated extension agents. Extension teaching was largely through apprenticeship. Families have taught succeeding generation crop production, animal husbandry and soil management through observation and participation by learners. Neighbors and friends shared new knowledge of improved farm practices. During the colonial era by the British, some agricultural development initiatives were undertaken with the purpose of increasing production. The first step was to establish the Department of Botanical

Research in 1893 with its headquarters at Olokomeji in the former western Nigeria(Williams, 1978). Its responsibilities included conducting research in both agriculture and forestry. In 1905, the British Cotton Growers Association acquired 10.35 square kilometres of land at the site now called Moor Plantation, Ibadan for growing cotton to feed the British textile mills. In 1910, Moor Plantation, Ibadan became the headquarters of the Department of Agriculture in Southern Nigeria, while the Department of Agriculture was established in the North in 1912. In a unified Department of Agriculture was formed in Nigeria, after the amalgamation of the North and the South. The major policy of the central Department of Agriculture was to increase production of export crops for the British market which was ready to absorb it for its industrial growth. Extension activities were therefore directed towards increasing efficiency in crop production and marketing. Regulations were made to set and enforce standards in export crop production.

The colonial government also established some agricultural development schemes to upgrade the skills of farmers and to produce agricultural commodities. The Kwara irrigation scheme was established in 1926. Implemented it in North West at Sokoto town, its purposes were to increase rice yields and provide experimental data on production under severe drought during dry season and flooding during the rains. The scheme started with 1000 acres or 405 hectares involving 800 farmers with farms situated along the river banks. The irrigation scheme employed the shadoof which is an ancient Egyptian technique, also used by the Sudanese. The scheme did not attain much of its objectives because (a) the irrigation scheme (shadoof) was inadequate on large farms; (b) it is a slow technique of irrigation; (c) it was difficult to collect cost of services from users; (d) in 1943, 1945 and 1954, river Rima over-flooded and washed away most of the rice crop; and (e) use of manure was not popular among the farmers. The colonial period also witnessed the establishment of the Niger Agricultural project in 1949 with the aims of producing

groundnut as export and guinea-corn for local consumption. It was also to relieve world food shortage, demonstrate better farming techniques and increase productivity of Nigeria's agriculture. The project was sited near Mokwa at an area which is suitable for mechanized food crop production.

2.3.7 The Post-Colonial Period

Post-colonial agricultural extension in Nigeria can be categorized into two groups: (1) government-organized agricultural programs; and (2) extension programs organized and sponsored by private agencies.

The first group constitutes the more extensive of the two. Government organized agricultural extension include the National Accelerated Food Production Project (NAFPP) which was introduced in 1972, Agricultural Development Projects, ADP (1975), the Accelerated Development Area Project, ADAP(1982), and Multi-State Agricultural Development Projects, MSADP (1986). Other programs were the Operation Feed the Nation Program, OFN (1976), the River Basin Development Authority, RBDA (1973), the Green Revolution Program, GRP (1980), the Directorate of Food, Roads and Rural Infrastructure, DFRRI (1986), the National Directorate of Employment, NDE (1986), the Nigeria Agricultural Insurance Scheme, NAIS (1987) and the National Fadama Development Project, NFDP (1992). In recent years, the Poverty Alleviation Program, PAP (2000), and National Economic Empowerment and Development Strategy, NEEDS (2004) were introduced. Specifically the National Special Program for Food Security, NSPFS was launched in March 2003. Some private agencies have embarked on agricultural extension services largely towards a specific clientele system of their choice. Some of the agencies are: The Nigerian Tobacco Company, oil companies such as Shell

Petroleum Development Company, and religious organizations such as the Catholic and the Anglican churches. Some Nongovernmental organizations, NGO's such as the Leventis Foundation also operate some extension services. Many international organizations have been involved in agricultural extension, agricultural and rural developments in Nigeria for decades. Notable among these are the World Bank, International Fund for Agricultural Development, IFAD, United States Agency for International Development, USAID, Technical Centre for Agricultural and Rural Cooperation ACPECCTA, and Food and Agriculture Organization, (FAO) of the United Nations.

2.3.8 Summary of Literature Review and Uniqueness of the Study

In this view, attempt has been made to discuss the Concept of Information and Communication Technology ICT. And The ICT facilities used in Agricultural extension service delivery in Kankara Local Government area of Katsina State, the study point out the Scopes , Impact and Challenges of the use of ICT in Agricultural extension service delivery in rural areas. From the review it deduce that the impact of ICT in Agricultural extension service delivery in rural areas are: It help in rapid spread of information to rural farmers, it help in giving information on input and supply to the rural farmers, it assist in easy access to rural farmers and extension agent, it help in assisting rural people to get information in a simple ways. However, to integrate ICT facilities into agricultural extension services in rural area of Kankara Local Government area of Katsina state, there must be proper and adequate funding and financing of agriculture. Government needs to invest heavily in the use of ICT facilities and create enabling environment for rural people to have knowledge in the use of ICT facilities in Agricultural extension programme The ICT program in the Local Government about Agricultural extension is by using GSM phone, and Radio. To make rural people to be more aware about use of ICT facilities is

done by training extension Agents and rural Farmers within the Local Government area to acquire skills necessary to integrate into agricultural programme. Also this study pointed out some of the challenges facing the use of ICT in Agricultural extension service delivery in rural areas some of them are: High cost of ICT, poverty, illiteracy, Lack of skills, limited network coverage, lack of community awareness, If these challenges are addressed it will ease the rural farmers to be fully involved and participate in agricultural extension programmes by using ICT facilities and help in the successful implementation of the programme by using ICT facilities in rural agricultural extension service programmes.

What make this study unique is that the study is on the impact and challenges of using ICT facilities on Agricultural extension service delivery in Kankara Local Government are of Katsina State. To the best of my knowledge this study has never been carried out in this area, although relevant studies have been carried out in various areas.

CHAPTER THREE

METHODOLOGY

This chapter describes the methods and procedures for data collection in the study; it deals with research design, population of the study, sample and sampling techniques, instruments, administration of the research instruments and procedure for data analysis.

3.1 Research Design

The researcher adopted a survey research design to examine impact and challenges of ICT in agricultural extension services in the area of study. This design is applied when the unit of analysis is the individual or group of individuals, (Suleiman 2004) explained that a survey research is intended to extract information from the respondent on his opinion, believe or attitude toward particular thing. It also involves collecting data to test hypothesis design to answer several questions about people opinion, on some specific topics or issues (Birdman 2000). Babbie and Fajonyomi (2003) said that survey research is used for descriptive and explanatory purposes. Therefore, the reason for selecting the survey research design is to reach the target population in order to drive conclusion, responses, and opinion about the use of ICT in agricultural extension service delivery in rural areas of Kankara Local Government Area of Katsina state and examine the impacts and challenges.

3.2 Population and Sample for the Study

3.2.1 Population for the Study

The population of this study comprised all Registered Rural Farmers in Kankara Local Government Area of Katsina State. According to Growth Enhancement Scheme (GES)

Programmes There are 18669 Registered Rural Farmers in Kankara Local Government Area of Katsina State.

Table 3.2.1 Population of the study

S/NO	WARD	NO:OF FARMERS
1	Kankara A and B	839
2	Danmaidaki (Yargoje)	759
3	Danmarabu	505
4	Burdugau	990
5.	Gatakawa/ Mabai	6575
6	Kuka Sheka	1037
7	Wawar Kaza	5082
8	Pauwa A and B	2065
9	Zango	355
10	Garagi	343
11	Hurya	319
	Total	18,669

3.2.2 Sample Size

Out of the 18669 rural farmers that served as population of study 355 respondents were selected as sample size for the study. The choice of the sample size of the population was in line with Research advisors (2006) table, where it is stated that the population of 18669 require the use of 355 sample size.

Table 3.2.2 Sampling frame

S/NO	WARD	NO: OF FARMERS	SAMPLE SIZE
	Danmaidaki (Yargoje)	759	15
	Danmarabu	505	10
	Burdugau	990	18
	Gatakawa/ Mabai	6575	130
	Kuka Sheka	1037	20.4
	Wawar Kaza	5082	100
	Pauwa A and B	2065	41
	Zango	355	7
	Garagi	343	7
	Hurya	319	6.2
	Tatal	18030	354.99

The above are the selected total number of registered rural farmers that were used as sample of this study. The balloting sampling techniques procedure was used.

3.2.3 Sampling Technique

The researcher adopted the use of simple random sampling technique from the total population of rural farmers. The research population consisted of registered rural farmers in rural areas of

Kankara Local Government. The sample was selected in accordance with the number of farmers per ward. Thus proportional sampling was used to draw the sample from each ward.

3.3 Research Instrument

The researcher adopted the use of Structured Questionnaire i.e. Questionnaire For Rural Farmers (QFRF), The Questionnaire for this research is close ended and columns for ticking in the appropriate answer for the respondent to specify on his/ her own opinion. It has five sections, Section A is Demographic data of the respondents, Section B, answered research Question no: 1, about ICT facilities used in rural Agricultural extension service delivery in Kankara Local Government Area, it has two questions A, and B, with five options from each one. Section C, answered research Question no: 2 about the scope of the usage of ICT facilities in Agricultural extension delivery in the rural areas of the study; it has one question with five 5 options Section D, answered research question no: 3 about the impact of ICT utilization in rural Agricultural extension service delivery it has six options. Section E, answered research question no: 4 about the challenges of ICT in rural Agricultural extension Service delivery in rural areas of Kankara Local Government area of Katsina State

3.4 Validity of Instruments

To ensure validity of the instrument, content validity was used to determine the validity of the instrument. In the process, the instrument was presented to my supervisor and other Lecturers in the department of Adult Education and Community Services. They were requested to ascertain the appropriateness of the instrument in relation to the objectives of the study. The instrument was corrected based on the observations.

3.5 Reliability of the Instrument

In order to determine the reliability of the instrument test- re- test method was used in order to have consistency in responses. The researcher administered the instrument to the respondents and retrieved them back and after two weeks administered and retrieved again the instrument. The two results were correlated in order to have the reliability of the instrument. The reliability coefficient was computed using correlation statistical technique known as Spear Man Rank Order, in which 0.7 reliability coefficient was obtained which indicate the instrument is reliable.

3.6 Procedure for Data Collection

To collect data the researcher collected an introductory letter from Head of the Department. The introduction letter was attached to the questionnaire explaining the purpose of the study, and an assurance of the confidentiality of the information obtained from them and the academic research purposes. The instrument was handed over to the extension officers who were trained on how to administer the instrument appropriately to the respondents, those who could not read were verbally asked and the responses taken.

3.7 Method of Data Analysis

For the analysis of the data obtained from the respondents, the researcher used table of frequencies and simple percentages to analyse the data.

CHAPTER FOUR

DATA ANALYSIS RESULTS AND DISCUSSION

4.0 Introduction

This chapter presents data analysis, results and discussion using frequency counts and percentages.

4.1 Data Analysis

The researcher distributed and retrieved the questionnaire of three hundred and fifty five (355) without any missing questionnaire. The questionnaires were distributed to the respondent with the research assistants and collected it back immediately.

4.2 Data Presentation

The data collected in the field of study were presented in a tabular form. A total of three hundred questionnaires were administered to rural farmers in Kankara local government area of Katsina state. The responses are presented in tables forms.

4.1.2 Demographic Data of Rural Farmers

S/No:	Variables	Option	Frequency	Percentages%
1.	Gender	a. Male	255	71.8%
		b. Female	100	28.1%
2	Occupation	a. C/servant	20	5.6
		b. Business	100	28.1
		c. Farming	200	56.3
		d. Retired	35	9.8
3.	Marital status	a. Married	200	56.3
		b. Single	45	12.6
		c. Divorce	10	2.8
		d. Widows	100	28.1
5	Age	20-25	30	8
		26-30	60	17
		31-35	70	20
		36-40	80	23
		41-45	90	25
		56 an Above	25	7
		Total	355	100%

Interpretation:

From the above table it shows that 255(71.8%) are Male while 100(28.1%) are female

Also in the occupation 200(56.3%) are Farmers while 100(28.1%) are business while 35(9.8%) retired while 20(5.6%) are C/servants.

The above table indicates that the larger percentage of rural Farmers is age 41 to 55(25%) years old; follow by 36-40(23) then follow by 31-35(20%) years. Then follow by 26-30(17%), then follow 20-25(8%) then the lowest number 56 and above with.

Here the result of data were used in analyzing Research questions 1 to 4 of the study. The research questions were taking one after the other. The results of the analysis were given below in various tables respectively.

4.2.1 Analysing the Research Questions

4.2.2 Research Question 1: What are the Information and Communication Technology (ICT) facilities used in Agricultural Extension Services in Rural areas of Kankara Local Government Area?

This research question is analysed using frequency and percentages and data presented on following table (N = 355)

Table 4.2.3 Information and Communication Technology (ICT) facilities used in Agricultural extension service delivery

Facilities	Frequency	Percentage %
Computer	-	-
CD and Tape	-	-
Handset/GSM	280	74.6
Radio	75	21.1
Television	-	-
Internet	-	-
Total	355	100

Interpretation:

The above table shows that 280 (74.6%) agreed that Handset /GSM were the main ICT facilities used by the rural people in Agricultural extension programme. While 75(21%) are using Radio especially old people who were unable to operate any ICT facilities to get information. while the rest of ICT facilities like Computer, Television, Internet, CD and Tape with 0(0%) response were not patronized by the rural people. Therefore from the above information indicated that GSM/Handsets were patronize and pre dominantly used by the rural farmers in Kankara Local Government are of Katsina State than any other ICT facilities.

From the above table, Handset/GSM 280(74.6%) were the main ICT facilities used in rural agricultural services follow with radio 75(21.1%) in the Agricultural Extension Programme. Base on the result it showed that the Information and Communication Technology ICT facilities used in rural Agricultural extension service delivery in rural area of Kankara Local Government are: Handset/GSM and Radio.

4.2.4 Research Question 2: What are the scopes of Usage of Information and Communication Technology (ICT) in Agricultural extension service delivery in the rural area?

This research question is answered using frequency and percentages and data presented on the following table (N = 355).

Table 4.2.3 Scope of the usage of ICT facilities in Agricultural extension services

Scope	Frequency	Percentage %
Distribution of Inputs	200	56.3
Price Information	100	28.1
Contact and coalition	55	28.1
Storage Information	-	-
Other specify	-	-
New Method of Farming	-	-
Total	355	100

Interpretation:

Table 4.3.2 above showed that the scope of ICT utilization in Agricultural extension service delivery in rural areas includes: Distribution of Inputs with 200(56.3%) then Price information with 100(28.1%) While the rest of the scope like Storage information, new method of farming are not existing in Agricultural extension service delivery in Kankara rural areas

From the above research question, the scope of using Information and Communication Technology (ICT) in rural and agricultural extension services includes: Distribution of Inputs, Price Information, Contact and Coalition are the main area focus on rural Agricultural extension services in rural areas of Kankara Local Government Area of Katsina State.

Research Question no: 3 what are the impacts of the use of Information and Communication Technology ICT facilities in Agricultural extension service delivery in rural area of Kankara Local Government area of Katsina State?

Following Question asked about the impact of using ICT in rural Agricultural Extension Services in rural area of the study.

This research question is answered using frequencies and percentages and data presented in the following table (N = 355).

Table 4.2.4 Impacts of using Information and Communication Technology in Agricultural extension services

Impacts	Frequency	Percentage
It help in rapid spread of information	100	28.1%
Getting information on input and supply	180	50.7%
Assist rural people to get information in a simple way	50	14%
Easy access to Extension Agents	20	5.6%
Easy access to rural	2	0.56%
Total	355	100%

Interpretation:

From the above table, using ICT in rural agricultural extension service delivery in Kankara Local Government Area of Katsina State was very important because about 180(50.7%) were of the views that ICT facilities like GSM Handset helped them in getting information on inputs supply, while 100(28.1%) agreed that it helped in rapid spread of information, 50(14%) said it helped in assisting them to get information easily while they were at their homes or farms, while 20 (5.6%) Easy access to extension agents that it help them to forwarded their issues and complaint and

have access to extension agent any time, while 3(0.84%) are on the view that it gives them opportunities to learn new information. are on the view that ICT facilities enable them to have easy access to rural farmers with 2(0.56%).

From the above, the impact of Information and Communication Technology (ICT) in rural and agricultural services delivery in Kara Local government area helped in given information on input supply, helped in rapid spread of information, assisted rural people to get information in simple ways, made easy access to extension agent and to rural people, provided opportunities for learning new information and ideas

Research Question no: 4

Table 4.2.5 Challenges of using ICT in rural Agricultural extension services (N= 355)

Challenges	Frequency	Percentage
High cost of air time	100	28.1%
Limited Services	80	22.5
Illiteracy	70	19.7
Lack of Skills	35	9.8
Poverty	50	14
Lack of Community awareness	20	5.6%
Total	355	100%

Interpretation:

From the above table the main challenges facing the use of Information and Communication Technology ICT facilities in Agricultural extension service delivery in rural areas of Kankara local Government area of Katsina State were high cost of ICT facilities with 100(28.1%) respondents, while Limited services that is network coverage of service with 80(22.5%), Illiteracy with 70(19.7%) Poverty with 50(14%) while Lack of skill with 35(9.8%) lack of awareness 20(5.6%).

From the above information the main Problems facing use of Information and Communication Technology ICT facilities were: High cost of ICT facilities, Limited network coverage, Poverty, Illiteracy, Lack of Skills, and lastly lack of community awareness on how to operate and use ICT facilities properly.

4.2 Summary of Findings

Based on the analysis presentation of data for the research question, findings of this study are as follows:

- i. The Information Communication Technology (ICT) facilities used in rural Agricultural Extension Programme in rural area of Kankara Local Government of Katsina state were; Mobile phone/GSM and Radio.
- ii. The scope of the use of Information Communication Technology (ICT) facilities in rural Agricultural Extension Service delivery in rural areas were: Distribution of inputs, Price information, Contact and Coalition.
- iii. The impact of the use of Information Communication Technology (ICT) in rural and Agricultural extension service delivery in Kankara Local Government Area were in the

area of information of inputs and supply, rapid spread of information, getting information in a simple way, easy access to extension agent, easy access to rural farmers, opportunity of learning new information and ideas.

- iv. Some of the problems facing rural agricultural services by using Information Communication Technology (ICT) facilities were high cost of Information Communication Technology (ICT) facilities, illiteracy, lack of skills and limited network coverage.

4.3 Discussion of Findings

The first finding of the study is that Information Communication Technology (ICT) facilities used in rural Agricultural Extension Programme in rural area of Kankara Local Government of Katsina state are Mobile phone/GSM/Radio. This is in line with Ake and Poole (2010) that use of computer, Handset is now regarded as a new way of educating people and mobilizes them to participate in various extension programmes especially rural people. Also according to Food and Agricultural Organization (FOA 1993).mobile phones as new modern means of technology help rural communities to get information easily by the extension agent in rural agricultural extension programme and help them to know the price of their produce and know where to sell their product in order to get profit.

The scope of the use of Information and Communication Technology (ICT) facilities in rural Agricultural Extension service delivery in the rural areas of study are Distribution of inputs, Price information, Contact and Coalition. Some of the problems facing rural agricultural services by using Information Communication Technology (ICT) are high cost of Information Communication Technology (ICT) facilities, poverty, illiteracy, and lack of skills and limited services. The challenges of agricultural extension services using Information and

Communication Technology ICT in rural area of Kankara Local Government area of Katsina state according to Federal Ministry of Agriculture Redemption Register for 2016 (Dry Season) 2017 (Wet Season) and Growth Enhancement Scheme GES Programme some of the general problem of using ICT in Agricultural Extension Services in rural Areas are crushing rural poverty and high illiteracy level of target group, lack of technological know how to use ICT facilities by rural farmers, lack of qualified extension agents, lack of enough funding of the programmes. This is in line with (Aker, 2010) that the general problems facing use of ICT in agricultural extension services in rural area include; high cost of ICT, lack of local content and language barrier , lack of infrastructure, Policy consideration, low level of ICT readiness, limited and high cost of telephone services either by landline or GSM, lack of power supply.

In conclusion it shows that the Information and Communication Technology ICT used in rural agricultural extension services are GSM, Mobile phone, Radio. The scope includes distribution of inputs, price information, contact and coalition. The impacts of using Information and Communication Technology (ICT) in Agricultural Extension services delivery includes: It helps in given information on inputs supply, it helps in rapid spread of information easy contact to rural farmers and extension agents. Assist rural people to get information in a simple ways, learning new information and new ideas. Lastly, the problems facing rural agricultural extension services in rural area of Kankara local government area of Katsina state are: high cost of Information and Communication Technology (ICT) facilities, Poverty, illiteracy, lack of skills and lack of community awareness.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

This chapter presents summary, conclusion and recommendations

5.1 Summary

The research investigated the Impact and Challenges of using Information and Communication Technology (ICT) in Agricultural Extension Service Delivery in Rural Areas of Kankara Local Government, Katsina state. Background of the study, statement of the problem, significance of the study. The research was guided by four (4) objectives: to identify ICT facilities used in Agricultural extension service delivery, to determine the scope of utilization of ICT facilities in Agricultural extension service delivery in rural area, to examine the impact of ICT facilities in Agricultural extension service delivery in rural area. To examine the challenges of the use of ICT facilities in Agricultural extension service delivery in rural area. Review of related literature about the impact and challenges of the use of ICT in agricultural extension services were conducted. Descriptive survey research design was adopted. The population of the study consisted of 18,869 rural farmers out of which three hundred and fifty five (355) was used as sample of the study based on Research Advisor (2006) table of determining sample. The data collected were analyzed using frequency tables and simple percentages. The findings of the study revealed that the ICT facilities used in Agricultural Extension Service Delivery were Handset/GSM and Radio. The Scope of ICT utilization in Agricultural extension service delivery in rural areas involved distribution of inputs, price information, contact and coalition. The impact of the use of ICT in Agricultural extension service delivery included rapid spread of information,

giving information on inputs and supply, assisting rural people to get information in a simple way, easy access to rural farmers and extension agent and giving opportunities of learning information and new ideas. Some of the challenges of using ICT found by the study included: high cost of ICT facilities, limited network coverage, illiteracy and poverty of the rural farmers, lack of skills and community awareness. Based on these findings, the study recommended that Government should improve and extend the provision and utilization of ICT facilities in rural areas, extend the scope of ICT facilities utilization in various Agricultural extension programmes in rural areas, Extension agents should also make more effort in guiding, advising and training rural farmers on how to use ICT facilities effectively, Soft loans and other ICT facilities should also be provided by governments and other organizations to rural farmers for improved production.

5.2 Conclusion

The Information and Communication Technology used in the rural agricultural extension services are GSM, Mobile phone, radio and television, the scope of the use of such facilities in Agricultural extension service deliver include: Distribution of inputs, Price determination, Contact and Coalition. The impact of using Information and Communication Technology ICT includes; Rapid spread of information to rural farmers, given information on price inputs, assist rural people to get information in a simple ways, easy access to rural farmers, easy access to extension agents. Opportunities for learning new ideas and information, Also, lack of using ICT facilities by rural farmers in rural area greatly affect the production efficiency and livelihood of rural population and consequently led to rural urban drift. Also illiteracy contributes to greatly problems among rural farmers, which include lack of competence, technical know- haw, innovation among others, this greatly affect and deterred farmer from efficient production.

Government should make it a policy to all rural farmers to undergo Adult literacy Education to enhance their level of awareness, socialization and knowledge on agricultural production, further more government should assist in providing more and convenient environment for Agricultural extension agent to practice their skills and art. Extension agent should make more effort in training, guiding rural farmers on how to use ICT facilities, rural farmers should enroll in to adult literacy classes, and government should provide soft loan and other ICT facilities on credit.

5.3 Recommendations

In the light of the above finding the following recommendations are hereby:

1. Government should establish the provision of adequate mobile phone/GSM facilities in a cheaper price that will enable rural farmers to participate and involve fully in Agricultural extension service delivery in Kankara Local Government area
2. Government should extend the scope of utilization of ICT facilities in Agricultural extension service programme in rural area of Kankara Local Government area. i.e. The scope should be extended to many areas in agricultural extension service programmes like Method of farming, Market survey, Storage information.
3. Extension Agent should make more effort in advising, guiding, training and mobilising rural farmers on how to use Handset/GSM in receiving and forwarding complaint about their day to day farming activities.
4. Government should provide soft loan and other Information and Communication Technology (ICT) facilities on credit to rural farmers.

5. Rural Farmers should enroll in to adult literacy classes to fight illiteracy and upgrade their level of livelihood.

5.4 Suggestions for further studies

This research work was carried out to examine the impact and challenges of the use of ICT facilities in rural agricultural extension services in rural areas of Kankara Local Government of Katsina State. For further study the researcher suggest that the researchers could carried out similar studies in other Local Government of Katsina State so as to have clear and comprehensive report on problem under study in order to improve the utilisation of ICT facilities in agricultural extension service delivery in rural areas.

Reference

- Adeniji, A. (1991). Count Down to Senior Secondary Certificate Examination to Agricultural Science. Lagos: Evans Brother Nigeria Limited
- Agricultural Performance survey of 2003/2014 Wet Season in Katsina State. August 2013. Ahmadu Bello University, Zaria E-mail:director@naerls.gov.ng. Website: www.naerls.gov.ng
- Aker, J. C. (2008). “Does Digital Divide or Provide, The Impact of Mobile Phones on Grain Markets in Niger.” BREAD Working Paper # 177.
- Aker, J. C. (2010). “Dial ‘A’ for Agriculture: Using Information and Communication Technologies for Agricultural Extension in Developing Countries.” Tuft University, Economics Department and Fletcher School, Medford MA02155.
- Akinsanmi, O. (1991). Senior Secondary Agricultural Science. United Kingdom: Longman Group Limited
- Anandaj P., R. Puskur, Workneh Sindu, and D. Hoekstra. (2008). Concepts and Practices in Agricultural Extension in Developing Countries: A source book.
- Anao, A, R. (2003). Society, Knowledge Incubation and Management-Lagos The Guardian Newspapers, November 11, 75
- Anderson, J. R., and G. Feder. (2004). “Agricultural extensio.” The World Bank Research Observer 19 (1): 41–60.
- Anderson, J.R. (2007). “Agricultural Advisory Services,” Background Paper for the World Development Report 2008, Agriculture and Rural Development Department, The World Bank, Washington, D.C.
- Ani, A. O. (2007); Agricultural extension; A pathway for sustainable agricultural development.
- Ani, A.O. (2007), Agricultural Extension: A Pathway for sustainable Agricultural Development. Loud Books/Apani Publications; Ibadan, p2.
- Annamalai, K., and S. Rao. (2003). “What works: ITC'se-Choupal and profitable rural transformation Web-based information and procurement tools for Indian farmers.” World Resources Institute, Washington, D.C.
- Anyanwu, A. C. and Anyanwu, V. A. (1978). Junior Agricultural Science in Post Primary Schools. Ibadan: Africana Educational Publishers
- Arokoyo, T. (2005); ICT Application in Agricultural Extension Delivery. In Adedoyin, F. O (Ed) Agricultural Extension in Nigeria;Published by the Agricultural Extension society of Nigeria, AESON;Pp 245- 251.

- Axinn GH. (1988). Guide on alternative extension approaches. FAO (Food and Agriculture Organization of the United Nations), Rome, Italy.
- Backer, H. (1986). Computer in the schools A Recent update: Classroom Computer learning January, 96-102.
- Birner, R., and J. Anderson. (2007). "How to make agricultural extension demand-driven? The case of India's agricultural extension policy." Discussion Paper 00729, International Food Policy Research Institute, Washington D.C.
- Carlson, S., & Firpo, J. (2001). Integrating computers in to teaching; Finding from a 3 – year programmers in 20 developing countries. In L, R, V. Shavinina & R, A Cornell (Eds), Cyber reduction: The future of Distance Learning. Larchmont, NY; Mary Ann Liebert, Inc, 85-114.
- CTA (2003): ICTs transformation agricultural extension: An E- discussion, 20th august to 29thSeptember, 2003.
- Ghouri, A.S.K. (1985): "Contact Farmers; An institution Under the Training and visit Extension Paper presented at the National Workshop on Agricultural Extension, Held at the Federal Agricultural Coordinating Unit, FACU; Ibadan; Jan; pp22-24.
- IFPRI (International Food Policy Research Institute), Washington, DC, USA, and ILRI (International Livestock Research Institute), Nairobi, Kenya. 275 pp.
- Maunder, A. (1985): Agricultural Extension; A Reference Manual. FAO; Rome; 336p.
- Obinne, C. (Undated): Fundamentals of Agricultural Extension ABIC Publishers; Enugu and Lagos; Nigeria.
- Ogunbameru, B.O (2001); Fundamental of Agricultural Extension and Communication, Daily Graphics (Nigeria) Ltd., Ibadan.
- Pattern of Agricultural Development in Southern Parts of Katsina State, Nigeria: Notion for www.iosrjournals.org 19 | Page ICT Applications on E-Agriculture (Wikipedia, 2010).
- Rolings, N, Ogunbameru,, B.O and Ani A.O. (2007): In Ogunfeditimi,T. (2007); Perspectives in Agricultural Extension University of Ibadan press.
- Seyed J. F. H. M. Niknami and G.H. H. Nejad (2009): policies affect the application of information and communication technologies by agricultural services. American journal of applied science vol 6(8).
- Swanson, B.E. and Claar, J.B. (1984); Agricultural Extension: A Reference Manual; 2ndEdition; FAO; Rome.
- Van den Ban, A, W and Hawkins H. S. (1998) Agricultural Extension: 2nd edition
- Williams, S. K. T. (1994). A Strategy for Rural Development, Community Development and Agricultural Extension versus Republic of Cameroon 1st - 6th October, 1994.

QUESTIONNAIRE FOR RURAL FARMERS (QRF)

Dear Respondent,

I am a postgraduate student of the above institution currently undertaking a research on a topic named a study on the challenges and impacts of ICT use in agricultural extension services of rural people in southern part of Katsina state. Please kindly respond to the items in this questionnaire. The data when collected will be for research purpose only, and we will be treated with confidentiality. Thanks, in anticipation of your cooperation.

SECTION A:

DEMOGRAPHIC DATA

1. Gender a. Male () b. Female ()
2. Location _____
3. Occupation
a. Civil servant () b. Business () c. Farmer () d. Retired ()
4. Marital Status
a. Married () b. Single () c. Divorce () d. Widow ()
5. Age.
a. 25-35() b.35-45 () c.45-55 () d.55-65 () e.65-75 ()

SECTION B

Research Question 3: What are the Information and Communication Technology facilities used in Agricultural Extension Services in rural areas of Kankara Local Government Area of Katsina State?

6. What Information and Communication Technology ICT facilities are you using to disseminate information and have contact to rural farmers
 - i. Computer ()
 - ii. CD and Tape ()
 - iii. Handset/GSM ()
 - iv. Radio ()
 - v. Television ()
 - vi. Other Specify ()

7. Which of the following Information and Communication Technology ICT facilities are you receiving information about Agricultural extension programme by extension agent.
 - i. Computer ()
 - ii. CD and Tape ()
 - iii. Handset/GSM ()
 - iv. Radio ()

v. Television ()

vi. Other Specify ()

Research Question No: 2 What are the Scope of the usage of Information and Communication Technology ICT facilities in Agricultural Extension Services delivery in Kankara Local Government area of Katsina State?

7. Which of the following areas are you receiving information to extensionagent?

i. Distribution of input ()

ii. Price information ()

iii. New Method of Farming ()

iv. Contact and coalition ()

v. Storage information ()

vi. Other ()

SECTION D

8. What are the impacts of the use of Information and Communication Technology ((ICT) facilities in Agricultural extension service delivery in rural areas of Kankara Local Government.

a. It help in rapid spread of information ()

b. It help in given information on inputs ()

- c. Assistance rural people to get information in a simple ways ()
- d. Easy access to extension agent ()
- e. Easy access to rural farmers ()
- f. Provision opportunities for learning new information and ideas ()

SECTION E:

Research Question 4: What are the challenges of the use of Information and Communication Technology ICT facilities in Agricultural Extension Services delivery in Kankara Local Government area of Katsina State?

9. Which of the Following challenges are you facing in Agricultural Extension Service delivery in Kankara Government area of Katsina State?
- i. High cost of ICT facilities ()
 - ii. Illiteracy ()
 - iii. Lack of Skills ()
 - iv. Limited network coverage ()
 - v. Lack of community awareness ()
 - vi. Conservativeness ()
 - vii. Lack of power supply ()