INFORMATION NEEDS AND SHARING STRATEGIES OF SMALL HOLDER FARMERS IN KATSINA STATE

BY

ABUBAKAR MAGAJI
(SPS/15/MLS/00020)

SUPERVISOR:
PROFESSOR SHEHU ONIPE BELLO

BEING A DISSERTATION SUBMITTED TO THE DEPARTMENT OF LIBRARY AND INFORMATION SCIENCES, BAYERO UNIVERSITY KANO IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF MASTER OF LIBRARY AND INFORMATION SCIENCE (MLIS)

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DECLARATION

I, Abubakar Magaji declare that this research work, "Information Needs and Sharing Strategies of Small Holder Farmers in Katsina State" is my original work which was supervised by Professor S.O. Bello. It does not contain any other person's data or information that is not duly acknowledged in the references pages. I hereby declare that this dissertation has never been submitted before as a requirement of any degree in any academic institution.

Abubakar Magaji
SPS/15/MLS/00020

CERTIFICATION

This is to certify that, this dissertation entitled "Information Needs and Sharing Strategies of Small Holder Farmers in Katsina State" submitted by Abubakar Magaji, with registration number, SPS/15/MLS/00020, meets the requirements for the award of Master's Degree in Library and Information Science. It was carried out under the supervision of the under listed distinguished scholars:

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Professor S. O. Bello **Supervisor**	**Date**
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Dr. U.G. Gama **Internal Examiner**	**Date**
----------	----------
Professor E. K. Dawah	
External Examiner	**Date**
----------	----------
Dr, Sani Muhammad Gwarzo	
HOD	**Date**
Faculty Representative	---------- **Date**
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Dean School of Postgraduate Studies	**Date**

APPROVAL PAGE

This Dissertation was read and approved by the undersigned as meeting the requirements for Master's Degree in Library and Information Science, Faculty of Education, Bayero University Kano, and was carried out under the supervision of the under listed distinguished scholars:

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Professor S. O. Bello **Date**
Supervisor

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Dr. U.G. Gama
Internal Examiner **Date**

---------- ----------

Professor E. K. Dawah

External Examiner **Date**

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Dr, Sani Muhammad Gwarzo

HOD **Date**

Faculty Representative ----------
Date

---------- ----------

Dean School of Postgraduate Studies **Date**

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DEDICATION

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LIST OF ACRONYMS AND ABBREVIATION

DOI – Diffusion of Innovation Theory

ICT- Information Communication Technology

ISB- Information Seeking Behavior

KTARDA- Katsina State Agricultural and Rural Development Agency

LGAs - Local Government Areas

PPMCC- Pearson Product Moment Correlation Coefficient

QFSHF- Questionnaire for Small Holder Farmer

WWW- World Wide Web

SHFs- Small Holder Farmers

SPSS- Special Package for Social Sciences

ABSTRACT

There is growing concerted effort to support farming activities worldwide. At present, many governments and donor agencies are intervening by supporting farmers with information in order to scale up farming operations and bridge the low-income generation. The purpose of this study is to determine information needs and information sharing strategies used by Small Holder Farmers (SHFs) in Katsina State. Cross sectional survey design was used in which a total of seven hundred (700) registered small holder farmers from three agricultural zones of the state formed the population. A total number of two hundred and eighty (280) respondents were randomly sampled using cluster sampling technique. Data were analyzed using descriptive and inferential statistics in which the null hypotheses were tested using Pearson Product Moment Correlation Coefficient (PPMCC). The findings of the study revealed that the information needs of the SHFs included the prices of farm produce, weather condition, agricultural loan, new seeds, fertilizer, pest control, new technology, information on storage methods as well as other information that could enhance their farming activities. The finding also revealed that the information sources of SHFs were friends, relatives, agricultural dealers, extension workers, radio, television, farmers' cooperative associations and local government agricultural units. The findings also indicated that information seeking patterns of farmers in the study area were through asking questions, verbal conversations and collaborations followed by chatting and referral. The findings revealed that more than seventy percent of the farmers engaged in different types of farming activities that includes rain fed, livestock farming, and irrigation farming activities. The findings indicated that the highest crops produced by the small holder farmers were beans, millet, maize and sorghum. The findings showed the overall strategies used by the farmers to share information for their farming activities which covered verbal communications, face-to-face interactions, farm visits, extension workers and phone calls. It was found out that farmers shared information to solve problems, get new methods and technology in farming as well as have maximum productivity of farm produce. The findings also showed that personal relationship, farm visits and farmers cooperative association platforms were used at the highest level of efficiency with little emphasis on the use of conferences, workshops, Facebook and WhatsApp platforms. The research further discovered that majority of respondents came across various challenges in seeking and sharing information which included: unavailability of enough extension workers, lack of awareness of information sources, poor response from government, lack of knowledge on how to seek information, uncovered age network services in rural areas, high cost of data and phones, lack of transportation and technical knowledge on how to use ICT for information sharing among others. It is recommended that to improve farming activities in the study area, the government should employ more extension workers to corroborate with farmer's cooperative associations to have a common information hub and train for the farmers.

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

It is understood that information has and will continue to play a fundamental role in supporting agricultural development. Farmers irrespective of their categories – the subsistence or small-scale farmers, medium scale farmers and the large-scale commercial farmers all need information about new developments in the agricultural business sector. A number of researchers have stressed the importance of information support for agricultural developments. For example, Mabuku (2015) stresses that, information is very vital in farming activities of any community and when it is poorly disseminated, farming activities as well as the community development becomes highly impeded. In the same vein, Kalusopa (2005) points out that, agricultural development activities are based on the utilization of information. Kalusopa further emphasized that the information must be up- to-date and easily accessible. The information must also serve certain functions including a means of acquiring knowledge, tool for decision making and a process of communication between stakeholders. To that end, information becomes a working tool for a change that could enhance productivity and assists farmers to solve their problems.

Information needs could be described as demand, requirement, want or desire. Information needs of farmers are not static. They change from time to time according to changes in technologies, environment, information policies and agricultural innovations. Farmers need information on new methods of farming such as; how to improve a variety of seeds, pesticides, agricultural equipments, weather conditions, market prices among others. Information needs of farmers vary by the stages of farming activities. Farmers seek to acquire accurate, timely and high-

quality information to make decisions related to their crops cultivated. Farmers can reduce the probability of losses and have maximum productivity, if they are able to access relevant and timely information. So, the information needs supplied by extension workers helps farmers to make better decisions for their farming. Studies have been conducted on the information needs of farmers, and the needs were different among farmers, according to their farming activities and crops produced. It is also noted that, SHFs need information to boost productivity in their farming endeavor that is why Katsina state is fully committed to assist small holder farmers to meet their information needs and have effective information sharing.

Information sharing assists farmers to meet their information needs and is a key ingredient for competitiveness of SHFs. Sharing information can be in traditional or electronic form. Farmers need to have effective information sharing strategies for successful farming. Information sharing, simply, refers to communication between two or more partners through a particular medium. It is an active and dynamic process in which ideas, knowledge and information are exchanged. Information sharing is important because it avails SHFs with the best knowledge and practices which assist them in improving their farming activities. Uzezi (2015) notes that, information sharing is a channel through which information is transferred and exchanged from one person or source to another. So, effective information sharing could eradicate ignorance and provide the knowledge required to achieve desired economic gross and development.

Furthermore, information sharing provides farmers with up to date information needs through providing helpful answers to requests for information as well as assist them to solve their problems. Sharing information is performed regularly via formal and informal channels. Information is typically shared face-to-face, in village meetings, and other traditional forms. The farmers are able to solve their own problems and have their own development process when there

is effective information sharing strategies. The role SHFs play in identifying their problems and information sharing strategies to solve them will be an important experience for the policy makers to draw lessons from and inform their strategies for policy formulation and implementation for more successful farming activities in Katsina state.

The traditional methods used by farmers to share information include; face to face interactions, through market and religious places, as well as village meetings, among others; while radio, television, mobile phones and ICTs gadgets are regarded as the major modern systems for information sharing. Sharing information in modern or traditional ways plays a dominant role by assisting SHFs to use new innovative technologies in farming activities. It is noted that, there is a lack of effective mechanisms to share information among the SHFs in Katsina State. Therefore, one promising communication strategy that could be employed to share information among SHFs at this present time is Information Communication Technologies (ICTs) such as social and hybrid media.

The conception of the term "Small Holder Farmers" (SHF) varies from one community to another. To that end, scholars have not provided a generic definition for the term. Qiao et al. (2018) cited in IFAD (2013) described small scale farmers as "marginalized people who have difficulties to access resources, capital, information and technology". Small Holder Farmers in South Africa are characterized as poor, less educated and reside in rural communities with less developed infrastructure. An old conception of small scale farmers is that they are "isolated" and living in "closed, self-sufficient societies. In general, as noted by Awazia and Tchamba (2018; Jacobs 2008), these categories of farmers mainly live in the rural areas and farming is the mainstay of their livelihood.

Dyck and Silvestre (2019), stated that, there are about 500 million small holder farms in developing countries. In Nigeria, small holder farmers made up of about 80 percent of the country's farming population (Afolabi, 2010). The contribution of the SHFs to food security in the low-income countries of the world cannot be overemphasized. However, these SHFs remain the most vulnerable to food insecurity, poverty and low net income. In order to address this issue, this study argues that information must play a central role in supporting farming activities of the small holder farmers.

Katsina state farming activities contribute to food production and security, employment generation and raw materials production. Ladan (2017) states that, Katsina state is blessed with abundant farming land and wide range of crops which include millet, guinea corn, maize, wheat, rice, sweet potatoes, Irish potatoes, beans, cassava, cotton, groundnuts and different types of vegetables, are grown. In addition to the farming of crops, the state possesses a large livestock population mainly made up cattle, goats and sheep which are reared in the Sudan savannah vegetation zone of the state. Fishing activities are carried out along rivers and on small, medium and large dams. In terms of forestry, there are both public and private forests in different parts of the state.

Farming activities are rapidly growing in the state through transportation and communication networks in the length and breadth of the state which ensures easy access to all parts of the state. Katsina state has introduced bus services to supplement the efforts of the private transporters. Road networks in the state also cover other parts of the country as well as neighboring Niger Republic. There are internet access and global mobile communication virtually in all the local government areas in the state.

The research study used survey design. This design was chosen because it allows collection of large amounts of data in a highly economical way. Surveys make measurement easier and the results can be statistically significant even when analyzing multiple variables and it enables many questions to be asked on a given topic, as such it allows flexible analysis. This method was also used to explain causality between variables, the relationship between the dependent and independent variables, as well as testing of hypotheses.

The researcher used Diffusion of Innovations Theory (DOI) and Wilson Model of Information Behavior. These correspond with the study variables to investigate Information Needs and Sharing Strategies Used by Small Holder Farmers for enhancing farming activities.

1.2 Statement of the Problem

Information is very critical and plays a dominant role in the life of small holder farmers and is essential for facilitating farming activities in both urban and rural areas. Nigerian government at all levels has made several efforts in boosting farming activities. Ladan (2017) states that, the Federal Government of Nigeria is shifting emphasis on developing the enormous potentials in farming activities as a viable option towards diversifying the economy due to dwindling oil revenues. In many states of the federation, particularly those in the northern part, conscious efforts are being made to develop farming as source of food, income and employment generation.

Farming activities in Katsina are less common despite adequate government intervention. Ladan (2017) cited in Ifo (2016) states that, farming in Katsina state contributes to food security and employment generation as well as production of materials and consequently the GDP growth. It is backbone of the state's economy as 75% of the people are full or part time farmers. He adds that, the federal government of Nigeria is spending about ₦9.874 billion Naira only annually as its

budget for agricultural sector; yet, the SHFs could not produce sufficient foods for the nation's consumption.

Katsina State Agricultural and Rural Development Agency (KTARDA) in collaboration with the state government initiated a new agricultural farming support system targeting small and medium farmers that aimed at increasing food crop production in transforming agriculture and boosting the states' economy. The projects provided incentives such as non-interest loan, extension services and training programmes among others. But after two years, no increase was recorded in production despite the existing relevant interventions put in place by Katsina state government.

Despite the huge investment and efforts made by both the federal and state governments, the SHFs could not produce sufficient food. Consequently, one is forced to ponder whether the small holder farmers have no access to relevant and sufficient information that could assist to improve production. Could it be that the available information sources are not in any way useful or the information sharing formula adopted by the farmers are defective. The strategies used for seeking and sharing information are not effective? This study, is set to investigate the information needs and sharing strategies used by SHFs for farming activities in Katsina state.

1.3 Research Questions

The following research questions have been formulated to guide the study:

1. What are the information needs of Small Holder Farmers in Katsina state?
2. What information sources Small Holder Farmers use to satisfy their information needs in Katsina state?
3. What information seeking patterns Small Holder Farmers use for farming activities in Katsina state?

4. What information sharing strategies Small Holder Farmers use for farming activities in Katsina state?
5. What information sharing platforms Small Holder Farmers use in Katsina state?
6. What challenges do Small Holder Farmers face in terms of:
   i. Information seeking patterns, and
   ii. Information sharing strategies in Katsina state.
7. What measures can Small Holder Farmers take to tackle the challenges of information seeking and information Sharing?

1.4 Research Objectives

The main objective of the study is to investigate and repackage the information needs and information sharing strategies the SHFs in Katsina state use to solve the problems associated with farming activities. The specific objectives are as follows:

1. To determine the information needs of Small Holder Farmers in Katsina state.
2. To determine the information sources Small Holder Farmers, use to satisfy their information needs in Katsina state.
3. To determine the information seeking patterns Small Holder Farmers use for farming activities in Katina state.
4. To determine the information sharing strategies Small Holder Farmers use for farming activities in Katsina state.
5. To determine the information sharing platforms Small Holder Farmers use in Katsina state.
6. To determine the challenges Small Holder Farmer face in terms in terms of:
   (a) Information seeking patterns, and
   (b) Information sharing strategies in Katsina state.

7. To profer solutions that could address the challenges of information seeking patterns and information sharing among SHFs in Katsina state.

1.5 Research Hypotheses

The following hypotheses were formulated to guide the study.

Ho 1: There is no significant relationship between the information needs and information sources Small Holder Farmers use in Katsina state.

Ho 2: There is no significant relationship between the information sharing strategies and farming activities SHFs engaged in Katsina state.

1.6 Significance of the Study

The finding of this study could assist extension workers and agricultural researchers to understand fully the effective information sharing strategies and information seeking patterns SHFs use and assist them to review ways of organizing and disseminating information. The result of this study could also make bare to the SHFs various sources of information which may not be aware of.

The findings could assist government and policy makers to know the challenges of information seeking and information sharing the SHFs face and suggest solutions to them through proper planning and implementations of agricultural information policies. The study would contribute to the body of literature of information needs and sharing strategies of Small Holder Farmers for farming activities.

The finding could be of great benefit to agricultural agencies and Non- governmental organizations like KTARDA, IFAD, etc through organizing training and programs for more successful farming activities. The findings could serve as reference tool for further investigation in this area.

1.7 Scope and Limitation of the Study

The study covered Information Needs and Sharing Strategies of SHFs and was restricted to three local government areas from the three agricultural zones in Katsina state of Nigeria. These LGAs were chosen because they stood as the centre's of challenges facing farmers in Katsina state. Therefore, the sample reflects the true representation of the entire population, so the findings of this study could be generalized to all LGAs in Katsina state.

The study covered registered SHFs in Katsina state, with the inclusion of their information needs, sources, seeking patterns, problems including measures to address the challenges, as well as information sharing plat forms and strategies used by farmers for enhancing farming activities. Thus, these limitations did not pose any significant threat to the successful completion of the study.

1.8. Operational Definition of Terms

The following terms and concepts were defined operationally thus:

Information: Is a processed data that has been recorded, classified, organized related or interpreted within context to convey meaning.

Information Needs: is an individual needs or desire that can satisfy conscious or unconscious needs.

Information Seeking: Is an activity by an individual in locating sources of information to solve his/her problems through various channels.

Information Sharing: Is one to one exchange of data or ideas between one individual to another.

Strategies: the detailed plans for achieving success in situations or the skills of planning for such situations.

Farming Activities: Is a unique and reasonably stable arrangement of farming enterprises that a household manages according to well defined practices in response to the physical, biological and socio-economic environment.

Small Holder Farmers: are Rain fed, Irrigation, Fadama and Lifestock farmers who cultivate land ranging from 0.5 to 4.9 hectares of land mainly at subsistence level and relying solely on rainfall.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

2.1 Introduction

This section presents a review of relevant literature and empirical studies from various journals articles, books, and conference proceedings among others that set the background context of the research inquiry. The review covers the following sub – headings:

2.1 Introduction

2.2 Concept and Significance of Information for Farming Activities

2.3 Information Needs of Small Holder Farmers

2.4 Information Sources Small Holder Farmers Use to Meet their Information Needs.

2.5 Information Seeking Patterns of Small Holder Farmers.

2.6 Information Sharing Strategies Small Holder Farmers Employ to Disseminate Information among Themselves.

2.7 Information Sharing Platforms Small Holder Farmers Use.

2.8 Challenges of Information Seeking and Information Sharing SHFs Face.

2.9 Measures of Addressing the Challenges of Information Seeking and Sharing.

2.10 Theoretical/Conceptual Framework.

2.11 Summary of the Review and Uniqueness of the Study.

2.2 Concept and Significance of Information for Farming Activities

Information is very vital in farming activities of any community and it is essential for enhancing farming activities and bringing social and economic change. Sani, Boadi, Oladekun and Kalosopa

(2014), states that, having adequate and well-presented information will improve the efficiency of rural development, policies, projects and programmes. Thus, farming activities and information provision should be the basic components of rural development programmes. Information is a common knowledge that people use to solve their problems. Information is an important and essential ingredient for both small and large holder farmers. It is critical resource for farming activities. Bernard et al (2014) cited in Meyer (2005) notes that, information has consistently been a significant element in the development of human society and has shaped over a long period of time the way in which we think and act. Information is a vital and crucial input in agriculture for sustainable farming in modern day technologies.

Despite the significant role of information in supporting farming activities, less attention is given to its importance. Supporting this notion from Nigerian context, Ozowa (1995) points out that, small scale farming and farmers have not been given considerable attention in Nigeria and information dissemination which is an essential ingredient in the agricultural development program has not been accorded the priority it deserves. Kalusopa (2005) aptly sums up the situation thus:

> Although it is widely acknowledged that information plays an important role in agricultural development, the conception has received less pragmatic attention and seems to have been less consolidated over time. The central role of information in this sector has thus been largely superficial.

In order to adequately support agricultural development of SHFs, there is the need to pay serious and adequate attention to information. Most key areas of agriculture where improvements would have impact on productivity, such as extension services, access to credit and loan facilities, marketing and local farmers' participation, need information (Kalusopa, 2005). Therefore, understanding the information needs and information sharing the SHF usein Katsina State could help scale up productivity and economic growth of the state.

Abosede, Alabi and Oluyemisi (2014) state that, farmers need to keep abreast with the necessary information that could enhance cultivation and make them aware of issues and developments surrounding any crop before every farming season. It is pertinent to note that farming remains largely in the hands of peasant farmers who rely on old traditional ways of farming. These farmers whose information needs are not met. They lack relevant knowledge and tools for modern farming. Kamba (2009) views information as a basic resource by African communities which the populace may use to improve their conditions of living and is essential to development process. Not only does information expand the possibilities of social, political, educational and economic development of any country, it also facilitates awareness and empowerment. Information is an asset and a resource for development.

Furthermore, information is very significant to SHFs for their farming activities. Bachhav (2012) believed that, information is the fifth need of man after air, water, food and shelter. It is a basic necessity of everyday life and everyone needs information about everything even in his day to day life. There is the need for reliable information to be readily accessible at the right time to the SHFs in order to guide them as well as the government in decision-making.

In addition, Fari (2015) states that, the provision of and access to accurate information at the right time and to the right users is important for the growth and development of any society. Moreover, Kamba (2009) also opins that, **i**nformation in a coherent form can raise aspiration, through arousing people from fatalism, fear of change, desire for a better life and the determination to work for it. This creates an intellectual climate which stimulates people to take another look at their own current practices and future perspectives. Ideally, information brings about knowledge, thus, a knowledgeable community is also an informed community. Similarly, Mansoor and Kamba (2010)

emphasize that information can eradicate ignorance and help achieve economic, social, political, and cultural objectives for the development of the entire community.

In the same vein, Harande (2009) points out that; information is a raw material for the development of both urban and rural areas. Prosperity, progress, and development of any nation depend upon the nation's ability toaccess acquire, produce and use pertinent information. It can be understood that information is a means of transferring events for better awareness, adding new knowledge that could change events, lives, or experiences of small holder farmers.

Emmanuel (2012), states that, information is an important tool used in the realization of any objective or goal set by individuals. It is a valuable resource required in any society, as such acquiring and using information are critical and important activities. Information is also a man's related knowledge in all subjects, in all forms and from all sources, which could help users to make rational decisions.

These scholarly views have shown that information is of paramount importance to small holder farmers for farming activities and a working tool for a change that can lead to enhance productivity for SHFs, if properly packaged and disseminated. The significance of information to farming activities cannot be over emphasized. Hence, lack of adequate and relevant information can impact negatively on any development process and no farmer can succeed without having relevant and timely information. Information is very important to all categories of farmers. It is an indispensable factor for farming activities and is the basis of extension services. The points of views of eminent scholars cited above showed that information enables SHFs to make better decisions about what to produce, when to produce, where to produce and how to produce.

Information needs could be seen as demand, requirement, want or desire. Wilson (2000) states that, the main document that focused on studies of information needs started between (the period

of) 1948 and (followed by attempts to explore information needs of ordinary citizens in) 1965 in USA. A conceptual model developed by Dervin links urban residents to information needs, information solutions to problems, and information sources. He identifies the psychological, intellectual, institutional, and societal barriers to the satisfaction of needs. Studies of this kind, however, run into the problem of defining the concept of information need, Dervin suggests that "information need" is not a fundamental need such as the need for shelter or the need for sustenance, but, rather a secondary order need which arises out of the desire to satisfy the primary need. According to Yusuf (2012) cited in Taylor, (2008) information need refers to the extent to which information is required to solve problems, as well as, degree of expressed satisfaction and dissatisfaction with the information.

According to Ikoja-Odongo and Mostert (2006), an information need may arise when an individual recognizes that his or her current state of knowledge is insufficient to cope with the task at hand, or to resolve conflicts, or to fill a void in some area of knowledge. Case (2007) noted that, information need arises when an individual sense a problematic situation or information gap, in which his or her internal knowledge and beliefs, and model of the environment fail to suggest a path towards the satisfaction of his or her goals. Such an identified information need may lead to information seeking and the formulation of requests for information. Talja (1997) states that generally information needs arise when an individual is in a problem situation and cannot manage with the knowledge possessed. Chowdhury (2004) identifies the characteristics of information need as follows:

i. An information need is a relative concept that depends on numerous factors and does not remain constant but changes over a period of time.

ii. Information needs vary from person to person, from job to job, subject to subject, organization to organization, etc.

iii. Information needs are largely dependent on the environment, for example the information needs of those in the academic environment may differ from those in business or industry.

iv. Information needs often remain unexpressed or are poorly expressed.

v. Information needs often change upon the receipt of some information.

Kamba (2013) explains that understanding information needs of rural populace will help extensively in designing information products and services relevant to their needs. It will also be more cost effective by libraries and Nigerian government to operate in that regards. Therefore, SHFs information needs with effective information sharing strategies ensure proper design and implementation for farming activities.

Mesmer-Magnus and DeChurch (2009) posits information sharing as a central process through which team members collectively utilize their available informational resources. The proliferation of information sharing systems and environments are strong indicator of the basic need for sharing information. They note that, the quality and reliability of the information shared, its acceptance, trust, and willingness to ask for it are all variable too.

Information sharing is a complex multi-dimensional phenomenon affected by behavioral, social, economic, legal, and technological influences, to name a few. It was proposed that the simplistic terms ‘information sharing’ or ‘knowledge sharing’ are better depicted as a continuum (Rafaeli and Raban: 2005). Hilary, Sseguya, and Kibwika (2017) opin that, information sharing is regarded as an effective predictor of value chain effectiveness. Information sharing contributes largely to improved relationships between sender and receiver by facilitating efficient coordination and

responsiveness as well as integration of partners' information systems. Trust enabled sharing of relevant information that helps change the mind set of farmers towards new and better farming methods.

The usefulness of information sharing cannot be over emphasized. It connects farmers and relevant stakeholders from different destinations on the level of trust and interactions for more successful farming system. Information sharing is a key ingredient to farming and critical to competitiveness for SHFs who require a free flow of information among themselves to remain productive and competitive in farming activities.

2.3 Information Needs of Small Holder Farmers

Information needs could be seen as a demand, requirement, want or desire as stated ealier. Yusuf (2012) cited in Taylor (2008) defines information need as the extent to which information is required to solve problems. It is also a degree used to express satisfaction and dissatisfaction with the information. Information needs are many and multi-dimensional and this could be linked to the diverse nature of communities (Harande, 2009). On a daily basis, small scale farmers need information to help develop and strengthen farming activities. Farmers seek to acquire accurate, timely and high-quality information to take decisions on crop production, reducing losses and maximizing productivity. Odini (2014) states that, farmers need relevant and adequate information on agricultural inputs, marketing and selection of varieties of seeds, high yield crops, and pest control and fertilizer application.

Similarly, Bernard, et al (2014) assesses information needs of rice farmers in Tanzania. The study shows that rice farmers have a wide variety of information needs that include information on weather condition, agricultural credit/loan, new seeds, storage methods, planting methods, diseases and pest control and pesticide availability and its application.

Mabuku (2015) investigates information needs of small scale farmers of Namibia. The study reveals farmers' information needs to include animal health information, information on animal husbandry, new technologies and agricultural policies. Furthermore, Adio, Abu, Yusuf, Sharif and Shehu (2016) point out the information needs of rural farmers may be grouped into five classes, namely agricultural inputs, extension education, agricultural technology, agricultural credit and marketing. Many scholars have identified different types of information needs of SHFs for their farming activities. SHFs preferred Agricultural information needs than any type of information.

However, Mabuku (2015) investigates Information Needs of Small-Scale Cattle Farmers of Katima -Mulilo Rural Constituency of Namibia. The study found that information needs of cattle farmers were; animal health information, market information, information on animal husbandry, new technologies, and agricultural policies. Similarly, Emmanuel, (2012) conducts a study on Information Needs of Rural Farmers in Okpukwu Local Government Area of Benue State, Nigeria. A total of 120 rural farmers from the three districts; Okoga, Edumoga and Ichama formed the sampled population of the study. The study revealed that rural farmers need information to improve their farming practices, enhance or boost their productivity and be informed of modern farming systems in order to meet up with challenges that may arise in their farming.

According to Emmanuel (2012) information needs of rural farmers may be grouped into five classes: agricultural inputs, extension education, agricultural technology, agricultural credit, and marketing. Bernard, et al (2014) carried out a research on Assessment of Information Needs of Rice Farmers in Tanzania using rice producers in Kilombero District as a case study. The results revealed that rice farmers have a wide variety of information needs that include; information on marketing, weather condition, agricultural credit/loan, new seeds, storage method, planting methods, diseases and pest control, and pesticide availability as well as its application. Therefore,

understanding the information needs of SHFs in Nigeria and Katsina State in particular is crucial for increasing quality, quantity, market access and diversification of the country's agricultural business sector, in line with commitment to broaden the economic sector. However, information needs of SHFs in Katsina State have not been widely recognized in the literature which examines agricultural development. Therefore, this study aims to fill this knowledge gap.

Empirical evidences have shown that most information needs of farmers were lying in the same direction. Farmers mainly need information on new method of farming and how to improve variety of seeds, pesticides, agricultural equipments, weather conditions, market prices among others for their farming activities. However, study on information about innovative and knowledge-based technology has not been carried out, and this create a gap in modern farming system that needs to be filled for maximum productivity. Benard, et al (2014) are of the view that information needs of farmers change from time to time due to changing farming systems. That is why librarians and information scientists always strive to develop collections and services that will meet the information needs of rural populace. Understanding the information needs of SHFs in Nigeria and Katsina State in particular is crucial for increasing quality, quantity, market access and diversification of the country's agricultural business sector. Since the information needs of small holder farmers in Katsina state have adequately studied, this study aims to fill this knowledge gap.

2.4 Information Sources Small Holder Farmers Use to Meet Their Information Needs

Farmers' information sources are the central elements of advanced farming activities as well as the fundamental and essential promoter of farming activities. Sani, et al (2014) state that information sources can be distinguished by form of representation - textual (books, journals, manuscripts), graphic (graphs, diagrams, plans, charts), and audio-visual (sound recordings, motion pictures, slides). Several scholars have conducted researches on the information sources small scale farmers

use to meet their information needs. Daudu, Chado and Igbashal (2009) investigated the agricultural information sources by farmers use in Benue State, Nigeria. The study reveals that farmers source their information from radio, libraries, friends and extension workers. Opara (2008) conducted a research on agricultural information sources used by farmers in Imo State, Nigeria and found out that the significant sources of information to the farmers are, farm demonstrations/ agricultural shows (40.8 percent), television (43.3 percent), fellow farmers (44.8 percent), contact farmers (35.3 percent) while the majority of the farmers (71.2 percent) preferred information from the extension agent to the other sources.

Daudu, et al. (2009) studied agricultural information sources farmers use in Benue State, Nigeria. The study revealed that 29.17% of the respondents source their information from Radio, 9.17% from libraries, 37.5% from friends and most of them (40.83%) depend on extension workers. In their study, Brhane, Mammo and Negusse, (2017) found out that 78.9% of farmers source their information from personal extension workers, 57.2% from woreda agricultural extension experts, 51.3% from family, 45.9% from farmers development group members, 37.5% from friends and neighbors, 26.3% from cell phone, 21.7% from conferences and meetings, 29.6% from radio, 22.4% from printed materials, 17.1% from cooperatives, 19.7% from different levels of administrative members, 7.2% from agricultural researchers, 10.5% from demonstration and field days as well as 5.3% from agricultural input suppliers.

Lwogo, Stilwel and Ngulube (2014)"s study revealed that farmers largely source their information from friends/neighbors (43%), extension workers (35.5%), agricultural input suppliers, (17.2%) and family/parents (17.2%). Other knowledge sources included farmer groups (11.8%), personal experience (10.8%), village leaders (7.5%), NGOs (4.3%), district officials (4.3%), radio (4.3%), village meetings (3.2%), middlemen (3.2%), and farmer cooperatives (2.2%).

However, Yaseen, Shiwei, Wen and Hassan (2016) assessed farmers' information sources in rural Pakistan. Findings indicated that majority of farmers (47.5%) ranked neighbor-friends-relatives as first source of information; while 31.9% of farmers ranked this source as second and 33.7% farmers ranked it as third major source. On the other hand, a few farmers, (10%) ranked extension workers as first information resource.

Bachhav (2012) found out that 62.29% of the farmers source information from newspapers, 57.15% of them from government and 41.72% from television. He added that majority of the farmers defend on their colleagues for information as about 80% of them farmers had mobile phones with which they source for information.

Sharma (2014) investigated farmers' satisfaction with information sources and services in India. The study revealed that elders, family members as well as friends, neighbors and relatives were the common sources of information for farmers. It also reported that there were three information sources available to the farmers thus: Personal contact, Group contact and Mass contact.

(i) Personal Contact as a Source: Farmers can develop personal contact with different persons to collect different useful information relating to farming. Such persons may be their own elder family members, relatives, neighbors, friends, farmers, extension workers, public library officers, local leaders, and subject specialists.

(ii) Group Contact as a Source: Farmers can develop group contact with different sources to collect different useful information relating to farming. Such sources may be meeting (organized by government department/NGOs), group discussion, fixed days of visit, and agriculture tours.

(iii) Mass Contact as a Source: Farmers can develop mass contact with different sources to collect different useful information relating to farming system. Such sources may be radio, television, motion picture, farmers' rallies and exhibitions.

Similarly, Biradar (2000) studied the Sources of Information of Farmers in Karnataka, India. He grouped the sources into three:

1. Informal personal sources: These are sources of agricultural information to farmers such as friends, neighbours, relatives, pesticides dealers etc.
2. Impersonal Sources: These sources play a vital role in many activities, particularly with respect to soil test and prices of agricultural products. These include radios, newspapers, Televisions, libraries, leaflets and film shows.
3. Formal Personal Sources: These comprise Gramasevaka and agriculture extension worker.

On his part, Mabuku (2015) revealed that, the major sources of obtaining information by farmers include: friends, relatives, veterinary doctors, extension workers, Meat Corporation Board of Namibia, traditional leaders, Likwama farmers union, radio, television and newspapers.

Empirical evidences have shown that, there is variety of information sources available to the farmers which includes radios, televisions, newspapers, mobile phones, printed materials, farmers groups, libraries, and social media among others. However, some of the studies reviewed, so far, highlighted that the performance of extension worker was not encouraging. Majority of farmers acquire information from friends, relatives, market dealers, self experience among others. It was also noted that, this type of research work had not been conducted within the geographical location of the study area. Therefore, information sources such as radio, television, newspapers, mobile phones, printed materials, farmers' groups, libraries, extension workers and social media

among others are widely used by farmers to get relevant information on agricultural activities. SHFs should try using these information resources to leverage in the agricultural business.

2.5 Information Seeking Pattern of Small Holder Farmers

Information seeking pattern is a behavior that leads an individual to the use of information in order to meet his information needs. Information seeking is a conscious effort to acquire information in response to a need or gap in knowledge and is used in terms of active and intentional behaviour. Information seeking is not always triggered off by the need to solve a problem or make decision, because at times, one may desire to have more information or assurance or wish to reduce uncertainty (Case 2007). An information need may lead to a decision to seek information. Information seeking is a form of human behaviour that involves seeking for information by means of active examination of information sources or information retrieval systems to satisfy the information need, or to solve a problem (Ingwersen & Järvelin 2005). Wilson (2006) opined that information seeking is more closely related to the concept of 'need' than it is to the concept of information itself.

Case (2007) describes information seeking pattern as a conscious effort to acquire information in response to a need or gap in one's knowledge. The individual realizes that he has a need which drives him to seek information. There are insignificant empirical investigations aimed at providing a comprehensive definition of information seeking pattern of farmers. Case, (2007) added that, information seeking takes place when a person has knowledge stored in long term memory that precipitates an interest in related information as well as the motivation to acquire it.

Kingrey (2002) views information seeking pattern as a cognitive exercise, a social and cultural exchange, and discrete strategy applied when confronted with uncertainty, and a basic condition of humanity in which individuals exist. He postulates that information seeking serves as an umbrella

overarching a set of related concepts and issues that involve the search for, and retrieval, recognition, and application of meaningful content; in other words, the content is accessed, used and synthesised into personal knowledge. Kuhlthau (1991) defines information seeking as the user's constructive activity of finding meaning from information in order to extend his or her state of knowledge on a particular topic.

Odini (2014) conducted a study on Access to and Use of Agricultural Information by Small Scale Women Farmers in Support of Efforts to Attain Food Security in Vihiga County, Kenya and find out that farmers sought information by asking friends, neighbours, talking to relatives, and discussions with those whom they thought had the needed and right information. Others listen to radio, while some women use mobile phones for needed information.

Mugwisi (2013) as cited in Kuhlthau, (1999) defines information seeking pattern as the user's constructive activity of finding meaning from information in order to extend their state of knowledge on a particular topic. In order to understand the context in which people seek information, he argues that it is important to first understand information seeking which is essential for designing information systems and services that respond to users' needs. He identifies the concepts as follows:

a. Process- Information seeking pattern is not only about locating sources and finding facts to answer questions and solve problems, but also a complex inquiry process that involves learning from a diverse range of inconsistent and incompatible sources and can have important implications on the way systems and services are designed. Conceptual strategies which may be developed for application in the design of more responsive systems and services include continuing, charting,

composing, collaborating and conversing. These conceptual strategies highlight the constructive process in information seeking.

b. Constructive process of information seeking pattern- The concepts involved in this process include: acting and reflecting, feeling and formulating, predicting and choosing, and interpreting and creating. These sequences or stages enable the person to construct or develop a new understanding based on the information encountered while searching for information.

c. Uncertainty. Uncertainty is considered to be a natural, essential characteristic of information seeking pattern (as opposed to the reduction of uncertainty as the primary objective of information seeking). It incorporates the user's perspective of information seeking, and can only be considered in context. It is context that reveals the relationship between uncertainty, confidence, uniqueness, redundancy, stance and interest, and their implications on the theoretical framework.

d. Complexity. Complexity is essential in understanding the experiences of uncertainty in the information seeking process, the argument being that it is an individual's perception of the complexity of a task that determines his/her experiences of process and degree of uncertainty. Task complexity, which is relatively new, is an important concept for understanding why and when the stages of the information search process are experienced by users in contrast to information seeking which is considered to be a more straightforward source-location and question-answering undertaking.

e. The concept of enough. Enough relates to seeking meaning in a quantity of information by determining what one needs to know and by formulating a perspective on which to build. The concept of enough may be applied at every stage of the process, e.g. incorporating the ability to

recognize an information need, to explore information on a general topic and to formulate a specific focus.

Daudu, et al. (2009) conducted a study on information use and seeking pattern of farmers and the result revealed that 18.33% and 8.2% of farmers use radio and libraries respectively, this could be attributed to inaccessibility of libraries and non-availability of radios due to cost of procuring them. It could also be due to the fact that both are one-way processes of communication.

The goal of information seeking is to identify potential knowledge, data, information, or raw material that will contribute to the theoretical or empirical development of a field or to the solution of a practical problem. (Mugwisi, 2013). There is insignificant literature on information seeking pattern of farmers, it can understand that, information seeking pattern of farmers simply means an activity by individual farmers in locating available sources of information, finding facts and their effective use to solve problems related to farming activities through various information channels that includes: relatives, friends, extension workers, traditional leaders and newspapers.

Information seeking pattern of SHFs is very critical for farming activities, even though, it has not been investigated within the geographical location of the area of study. Information seeking pattern assist farmers to articulate their information need. However, based on the available literature, one can understand that, information seeking pattern vary according to demographic characteristics like age, gender, education, exposure, information sources, content, and medium among others.

2.6 Information Sharing Strategies Small Holder Farmers Employ to Disseminate Information among Themselves

There are contradicting views of the two concepts ‘‘information sharing strategies’’ and ‘‘information sharing platforms’’. Information sharing strategies can be seen as communication between two or more partners through a particular medium, or an active, dynamic process in which ideas and information are exchanged. Information sharing strategies can be seen as the patterns or channels used in transferring and sharing agricultural information among small holder farmers. Information sharing platforms are communication groups among SHFs which include: meetings, face-to-face interactions, forums that involve one-on-one conversations or farmers interacting with many farmers within a society. Information sharing platforms are based on mutual agreement and understanding between two or more individual farmers to share knowledge, ideas, information and experiences through a particular medium for the improvement of their farming activities or to solve problems associated with their farming activities.

Information sharing strategies are broader than information sharing platforms. All information sharing platforms are strategies but not all strategies are platforms in sharing information among SHFs. There is need for good information flow and effective information sharing among Small Holder Farmers for better performance and maximum productivity for their farming activities. Studies were carried out on information sharing strategies from various locations. Hilary et al (2017) states information sharing has been regarded as an effective factor of a value chain’s effectiveness. Information sharing contributes largely to improved farming and facilitate efficient coordination and responsiveness as well as integration of partners’ information systems. Information sharing trusting relationship and encourages interaction among value chain actors and further enhances the benefit of information sharing. Lack of trust in agriculture extension workers

result into farmers being reluctant in accessing information from them. Information sharing has enabled increased yields, well informed decisions and reduces post-harvest losses.

Abbas (2015) states that, in Nigeria farmers share and disseminate information via extension workers, agricultural government offices, and mobile telephones. Information is shared to farmers about the availability of farm implements, fertilizer, seeds and seedlings, while farmers seek clarification on many issues about farming and farming techniques through extension workers. Masuki, et al. (2010) discussed strategies used by farmers in managing and sharing information as follows:

1. Correspondence: It is non-concurrent, remote communication between farmers, including letters, emails, newsgroups, Internet forums and blogs. Meetings: These may take the form of face-to-face interactions, workshops and focus groups specialised committees (e.g. village development committees), policy forums and debates. Farmers can share information through these strategies.
2. Interpersonal channels: They involve one-on-one conversations or individuals interacting with many people within a society. They include extension work, toll free lines, opinion leaders, phone-ins, video and audio clips by SHFs to share information.
3. Training activities: Media and government ministry communication units can be used to equip public relation officers and journalists with knowledge and skills for reporting on agricultural issues. Training, most probably short term, can be used as a tool for raising awareness.
4. Publication: Publication is a major and common strategy of sharing knowledge and information. It may take the form of brochures, calendar of events, information

bulletins/folders, pamphlets, bibliographies, newsletters, quarterly or annual reports, and research and consultancy reports.

5. Public events: These could be used for educational and awareness raising purposes. Agricultural, trade, industry, scientific, environmental, disaster awareness days, and other fairs can be exploited by the project team and its stakeholders to disseminate information on the benefits and actualization of evergreen agriculture.
6. Socio-Cultural marketing: culture and use of non-traditional forms of media such as traditional dances, drama, community theatre, jam sessions involving poetry, music, song and debates as a major avenue of disseminating and sharing information.
7. Media: Media play a critical role for information sharing strategies of farmers. Farmers receive information and messages through a variety of communication media which includes; radio, television, mobile phones, village meetings, field days, leaflets among others. Media is an instrument for sharing modern ideas that would improve farming activities. These media could be electronics mass media (radio, television, video etc.) prints media (newspapers, posters, and leaflets among others), information communication technology media or interpersonal communication media. This media includes:

i. Mass Media: Mass media have tremendous potential for agricultural information sharing. Mass media channels are those means of transmitting messages such as radio, television, newspapers etc. They are often the most rapid and efficient means of informing an audience of the existence of an innovation, that is, to create awareness-knowledge. (Rogers: 1983).

ii. Print Media: Print media is a publication in printed format for agricultural information sharing among SHFs. Mugwisi (2013) states that, print media provide news on current events and information in agriculture such as the marketing of commodities, price indices, farmer

organizations, input supply companies, etc. Information is disseminated in form of pamphlets, posters and magazines on various aspects of agriculture, including fertilizer and chemical handling, how to grow certain crops, post-harvest handling among others.

iii. Information Communication Technology (ICT) Media: Information communication technology media is the modern method which includes the use of internet and email in order to share information to SHFs to support their farming activities.

iv. Interpersonal Communication Media: The extension agents cannot reach every farmer, so mass media could be used to share information interpersonally among SHFs from various destinations. Ndilowe (2013) states that, interpersonal communication emerged as one of the most effective methods used when communicating information to the farmers. Communication (whether print, electronic or verbal) plays a critical role in sharing information among small holder farmers for farming system to improve. It thus, needs to be given great consideration.

Oral communication is a channel used in transferring and sharing agricultural information among SHFs in rural areas.

Mabuku (2015) in a study revealed that oral communication was the most preferred channel of communication. He observed that, not all farmers use mass media communication strategy for information sharing with no formal education, those in primary and secondary levels relied heavily on oral (Verbal) communication strategies.

Abcic (2016) states that, SHFs information sharing strategies linked with Information and Communication Technologies (ICT). This is generally referred to as the expanding assembly of technologies that are being used to handle information and facilitate communication in different sectors of economies. It enables acquiring, processing, storage and dissemination of information both locally and globally.

Small Holder Farmers prefer information through oral communication strategies. If there is a new technology, unless they see extension workers demonstrate how it works, they will never use and accept it. They are more comfortable with oral strategy where they can understand issues that they do not understand. Based on empirical studies reviewed, it was found out that no study was carried out on information sharing strategies of SHFs in the study area.

2.7 Information Sharing Platforms Small Holder Farmers Use

Information sharing platform is an interactive process in which information, knowledge and skills, relevant for development are exchange between farmers, extension workers as well as advisory services and information providers and researchers either personally or through media. Fari (2015) state that, information and knowledge sharing is an activity that requires the interaction, transfer and exchange of ideas and expertise among individuals, organizations and/or nations.

Churi, Malongo, Mlozi and Tumbo (2012) conducted a research on "Understanding Farmers' Information Communication Strategies for Managing Climate Risks in Semi- Arid Areas of Tanzania" found out that, sharing of knowledge from farmer to farmer through personal contact has remained the main platforms of sharing information despite the inadequate reliability of information and experience shared among them. Others information sharing platforms include use of mobile phones, radio, village meetings, extension services and even television to some extent.

Tadesse (2008) cited in Burnett (2003) states that, information sharing with fellow farmers is made easy through meetings in the village such as local beer places, market places, mosques, churches, and funeral gatherings. Bachhav (2012) opines that, if relevant and timely information is shared and effectively used by SHFs it will help them to make right decision for their farming activities.There are various information sharing platforms that can be used by SHFs. The use of

Information Communication Technologies (ICTs), social network and media improve information sharing strategies that connect SHFs not only within the rural areas but urban areas too. (;Idiegbeyan and Theresa,2009; Okwilague, 2007). Moreover, there is a wide variety of ICT platforms that are currently being used to provide different types of information sharing strategies to SHFs. These include online PC based platforms, internet websites, mobile telephones, radios and televisions and GIS tools among others. In Africa, different ICT platforms are being used for exchange and dissemination of a wide range of information, these demonstrate the potential for using ICTs dissemination and feedback on variety of related information. There is a wide range of websites and online portals providing interaction platforms for agricultural researchers and SHFs. ICT information services can also serve as excellent entry points for farmers who have not previously had access to unbiased and timely information (Abcic: 2016).

Mgbenka, Agwu and Ajani (2013) suggest that the most effective communication platforms that extension agents use to effectively disseminate and share information to farmers are face-to-face interactions such as discussion, visit to farmers, field day, meetings, etc. The effectiveness and viability of such interactions are motivated by certain variables such as intentions, characteristics, environment and benefits and, more importantly, modern technologies, which are referred to as ICTs, that largely contribute to the rapid and remote transfer of information and knowledge. Effective information sharing avail the farmers with the best practices in farming, timely access to market information and helps them to make correct decisions about what crops to plant and where to buy them and sell them.

Information sharing platforms are of great importance to SHFs for their farming activities. Some methods that could be used by SHFs to create more platforms to share information for farming activities are:

a. Radio: Radio is one of the important mass media which farmers can use to create platforms for information sharing. Mabuku (2015) found that, there was little use of radio as an information sharing platform. Most of his respondents complained that information presented and shared through radio was too basic and lacked wide coverage of many subject areas. Contrary to the findings of Zhao (1998) and Geng (2001). Who ranked radio as the most used information sharing platform in their studies.

b. Television: Television plays an important role as platform for information sharing for farming activities of SHFs. It is an appealing medium for sharing information. SHFs can learn much from it as they do on physical demonstration by extension workers. It can be used to show package information sharing for farming activities in rural areas.

c. Newspapers: The use of newspapers, leaflets and newsletters, as message carriers for information sharing are of limited use for reaching illiterate farmers. Besides, information publications on farming activities in Africa are scarce due to inadequate financial resources. (Ozawa, 1995, Mabuku; 2015). Newspapers were ranked last in the study conducted by Mabuku (2015). Gloy, Akridge and Whipker (2000) examined preferences of information Media platforms used by cattle and crop farmers. Their study revealed that the two most useful platforms were crop/cattle specific publications and general farm publications.

d. Mobile Phone: Mobile phone is one of the communication platforms for information sharing and may be the most effective and fastest way of sharing information. Contrary to Mabuku (2015) who rated it last in his study. and as very few were reported to have ever used mobile phones as a channel of information sharing platforms. Churi et al. (2015) state that, the popularity of the use of mobile phones in rural areas has tremendously increased very fast despite their low level of income. The results from FGD indicated that farmers rely on mobile

phones as platforms for sharing information on availability of seeds, herbicides and fertilizers from local dealers. Zhao (1998), Geng, (2001) He and Zou, (2006) also reported that, Mobile Phones were used by farmers as information sharing platforms. Geng (2001) also reported that farmers obtain and share information through computer networks platforms. Internet maybe a new technology that facilitates a wide coverage of information sharing. However, people in rural areas are not yet familiar with it because it requires an individual to have knowledge and skills of using it. This type of medium also requires an individual to have money to pay for its services which most people in rural areas cannot afford.

e. Library and Information Centre: In January 2009, a session on the future of agricultural libraries was held at the 'Knowledge Share Fair for Agricultural Development and Food Security'. Participants reflected on the future roles of agricultural libraries. Ballantyne (2010) states that, future agricultural libraries will play a better role and be more active in opening access to information and knowledge, not just by collecting and documenting global goods, in catalyzing knowledge sharing among farmers, but by providing integrated platforms for information and knowledge management, and in providing a range of targeted services and products. He further says, libraries will be part of wider information and knowledge exchange systems in which 'users' will increasingly become 'collaborators' and librarians knowledge sharing catalysts and brokers. These changes are likely to require substantial re-positioning of traditional information centres—away from mainly 'collecting' roles towards more 'connecting' ones. Such libraries need to add skills from knowledge management, social media, participatory communication, and information technology to their existing core focus on agricultural content.

Therefore, empirical findings on medium used for information sharing showed that radio, television and mobile phones were important media for information sharing. So, any communication that wants to reach a large audience of farmers needs to use radio, television, mobile phone and an appropriate media like newspapers, brochures, among others. It was discovered that, no study conducted on information sharing that can optimize utilization of ICT to complement the existing traditional methods in the area of study. However, to the researcher's best knowledge very few publications address the information sharing strategies and platforms used by farmers. That is to say, the topic under study was not investigated especially from the point of view of this current research.

2.8 Challenges of Information Seeking and Information Sharing of Small Holder Farmers

There is need for good information seeking and information sharing patterns among SHFs for better performance and improved farm produce. Information is an essential ingredient of farming and agricultural development programmes. It is essential in managing information flow in order to work effectively. There is need also to have a form of communication that provides information as well as a strategy for building trust and strengthening relationships. SHFs face several challenges in information seeking and information sharing for farming activities. These challenges are discussed below:

2.8.1 Challenges of Information Seeking

Tologbonse, Fashola, and Obadiah (2008) reveal that, outdated information, language barrier, lack of awareness of existence of different information sources, lack of funds as well as poor format of information carrier are the major challenges SHFs face while seeking information. Adetimehin, et al (2018) state that farmers were facing infrastructure shortage (power), lack of money to buy mobile phones, radios, lack of interest, incompatible format where the information is packed, and

maintenance problem. Similarly, the findings revealed that there was lack of timely information, users' inadequate knowledge and skills on how and where to access the required information and distance of information source.

Mahendra (2012) in a study conducted revealed the challenges of information seeking the SHFs face as: low level of formal education and skills. He opines that the literacy and mean years of education of the SHFs were low compared to medium and large farmers. He found that literacy among males and females for marginal farmers respectively were 62.5% and 31.2% respectively while the corresponding number for medium and large farmers were 72.9% and 39%. Similarly, the mean years of education for males among marginal farmers were 3.9 as compared to 5.3 for medium and large farmers. It is important for SHFs to have a reasonable level of awareness regarding their information needs.

Byamugisha, et al. (2008), point out that, the major challenges the SHFs encounter in Uganda when seeking for information were lack of cooperation from fellow farmers and language barriers. Brhanel et al (2017) stated that, the main challenges experienced by small holder farmers when seeking relevant information were: infrastructure shortage (power), lack of money to buy mobile phone, radio and service fee, lack of interest, incompatible format where the information is packed, and maintenance problem. Similarly, the findings revealed that there was lack of timely and locally information, users' inadequate knowledge and skills on how and where to access the required information and distance of information source. Brhanel, et al (2017) further explained that SHFs lacks funds to buy ICTs apparatus and pay service fees. Poor information packaging and low level of SHFs' skill in using modern ICTs tools for searching agricultural information purpose. This is in line with Lwoga, Stilwell and Ngulube (2011) in their study which revealed as follows:

a. Inadequite of public extension workers

Most of the surveyed communities either lacked or had only a few extension workers to assist them when they had problems. Farmers lacked funds to travel to the district headquarters for consultations with the available extension workers in case of problems. Further, most extension workers were ignorant about indigenous farming techniques, and farmers were reluctant to seek information from them.

b. Lack of awareness of information sources

Farmers were ignorant of their right to consult formal sources of knowledge, such as workers or district officers through their village leaders, once they had problem. Thus, most of them depended on family, neighbors and friends, whose information at times were not sufficiently reliable to solve their problems.

c. Socio-economic factors

Socio-economic status of some farmers hinders them to seek knowledge from their fellow farmers, farmer groups, village authorities and extension workers. It was reported that some farmers were too old to seek information from the various sources of information within and outside their villages. But rather, rely on their neighbors and family for advice when they have a problem for their farming activities.

d. Long Distance Location

Concerns were raised about the long distance that farmers had to travel to consult the extension workers at the district headquarters or in other villages and to negotiate prices with middlemen. Some farmers were located very far away from district headquarters or markets where village extension workers were not available. It was difficult for them to access reliable market

information. Many farmers only consult their neighbors and friends who do not have accurate information.

e. Resistance to change

Farmers were resistant to change, due to thier ignorance and lack of encouragement from their leaders. They do not seek and adopt new information and knowledge. It was also noted in the study that, farmers were not willing to learn from other farmers because they preferred to draw from their own personal experience.

f. Nature of small-scale farming

Most farmers felt that there was no need to seek information and knowledge to solve their farming problems because they farm on a small scale. Sometimes, the nature of small holder farming system is a problem which limit farmers from seeking information.

Lwoga, et al. (2010) describes other challenges that inhibit farmers from seeking information in their communities. This include: poor response from government authorities in terms of requests for information, lack of awareness on the available sources of information and poor knowledge sharing culture. Naveed and Anwar (2013) found that, the challenges of information seeking faced by SHFs a large majority of the respondents (72.6%) mentioned that they failed to access their required information. This was not surprising because rural farmers rely mainly on informal Information sources and prefer oral communication channels. Low level of education (41.7%), language barrier (33.3%) and no access to the information (30.9%) also restricted them in meeting their information needs. Some respondents (13.1%) also mentioned lack of awareness about where to get the required information. The least mentioned problems include shortage of electricity supply, bad timing of programs and infrequent visits of extension staff in the village.

However, Mbagwu, Benson, and Onuoha (2018) note that, the challenges of meeting information needs and seeking by rural farmers through Internet include:

i. Lack of ICT infrastructures through which internet-based service can be provided and accessed: Information service that could have been provided through websites, online forums, and social media would hardly be provided when the infrastructures are not in place.

ii. Low level of interest in utilizing agricultural information among rural farmers: It has been acknowledged over time, that there is a connection between the level of interest in anything and extent of use of same thing. Most rural farmers assumed that they have no need for information or seeking and prefer to continue their farming practices in their conventional mode. This affect the extent to which rural information needs and seeking can be satisfied through internet-based services.

iii. Inadequate knowledge of SHFs' agricultural information needs and seeking: This is one of the major factors that affect the provision of internet-based services for information seeking by small scale farmers. Even when there are structures and facilities in place, it is pertinent that the information needs and seeking of SHFs are understood properly. Adequate understanding of rural famers information needs and seeking is essential in providing internet-based information service, because it helps in determining the best approach and form of internet information system to adopt and use.

iv. Level of ICT literacy: it has been established in literature that the level of ICT literacy among rural farmers, especially in developing countries is very low.

v. Non-existence of information providing agency in rural areas: Lack of information providing agencies in rural areas affects the provision of internet-based service to rural farmers. Having information agencies in rural areas would make it easier for stakeholders in agriculture to

partner with them and ensure that they are utilized as platforms to reach to the farmers and meet agricultural information needs and seeking patterns of rural farmers.

vi. Non-existence of agricultural advisory services in libraries: Libraries in most developing countries do not provide agricultural advisory services to rural farmers. This ordinarily would have been a good platform for reaching out to rural farmers.

Nnenna (2011) investigated the rural farmers' problems of seeking and accessing agricultural information in Nsukka local government area of Enugu state. The study revealed that poor public relations of extension officers, inability to read and write (illiteracy), poor radio and television signals, agriculture information on radio aired at odd hours, lack of constant power supply, access roads for easy community visits of extension workers as well as money to purchase newsletters, leaflets of agricultural information as the main of constraints for seeking and accessing information for SHFs.

Many studies indicated that, inadequate extension workers, lack of awareness of information sources, lack of ICT skills and knowledge, low level of education, illiteracy, language barrier, inadequate extension workers, long distance to information centers, inaccessible roads, and agricultural programmes on radio aired at odd hours among others were the major problems that hindered farmers from seeking and obtaining information for their farming activities.

2.8.2 Challenges of Information Sharing

Hilary,et al (2017) conducted a study on information quality, sharing and usage in Uganda, and stated that, most farmers were unwilling to share information that may put them at a competitive disadvantage. As a result, tremendous amounts of information remain inaccessible to other value chain actors. Information sharing in a value chain is entirely dependent on the willingness of individual to share. The result demonstrates that SHFs were facing infrastructure shortage (power),

lack of money to buy mobile phone, radio and service fee, lack of interest, incompatible format where the information is packed, and maintenance problem. The results are also supported by Chachhar and Hassan (2013), Mohammed (2014) and Miwanda, et al. (2014). Were in the same direction and noted that, many developing countries face lack of infrastructure and service delivery from government.

The study of Hilary, et al (2017) further revealed some challenges of information sharing as include:

a. Lack of feedback: Limited feedback from information seekers led to lack of trust. There is a risk of acting against one another's interests rather than working toward common objectives. Positive feedback is very important in information sharing to avoid information distortion. It was also noted that members working at the OSCAs have vast information on agriculture including; farming techniques, farmer group activities and organization, prospects, achievements and plans. But these were not documented and thus cannot be shared with other relevant stakeholders. This contributes to loss of information along the chain.

b. Language Barriers: The study further revealed language barriers was a challenge of information sharing. it also revealed that, almost all available information especially the crop production handbooks were written in English. These have barely been translated into the local languages for the farmers to comprehend. This has an influence on farmer's perceptions and attitude in regard to information shared. The statements simply highlight the information gaps exist due to language barriers and mind set of some actors. It also indicate that limited information flow to the farmers affecting farmer development.

c. Limited knowledge on use of smart phones: Today world over, with the aid of high-speed cellular network, any video, audio, or multimedia files can be shared as information material. The

information sharing process has become tremendously fast and interesting process. Mobile phones have increased the effectiveness of a communication. It is because of mobile phones that we are sure for any-time any-where communication possibility. The study revealed that, farmers use their phones to share agricultural information but there was limited knowledge on the use of smart phones, unreliable network connectivity and high costs of air time.

Rafaeli, and Raban (2005) identified some problems of information sharing via technology channels of SHFs, it was revealed that, the problem of information sharing may stem from the medium used rather than from the willingness to share. Information sharing also may be affected by a host of additional factors, individual differences and educational background. Another factor that is likely to influence information sharing is done by copying among others.

Aina (2007) stated some problems with sharing and dissemination of agricultural information in Africa thus include; inadequate financial power of farmers in Africa, Illiteracy of African farmers. Majority of them cannot read or write in any language. African farmers live in areas, where there is lack of basic infrastructure, such as telephone, electricity, good road network, few numbers of extension workers among others. The ratio of agricultural extension workers to farmers is low. Poor radio and television reception signals in most village communities in Africa.

The quality of sources of information available to the users is also important because relevant sources are most likely to get useful information. This signifies that the quality, characteristics and sources of information is very crucial in achieving success in information seeking and sharing strategies of SHFs.

2.9 Measures of Addressing the Challenges of Information Seeking and Sharing

Information contributes a key role in enhancing farming production and productivity. Identifying information seeking patterns and sharing strategies of SHFs is helpful to inform information service providers on what strategies to adopt for information seeking and sharing for the improvement of farming productivity by applying relevant information services. Various scholars suggest some measures to curtails the challenges of information seeking and sharing. Adetimehin, et al (2018) revealed that majority of the farmers suffered from financial difficulty for information seeking and sharing and suggested that the following measures could be used to address the challenges of information seeking and sharing:

1. Government and Agricultural Agencies should promote adequate workshops, training and awareness for SHFs

2. Government should establish information centers in all rural areas in Nigeria. Such information centers could provide the rural farmers the desired agricultural information in a format that would be comprehensible to them, taking into cognizance the prevailing high illiteracy rate, cultural differences and limited technology.

2.9.1 Measures of Addressing the Challenges of Information Seeking

Nnenna (2011) identifies a number of measures as necessary strategies to address the challenges being experienced by Nsukka rural farmers in seeking and accessing agricultural information. These measures include construction of good access roads, installation of radio and television antennas at strategic positions for better radio and television signal receptions, mounting of electrical transformers in villages/communities in Nsukka LGA, airing of agricultural information programmes on radio between the hours of 2 and 3 pm; when the farmers would have come back from their farms, provision of community rural electrification via the Enugu State government,

broadcasting agricultural information programmes on radio and television in native dialect and building of community libraries in towns and villages. Establishing community libraries for procuring books, newsletters, leaflets on agricultural information from which the literate farmers could borrow and read. The community library staff could also partner with the state Ministry of Agriculture to organise seminars and workshops on agricultural innovations for the rural farmers.

Lwoga, et al (2010) report that the following could address the challenges of information seeking:

a. Government should improve access to public extension services: by increasing the number of extension officers, and providing them adequate training programmes to update their skills in the farming activities. The government should also provide adequate resources to the extension officers such as information materials, and agricultural inputs in order to fulfill farmers' needs.
b. Provision of rural information services: (that is, agricultural extension officers, researchers, educators, libraries, and other agricultural actors) need to conduct regular studies on information needs in order to fulfill the communities' needs and improve farming activities in the rural areas.
c. Needs assessments should also be used to map communities' knowledge and information sources in order to enable local farmers to locate agricultural experts in their communities.
d. Rural information services: government departments and village authorities should work together to create awareness of the available information sources, and promote a culture of learning to enable the communities to seek advice when they have a problem and seeking their knowledge. Leaders should encourage active participation and involvement of farmers in various processes that deal with knowledge sharing and learning in the villages, such as

farmer groups, knowledge sharing forums, community of practices, village meetings, and other related activities to enable farmers to seek knowledge and learn from each other.

e. The government should strengthen the social capital: The social capital of the local leaders and their roles in knowledge and information seeking and learning activities should be properly defined.

f. Multiple sources of information and knowledge: This is including print and electronic information, should be made available to ensure farmers have access to relevant knowledge. Print formats (such as leaflets, newsletters, books) and ICTs such as internet, e-mails and cellular telephones can be used to share and distribute knowledge among farming communities to supplement what was gained verbally.

Brhane1, et al (2017), suggest the following measures to curtail the challenges of information seeking used by SHFs: government and non-governmental institutions have to work effectively and efficiently on enhancing rural electrification, repackage agricultural information into simple and understandable language and promote ICTs to make a difference in overcoming barriers that smallholder farmers are facing in seeking relevant agricultural information.

Mbagwu, et al (2018), also suggest some measures to address the challenges of information seeking which are associated with internet-based services. These include:

i. Improving on the Strength of Internet Connectivity: in order to meet the information needs of rural farmers through internet-based information services. It is imperative that internet connectivity is improved. The Nigerian government should address the problem of using internet in farming and rural development via provision of broadband connectivity and a content centric development approach particularly in the rural areas.

ii. Creating Online Farmers' Discussion Forum: Social media platform like Whatsapp and Facebook can be used to create Online Discussion Forums (ODF) for rural farmers through which their information needs can be satisfied at minimal costs. If small scale farmers have access to mobile phones, then there is a great potential for online forums. Creating online farmers discussion forums would help rural farmers to access information that will help them to know various farming innovation that are relevant to them.

iii. Organizing of ICT and Agricultural Information Literacy for Rural Farmers: If preparation fails to precede opportunity, then challenge becomes inevitable. It is pertinent to organize ICT literacy classes for rural farmers; this would help them to be fully equipped to harness the potentials of internet-based information services.

iv. Carrying out Research to Ascertain Rural Farmers' Agricultural Information Needs: It is important that research should be carried out by stakeholders in agriculture in order to ascertain agricultural information needs of rural farmers. When this is done, it would equip stakeholders with timely information on the best internet tools to adopt and use in agricultural information delivery.

v. Repackaging of Information Using Social Media Platform: There is need to repackage agricultural information to meet the information needs of rural farmers. Social media platform can be put to maximum use in repackaging of agricultural information.

vi. Provision of Online Agricultural Advisory and Consultancy Services: Library and information science practitioners should provide online agricultural advisory and consultancy services to rural farmers in developing countries.

2.9.2 Measures of Addressing the Challenges of Information Sharing

Churi et al (2012) suggest that, radio, mobile phones, extension workers, fellow farmers, farm field demonstration, farmers field schools and agricultural inputs suppliers should be used when sharing information. He further explained that, information flow through extension workers should be designed to improve timely access to information. Research on agricultural databases, information processing and communication systems is needed to be developed and implemented for enhancing extension services and effective information sharing. This will provide a new platform for storing and sharing knowledge to farmers in convenient way using simple and low cost.

Hillary, et al (2017) suggest that, there is need to have feedback to establish trust and genuine sharing of information to address information gaps. There is need also to establish genuine partnerships between actors including local leaders, to address information gaps and ensure quality information. It is important to pay attention to the means used for potential participants to build relationships that enhance trust.

2.10 Theoretical / Conceptual Framework

There are a number of theories and models that relate to this study. Such theories and models were carefully identified, examined and evaluated in order to establish the theoretical base/foundation for this study. Some of the theories or models that were found to be relevant to this study include:

i. Diffusion of Innovations Theory (DOI)

ii. Wilson Information Behavior Model

iii. Technology Acceptance Model

iv. Dervin sense making process model etc.

However, the researcher used Wilson Information Behavior Model and Diffusion of Innovations Theory (DOI) only. This section describeS the Wilson Information Behavior Model and DOI theory, as well as how they related to the present study.

1. Wilson Model of Information Seeking Behaviour

A model may be described as a framework for thinking about a problem and may evolve into a statement of the relationships among theoretical propositions. Most models in the general field of information behaviour are of the former variety. They are statements, often in the form of diagrams, which attempt to describe an information-seeking activity, the causes and consequences of that activity, or the relationships among stages in information-seeking behaviour. Rarely do such models advance to the stage of specifying relationships among theoretical propositions: rather, they are at a pre-theoretical stage, but may suggest relationships that might be fruitful to explore or test. (Wilson: 1990).

i. Wilson's First Model of Information Seeking

Thomas D. Wilson's first model had its origin in a presentation at the University of Maryland in 1971 when an attempt was made to map the processes involved in what was known at the time as user need research. Published in 1981, Wilson's first model outlined the factors leading to information seeking, and the barriers inhibiting action. It states that information-seeking was prompted by an individual's physiological, cognitive, or affective needs, which have their roots in personal factors, role demands, or environmental context. In order to satisfy these needs, an individual makes demands upon a system by acting as an intermediary, or through the use of

technology. (Wilson; 1999) **.** Wilson's 1981 model is based on two propositions: firstly, that an information need is not a primary need but a secondary need that arises from needs of a more basic kind and secondly that in the effort to discover information to satisfy a need, the information seeker is likely to encounter different kinds of challenges/ obstacles (Wilson; 1999). Wilson defines basic needs as physiological, cognitive, or affective, and the context of any of these needs may be the person him/herself, their social role, or the surrounding environment (political, economical, technological, etc.). These contexts could also act as obstacles that hamper the information search process. The most cited model from his original concept focuses on the origin of information needs and barriers to seeking information (Wilson; 2005).

The aim of Wilson's 1981 model was to outline the various areas covered by what he proposed as 'information-seeking behaviour' as an alternative to 'information needs'. Wilson's model suggests that information-seeking behavior arises as a consequence of a need perceived by an information user. In order to satisfy that need, the user then makes demands upon formal or informal information sources or systems. These demands for information result in success or failure in finding relevant information. (Mugwisi, 2013: Wilson 1999). Wilson also shows that part of information seeking behaviour may involve other people through information exchange, and that information that is believed to be useful may be passed to other people as well as being used by the person him/herself. The information provided by the system is then evaluated to determine if it satisfies the individual's needs.⁻This first model was based on an understanding of human information seeking behaviors that are best understood as three interwoven frameworks: The user, the information system, and the information resource. (Wilson; 1999).

ii. **Wilson Model in 1994**

Wilson later built upon his original model in order to understand the personal circumstance, social role, and environmental context in which an information need is created. This new model, altered in 1994 incorporated Ellis' stages of information-seeking: starting, browsing, differentiating, monitoring, extracting, verifying and ending.‑It also displayed the physiological, affective, and cognitive needs that give rise to information seeking behavior. The model recognized that an information need is not a need in and of itself, but rather one that stems from a previous psychological need. These needs are generated by the interplay of personal habits and political, economic, and technological factors in an individual's environment. The factors that drive needs can also obstruct an individual's search for information. (Wilson:1999). The model also depicts that the person may involve others for exchanging and using information, which indicate the element of reciprocity, a characteristic feature of human interactions (Wilson, 2006).

iii. Wilson Model in 1996

Wilson made another model which was a revision to his 1981and 1994 model of information behaviour. This model incorporated several new elements that helped to demonstrate the stages experienced by the 'person in context', or searcher, when looking for information. These included an intermediate stage between the acknowledgement of a need and the initiation of action,‑a redefining of the barriers he proposed in his second model as "intervening variables, to show that factors can be supportive or preventative, a feedback loop, and an "activating mechanism" stage. Activating mechanisms' identify relevant impetus that prompt a decision to seek information, and integrate behavioural theories such as 'stress/coping theory', 'risk/reward theory' and 'social learning theory'. (Wilson:1999). The 1996 model also presents three relevant theoretical ideas as

activating mechanisms to explain user behaviour (Wilson; 1999). The activating mechanisms are psychological factors which are explained by these different theories and which prompt the user to proceed with the information seeking process. Thus, Wilson identified characteristics of a number of human behaviour models in his model. Wilson also incorporated Ellis' "behavioural characteristics" of information-seeking (Wilson 2005).

In 1999, Wilson developed a nested model that brought together different areas of research in the study of information behavior. The model represented research topics as a series of nested fields, with information behavior as the general area of investigation, information-seeking behavior as its sub-set, and information searching behavior as a further sub-set. Wilson's model has changed over time, and will continue to evolve as technology and the nature of information changes. The model has been cited and discussed by leaders in the information science field, and can be integrated with other significant theories of information behavior. Wilson describes the model diagrams as elaboration on one another, saying "no one model stands alone and in using the model to guide the development of research ideas, it is necessary to examine and reflect upon all of the diagrams. (Wilson:1999).

Table 1.0 Wilson Model of Information Seeking Behavior

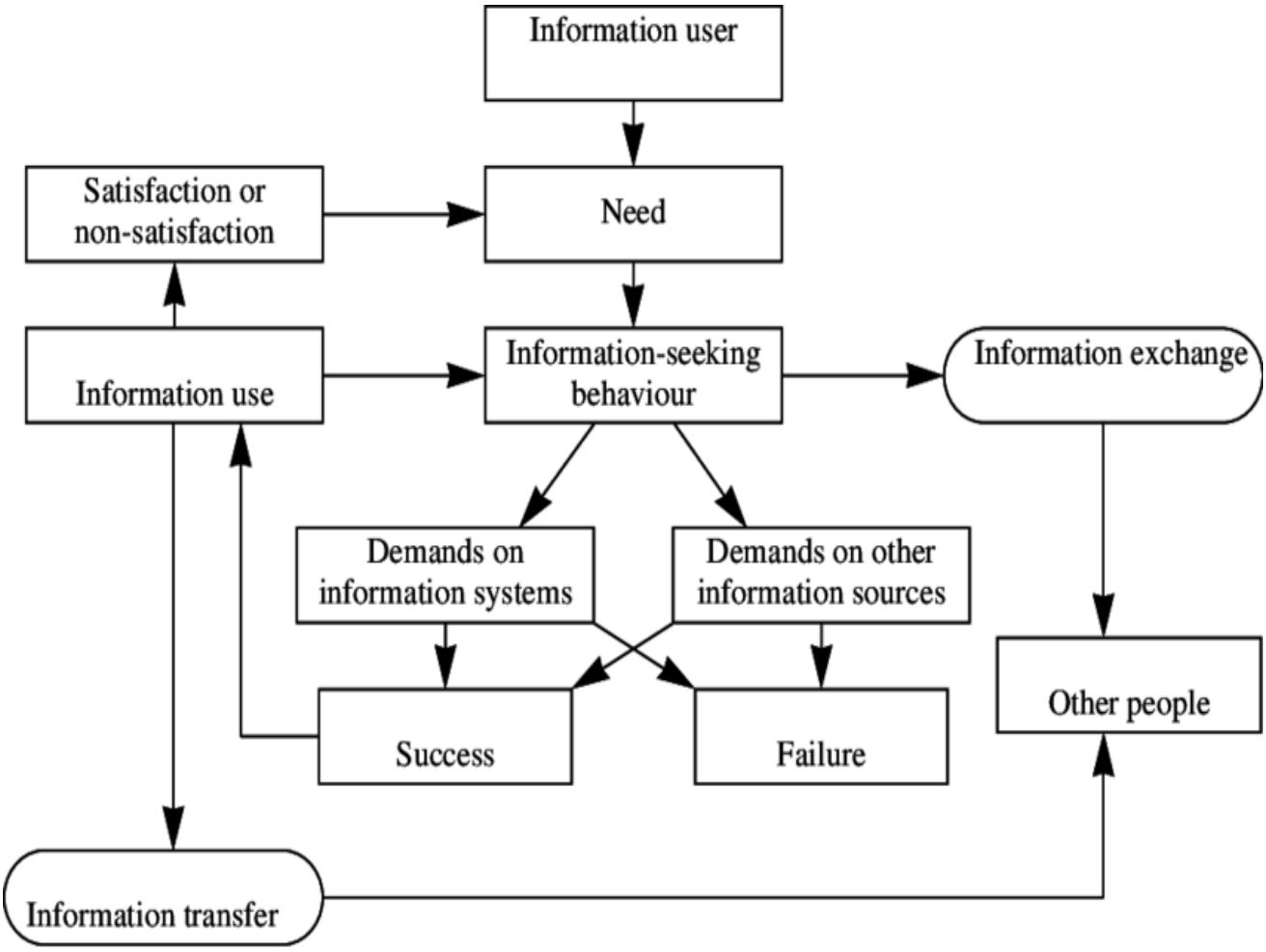

Fig. 1: Wilson Model of Information Seeking Behaviour

Wilson's first 1981 model shows that part of information-seeking behaviour may involve other people through information exchange. The information perceived as useful may also be passed on to other people as well as by the person seeking the information a threefold view of information-seeking. Although Wilson's model only draws attention to gaps in research it continues to serve as a framework in present research with as much validity as at the time of its conception (Wilson 2005). The revised model identifies three constructs: context of information needs, information-seeking, and information processing and use; and two moderating variables: activating mechanism

and intervening variables. (Al-suqli and Al- Aufi; 2015). Mugwisi (2013) highlighted that, the result is in user satisfaction while failure would result in non-satisfaction and require the user to adapt his search using a different information system. Wilson (1999) posits that information-seeking behaviour begins with a need as perceived by the user, who in order to satisfy that need, makes demands on formal and/or informal information sources or services which ultimately result in success or failure to find relevant information.

The information seeking models that were discussed above have demonstrated the various patterns and strategies that people apply in the information seeking process. The theories assume some level of literacy, either consciously or subconsciously, on the part of the person seeking information as demonstrated in the stages involved. (Mugwisi; 2013). However, Wilson (2006) highlights search strategies within an information system, whether manual or computerized. The models emphasize the importance of seeking information in response to a challenge or the need to solve a problem. He further points out that this places demand on formal information systems such as libraries, information centers and online services.

Strength of Wilson's Models

Wilson's models exist within a "universe of knowledge" where the information seeker or the intermediary might exhibit human behavior portrayed by constructs and theories integrated in the information behavior models. As a result, there is always a scope for introducing new constructs and new theories from multiple disciplines, and testing the newly proposed models with user groups in different contexts. For instance, Al-Suqri (2011) developed an integrated model of social science information-seeking behavior by blending Wilson's (1996) revised model of information behavior with other established models, to study the information-seeking among social science faculty in an Omanian university and promote future development in Library and Information

Science in the Middle East. Potnis (2010) applies constructs from Wilson's models to study the role of information behavior in shaping socio-economic opportunities for female mobile phone owners earning less than a dollar a day in rural India. The ability of Wilson's models to continue serving as frameworks for developing and testing new combinations of information behavior constructs and theories with a wide range of user groups from different parts of the world illustrate the rigor, relevance, and utility of the models in rapidly changing landscape of information environments. (Al-Suqri, 2007).

The strengths of first model: Identify gaps in the information science research relative simplicity of the three conceptualizations built a consensus understanding for information behavior among information science researchers and practitioners. They continue serving as a reference framework with the same validity as that at the time of inception. The second revised Model: It is a richer source of hypotheses and furthers research than the original concept. The model can be easily related to other information-seeking behavior theories (e.g., theories proposed by Ellis and Kuhlthau), which strengthens the claims made by the model. The model draws attention to the totality of information behavior and shows how a specific piece of research contributes to an understanding of the whole phenomenon. The third revised Model: Most clear and much needed depiction of the inter-relationship between information behavior, information seeking and information retrieval. It provides a framework to explain goal-oriented information-seeking behavior. (Al-Suqri and Al-Aufi; 2015).

However, the models primarily focuses on the general processes of information seeking, and not on the context of the information search or the types of information available. As a result, the generic models may not fully explain the information behavior of various actors in different contexts seeking a variety of information (Al-Suqri, 2007). For instance, Wilson (1999)

acknowledges that his original concept (1981) paid insufficient attention to contextual factors: The limitation of this kind of model, however, is that it does little more than provide a map of the area and draw attention to gaps in research. It provides no suggestion of causative factors in information [behavior] and, consequently, it does not directly suggest hypotheses to be tested (Al-Suqri, 2007; Wilson, 1999).

The weaknesses of first Model: the original concept does not suggest any causal relationship among information behavior concepts. It does not assume barriers to seeking information have any effect on the user motivation for seeking information. It does not provide sufficient attention to contextual factors. It does not provide any direct or explicit hypotheses to be tested. The second revised Model does not integrate original concept with the related concepts from all the fields It cannot explain everything to do with information behavior. The third revised Model is limited to defining and solving problems. (Al-Suqri and Al-Aufi; 2015).

The concepts of information needs, information sources and information seeking patterns, showed how they collectively fall within the nested model of information behaviour. Wilson (1999) observes that models of information behaviour do not attempt to describe the same set of phenomena or activities, and are complementary rather than in competition. The complementary role of the models demonstrates that information is relative and is sought by different people depending on socio economic and educational background of users. The relationship between the concepts and the current study has also been shown, specifically how the information needs and information seeking pattern are affected by such environmental factors.

2. The Diffusion of Innovation Theory

Diffusion of innovations refers to the spread of abstract ideas and concepts, technical information, and actual practices or objects within a social system. It is where the spread signifies the flow or

movement from a source to an adopter, typically through communication and influence within a social system. It takes place through its adoption by individuals or groups. Adoption is the decision to make full use of an innovation as the best available course of action (Rogers, 1983).

Diffusion is the process by which an innovation is communicated through certain channels over time among the members of a social system. It is a special type of communication, in that the messages are concerned with new ideas. There are four main elements of diffusion by which (1) an innovation (2) is communicated through certain channels (3) over time (4) among the members of a social system. The four main elements are the innovation, communication channels, time, and the social system. (Rogers, 1983). Rogers, (1983) identifies four main elements in his analysis of the Diffusion of Innovations theory, as innovations, communication channels, time, and social systems.

a. **Innovations:** An innovation is an idea, method or object which is regarded as new by an individual or other units of adoption, but which is not always a recent development or phenomenon (Mugwisi :2013). Rogers, (1983) identifies five characteristics of an innovation, namely relative advantage, compatibility, complexity, trialability, and observability.

i. Relative advantage; Rogers (1983) explains relative advantage to be the degree to which an innovation is perceived to be better than the idea it supersedes, noting that the greater the perceived relative advantage of an innovation, the more rapid its rate of adoption is going to be.

ii. Compatibility; Rogers (1983) de

iii. fines compatibility as the degree to which an innovation is perceived to be consistent with existing values, past experiences, and the current needs of potential adopters. Mugwisi (2013)

notes that an idea that is not compatible with the prevailing values and norms of a social system will not be adopted as rapidly as an innovation that is compatible.

iv. Complexity; is the degree to which an innovation is perceived to be difficult to understand and use (Rogers, 1983). Mugwisi (2013) observes that some innovations are readily understood by most members of a social system (e.g. the mobile phone), while others are more complicated and will be adopted more slowly (e.g. the computer).

v. Trialability; is the degree to which an innovation may be tried out or experimented with a limited basis. New ideas that can be tried in the installment plan will generally be adopted more quickly than innovations that are not divisible (Rogers, 1983). Mugwisi (2013) also observes that an innovation that can be tried out represents less uncertainty to individuals who are considering it for adoption.

vi. Observability; Rogers (1983) defines observability as the degree to which the results of an innovation are visible to others. He observes that the easier it is for individuals to see the results of an innovation, the more likely they are to adopt.

b. Communication Channels: Rogers (1983) defines communication as how participants create and share information with one another in order to reach a mutual understanding. He observes that the essence of the diffusion process is the exchange of information, which is when an individual communicates a new idea to another individual or group, and this process also involves the communication channel connecting the two units. It was also observed that mass media channels such as the radio, television and newspapers are often the most rapid and efficient means via which to inform an audience or potential adopters about the existence of an innovation but interpersonal communication is considered more

effective in persuading individuals to accept a new idea because of its interactive nature (face-to-face contact, group meetings, and so on) (Mugwisi, 2013; Rogers, 1983).

c. Time: Rogers (1983) explains that at first, only a few individuals adopt the innovation in each time frame (year or month), i.e., the innovators. The diffusion curve begins to climb as more and more individuals adopt the innovation until saturation, signifying the end of the diffusion process., most innovations have an S-shaped rate of adoption. Differences arise in the rate of adoption of the same innovation in different social systems. Dervin (1983) opines that, the concept of time defines the context in which information problems arise and attainment of the desired situation or outcome. The diffusion of an innovation is a process that begins with generation and ends with implementation (or rejection). When new technique has been developed by agricultural stake holders it will be easily widespread among farmers or may be delayed for a period of time.

d. Social system: The social system is the fourth main element in the diffusion of innovations. Rogers (1983) defines a social system as a set of interrelated units that are engaged in joint problem solving to accomplish a common goal. He observes that the members or units of a social system may be individuals, informal groups, organizations and/or subsystems, with each unit in the system being distinct from other units. In relation to the above points of view, Innovation-Decision Process of Diffusion of Innovation Theory can play a significant role for effective farming system. Innovation-Decision Process is the process through which an individual (or other decision-making units) passes from first knowledge of an innovation to forming an attitude toward the innovation, to a decision to adopt or reject, to implementation of the new idea, and to confirmation of this decision. We conceptualize five main steps in the process: (1) knowledge, (2) persuasion, (3) decision, (4) implementation, and (5) confirmation. Knowledge occurs when an

individual (or other decision-making unit) is exposed to the innovation's existence and gains some understanding of how it functions. (Rogers: 1983).

With regard to the applicability of the theory, a critical analysis of the literature indicates that there are various scholars and researchers who used DOI. Mugwisi (2013) conducted a research in his PhD studies titled "The Information Needs and Challenges of Agricultural Researchers and Extension Workers in Zimbabwe", used Diffusion of Innovation Theory. Graham, (2012) investigated Information Needs of Pigeon Pea Farmers, Assessing the Effectiveness of Communication Channels Used to Diffuse (communicate) the improved Pigeon Pea varieties in Makueni County of Kenya in their paper titled "The Diffusion of Agricultural Innovations: The Effectiveness of Communication Channels used in the Improved Pigeon Pea Varieties in Makueni County, Kenya". Researchers like; Lwoga, et al (2011), used Diffusion of Innovation Theory for their study on "Access and Use of Agricultural Information and Knowledge in Tanzania". Islam, et al. (2016) also used Diffusion of Innovation Theory for their research conducted on "Diffusion of Agricultural Innovation through Opinion Leadership. Similarly, Simin and Jankovic (2014) investigated the possibility of applying the theory of diffusion of innovations in the concept of organic farming in their article titled "Applicability of Diffusion of Innovation Theory in Organic Agriculture".

Roling (2004) an Emeritus Professor in Agricultural Knowledge Systems Wageningen, Netherlands presented a paper titled" Communication for Development in Research, Extension and Education" at the 9th United Nations Roundtable on Communication for Development at Rome, Italy. He states that popularity of the Diffusion of Innovations narrative can be explained by the fact that empirical studies of cases where an innovation diffused to a large proportion of the farmers in a population in a very short time have created an expectation that technologies, once

introduced to few farmers through extension and research efforts, will diffuse rapidly on their own and multiply the public sector effort.

The Diffusion of Innovation Theory and its Relationship to the Study.

Diffusion of innovations (DOI) theory has been used by many Information Scientists and researchers to explain the adoption and diffusion of information technologies especially in the areas of information sharing. It is a public knowledge that the innovation of new technologies and ideas has the potential for full adoption within the social system of small holder farmers. Therefore, there is need to focus on SHFs information needs, sources and well-defined information sharing strategies as well as the biographical characteristics of farmers, and then small holder farmers will be adopters, and the use of information sharing strategies will rapidly continue to prosper for more successful farming activities.

An innovation does not necessarily mean technology only but rather it may refer to human new ideas of innovation to achieve a purpose. Diffusion of Innovations Theory requires the introduction of new technologies, as well as new ways of thought and action. Therefore, one can understand that this theory can be used for technological and electronic innovative information sharing strategy among the SHFs by considering the attributes and characteristics features of Rogers Diffusion of Innovative Theory. Roling (2004) states that, "SHFs in West Africa are amazingly innovative. Lack of impact of agricultural research in West Africa cannot be blamed on lack of innovativeness on the part of the farmers. West African farmers can be considered among the most innovative in the world. Their indigenous systems represent sustainable, resilient and intelligent forms of farming that have supported expanding communities over the centuries.

Messages can be sent and communicated through various channels and sources. Like mass media (radio, television, newspapers, flyers and inter personal channels, group meetings, face-to-face discussions, exchange of ideas between two or more individuals) can reach large farmers. Leeuwis (2004) adds that, technologies facilitate communication via internet, World Wide Web (www), electronic mail (e-mail), newsgroups, social networking sites, chat rooms, and many other forms of efficient communication. ICTs provide mass storage for packaging information and innovations that extension workers can use for further dissemination to farmers. Library and information centers could also utilize ICTs in the collecting and sharing agricultural information through access to databases.

Strength of Diffusion of Innovation Theory

Diffusion of Innovation Theory has numerous strengths and important contributions to our understanding of human behavior change and information sharing pattern of rural farmers. Some of the strengths of Diffusion of Innovation Theory according to Rogers (1983) are as follows:

a. The diffusion model is a conceptual paradigm with relevance for many disciplines. The multidisciplinary nature of diffusion research cuts across various scientific fields. Diffusion approach provides a common conceptual ground that bridges these divergent disciplines and methodologies. Diffusion research offers a particularly useful means to gain such understandings because innovations are a type of communication message whose effects are relatively easy to isolate.

b. The apparent pragmatic appeal of diffusion research in solving problems of research utilization is high. The diffusion approach seems to promise a means to provide solutions (1) to individuals and/or organizations who have invested in research on some topic and seek to get it

utilized, and/or (2) those who desire to use the research results of others to solve a particular social problem or fulfil a need.

c. The diffusion paradigm allows scholars to repackage their empirical findings in the form of higher-level generalizations of a more theoretical nature. Such an orderly procedure in the growth of the diffusion research field has allowed it to progress in the direction of a gradual accumulation of empirical evidence.
d. The data are not especially difficult to gather; the methods of data analysis are well laid out. Diffusion scholars have focused especially on characteristics related to individual innovativeness through cross-sectional analysis of survey data.

Weaknesses of Diffusion of Innovation Theory

a. One of the most distinctive problems in the communication of innovations is that the participants are usually quite heterophilous. A change agent, for instance, is more technically competent than his clients. This difference frequently leads to ineffective communication. They simply do not talk the same language. In fact, when two individuals are identical regarding their technical grasp of an innovation, no diffusion can occur. Ideally, they would be homophiles on all other variables (education, social status, and the like) even though they are heterophilous regarding the innovation.
b. Pro innovation bias is another most serious shortcoming of diffusion research. This problem was one of the first biases to be recognized. The pro-innovation bias is the implication of most diffusion research that an innovation should be diffused and adopted by all members of a social system, that it should be diffused more rapidly, and that the innovation should be neither re-invented nor rejected. (Rogers 1983).

Five–step decision-making process of Diffusion

Diffusion occurs through a five–step decision-making process. It occurs through a series of communication channels over a period of time among the members of a similar social system. Rogers' five stages (steps): awareness, interest, evaluation, trial, and adoption are integral to this theory. An individual might reject an innovation at any time during or after the adoption process. Five stages of the adoption process are:

Table 2.1: Five Stages for the Adoption Process of Diffusion of Innovation Theory (DOI)

Stages	**Definition**
Knowledge	The individual is first exposed to an innovation, but lacks information about the innovation. During this stage the individual has not yet been inspired to find out more information about the innovation.
Persuasion	The individual is interested in the innovation and actively seeks related information/details.
Decision	The individual takes the concept of change and weighs the advantages/disadvantages of using the innovation and decides whether to adopt or reject the innovation. Due to the individualistic nature of this stage, Rogers notes that it is the most difficult stage in which to acquire empirical evidence.
Implementation	The individual employs the innovation to a varying degree depending on the situation. During this stage the individual also determines the usefulness of the innovation and may search for further information about it.
Confirmation	The individual finalizes his/her decision to continue using the innovation. This stage is both intrapersonal (may cause cognitive dissonance) and interpersonal, confirmation the group has made the right decision.

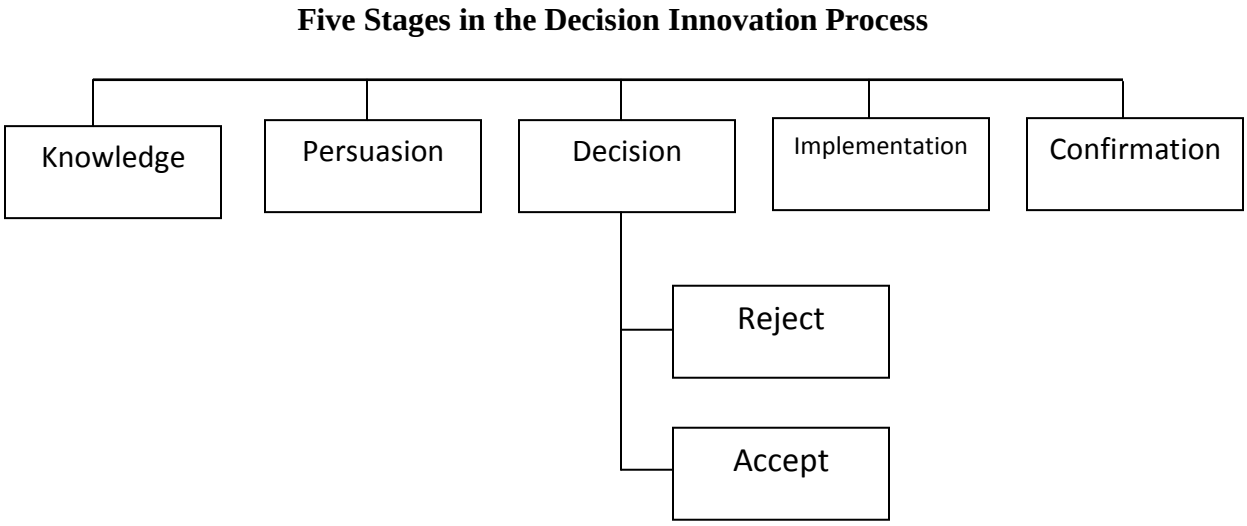

Figure 2: Decision Process of Diffusion of Innovation Theory

Table 2.2: Wilson Model of ISB and Diffusion of Innovation Theory Constructs

S/N	Study Variables	Theory/ Model	Constructs
1.	Information needs	Wilson Model	Needs
2.	Information sources	Wilson Model	Demand on Information Sources
3.	Information seeking patterns	Wilson Model	Information Seeking Behaviour
4.	Information sharing strategies	DOI Theory	Innovations
5.	Information sharing platforms	DOI Theory	Communication channels
6.	Challenges of information seeking and sharing	DOI Theory	Social systems
7.	Measures to address the challenges	Wilson Model	Success

Table 2.2 shows the merging of Wilson Model of Information Seeking Behavior and Diffusion of Innovation Theory (DIO) with the study variables. This shows how components of both theories are applicable to the present study.

2.10.2 Conceptual Frame Work

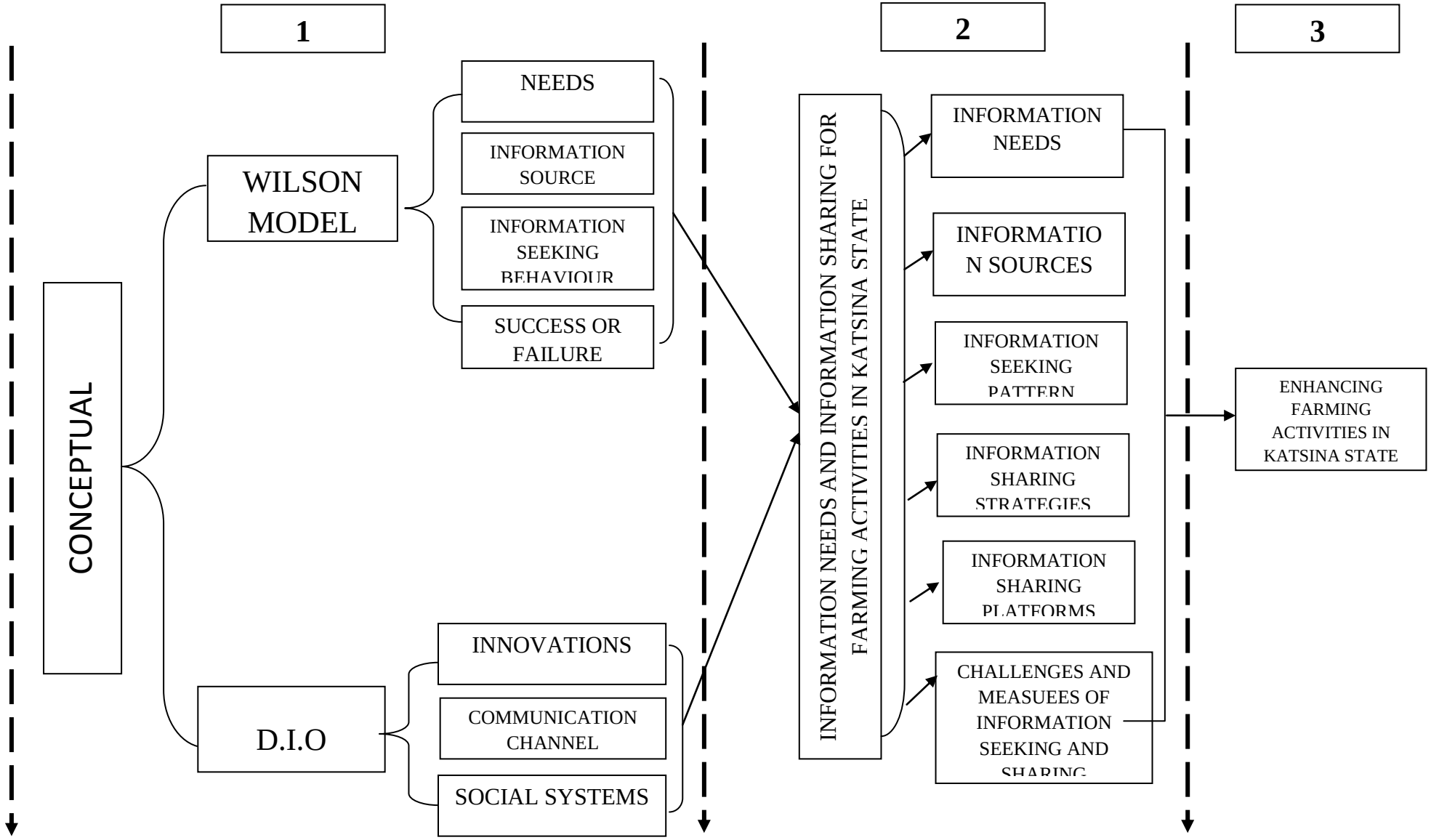

Fig. 3: A Proposed Conceptual Framework for Enhancing Farming Activities in Katsina State.

Conceptual framework is the way of organizing ideas to achieve research projects purposes of defendant and independent variables. The following is the conceptual framework based on the literature reviewed.

i. **Information needs:** Information needs of SHFs is very critical and play important role which can enhance farming activities, solve farmers' profblems and ensure effective farming system when relevant and timely information is provided. It is agreed that information providers need to pay attention to the information needs of the various groups and the communication strategies among each group of the user community.

ii. **Information Sources:** Information sources of farmers are central elements of advanced farming activities as well as fundamental and essential promoters of small scale farming. Information source is an institution or individual that brings about messages. Sources of information includes: extension agents, fellow farmers, radio, television, newspapers among others.

iii. **Information Seeking Patterns:** Is a strategy or technique used by farmers to seek knowledge in order to fulfill their needs and improve their farming activities. Information Seeking Pattern simply means farmers to look for ways to solve their information-related problems.

iv. **Information Sharing Strategies:** information sharing strategies are of great importance to SHFs. They are channels that are used for exchange and dissemination of a wide range of information among SHFs. Strategies could be through personal contact, electronic or application of Information Communication Technology ICT among others.

v. **Information Sharing Platforms:** These are communication groups among SHFs which include: Meetings, face-to-face interactions, forums that involve one-on-one conversations

or farmers interacting with many farmers within a society as well as training activities that can be used as tools for raising awareness among small holder farmers.

vi. **Challenges of Information Seeking Patterns and Sharing Strategies:** The problems associated with the information seeking of SHFs include: unavailability of extension workers that hinder farmers from obtaining information, lack of awareness of various information sources and distant locations for consultations among others. Moreover, the challenges of information sharing include: inadequate fund, lack of technical knowledge on ICTs use, high cost of ICTs devices among others.

vii. **Measures for addressing the Challenges:** several challenges have been faced by farmers in the process of seeking information. Farmers need information and have various patterns to identify their information needs and sources. This information seeking pattern is linked with information sharing strategies used by SHFs. The measures to address the challenges are; government to employ adequate extension workers, provision of more sources of information as well as organizing seminar and training to farmers. Measures to address the challenges of information sharing: The challenges could be from the sources of sharing information, the processing for assessing and sharing information or other barriers. Government should not be isolated from traditional method of information sharing and farmers should be motivated to use new innovations for assessing and sharing information.

2.11 Summary of the Review and Uniqueness of the Study

The reviews presented a better appreciation of the relevant literatures on the topic. Series of literature revealed the concept of information and the significant role it plays on SHFs for successful farming activities. Literature reviewed on the information needs of SHFs conducted by scholars like Bernard, et al (2014), Emmanuel (2012) and Odini (2014) report that farmers mainly

need information on new methods of farming and harvesting, storage and new technology of farming, information on how to improve variety of seeds and agricultural loan, weather conditions and pesticides, among others. The literature reviewed also showed that information needs of SHFs change from time to time.

Literature on the sources of information used by SHFs to meet their information needs were also reviewed. Studies by Lwoga, Ngulube and Stilwell (2014), Yaseen, Shiwei, Wen and Hassan (2016), Bachhav (2012), Sharma (2014), etc showed that, there were a variety of information sources available to the SHFs which include: family, friends, extension workers, agricultural dealers, radios, televisions, newspapers, mobile phones, printed materials, farmers groups, libraries among others. Some few studies revealed that the majority of farmers acquire information from friends, relatives, market dealers, self experience among others.

There are scholars like Ikoja-Odongo (2008), Case (2007), Kingrey (2002), Mugwisi (2013), Daudu, et al (2009) and Chilimo (2008) found that, information seeking of SHFs vary according to demographic characteristics like age, gender, education, exposure as well as the information sources, content, and medium.

The review covered relevant literature on information sharing strategies and platforms used by SHFs to disseminate information. It revealed that SHFs are more comfortable to use traditional strategies to share information among themselves. It was also revealed the variety of information sharing platforms and the most common electronic media use. Radio and mobile phones were considered as most important electronic media and platforms that can be used for information sharing which can reach a large audience of farmers.

The researcher also reviewed the problems associated with the information seeking patterns and information sharing strategies used by SHFs from different scholars point of views. Mabuku (2015), Rafaeli and Raban (2005), Churi, et al (2012), Odoemenem and Obinne (2010), Hilary, Sseguya, and Kibwika (2017) where they mentioned the problems were the medium used rather than from the willingness to share. Individual differences in levels of knowledge and differences arise from subjective measures as well as from knowledge, group-level differences among others.

This study is unique and different from other studies conducted earlier, most of the previous studies conducted in developing nations focused on the information needs of farmers while information sharing strategies used of farmers were neglected. The study is also unique by adopting a survey design and using the registered SHFs that belong to cooperative associations to determine the effectiveness of information sharing for successful farming activities. Similarly, Diffusion of Innovation Theory was reviewed which provides the theoretical basis for the research.

In conclusion, it appears that despite the substantial number of researches in this area, there are gaps in information sharing strategies and platforms used by SHFs that need to be filled. This study is aimed to achieve that.

In relation to the concepts and methodology of this study. The researcher examined that there was a lack of overall agreement on the concepts of information sharing strategies and information sharing platforms. It also appears that no literature shows that the Diffusion of Innovation Theory was applied and tested the constructs of the theory as theoretical framework to investigate information needs of and information sharing strategies used by SHFs for farming activities in Katsina state.

CHAPTER THREE:

METHODOLOGY

3.1 Introduction

This chapter is presented under the following sub headings; research design, research setting, preliminary study, population of the study, respondents group, sampling procedure and sample size as well as research instrument, administration of the research instrument, method of data collection and method of data analysis.

3.2 Research Methodology

Quantitative research paradigm was used in the conduct of this study. Fox and Bayat (2007) observe that quantitative research is concerned with things that can be counted, and one of its principal characteristics is the use of statistics to process and explain data and to summarize findings. Leedy and Ormrod (2005) describe quantitative research as looking at the amounts or quantities of one or more variables of interest. They explain that quantitative researchers seek explanations and predictions that can generalize onto other persons and places. The intent being to establish, confirm, or validate relationships and to develop generalizations that contribute to existing theories. Wilson (2006) asserted that quantitative methods have a role to play in conducting information needs, so this approach was necessary in this study. The objective of quantitative research is to provide facts that can be applied to predict, explain causality, and validate existing relationships among variables through translation of numerical data (Leedy and Ormrod; 2005).

The strengths of quantitative research methodology are, ability to provide adequate details, facilitate generalized comparison and finding across different contexts. Patton (2002) opines that quantitative methods facilitate comparison and statistical aggregation of data using measurement

of reactions of many people and a limited set to questions. Durrheim and Painter (2006) state that data from quantitative methods is considered systematic, standardized and hence findings are considered to be objectively measured to justify the broad and generalizable comparisons. Cohen, Manion and Morrison (2007) state that, it is also believed that good quality quantitative data allows the researcher to compare different situations. In addition, the statistical analysis of quantitative data is considered advantageous in that it helps to explain concepts using numerical analysis and statistical tests.

3.3 Research Design

The study adopted the survey research design with emphasis on cross sectional design. Bailey (1994) states that, if the survey is well conducted, using a representative sample, valid inferences can be drawn from the sample to make generalizations on the opinion attitudes and beliefs of the whole population on a specific topic. The rationale for employing the survey in this study is to have a bigger perspective through a bigger sample than what is usually obtainable through interviews. This design was chosen because it allows collection of large amounts of data in a highly economical way. Survey research was used quantitatively to describe specific aspects of a given population; it involves examining the relationships among variables. Survey research uses a selected portion of the population from which the findings were generalized.

Survey is capable of obtaining information from large samples of the population. Survey is also well suited to gathering demographic data that describes the composition of the sample. Surveys can elicit information about attitudes that are otherwise difficult to measure using observational techniques (McIntyre: 1999). Survey is relatively easy for generalizing of the findings by using a representative sample which require minimal investment to develop and administer instrument in a large population.

The researcher used cross sectional survey design in the conduct of this study. Cross sectional study was particularly suitable for estimating the prevalence of behavior. In a cross-sectional study, the measurements for a sample member were obtained at a single point in time, although recruitment may take place across a longer period of time. Sedgwick (2014) emphasizes that, the cross-sectional survey is generally quick, easy, and cheap to perform. The cross-sectional design was used to assess the hypothesized relationships between the information needs and information sources used among SHFs. They were often based on a questionnaire survey. Cross sectional study is prone to non-response bias if participants who consented to take part in the study differ from those who did not, resulting in a sample that is not representative of the population. It is possible to record exposure to many risk factors and to assess more than one outcome in a cross-sectional study.

The nature for the study necessitated the researcher to adopt survey cross sectional design, because it involves observing, and describing the situation that involves large population. The respondents have educational background to answer the questions on the instrument. Cross-sectional survey was carried out at one time over a short period of time. Data was collected on individual characteristics, including exposure to risk factors, alongside information about the outcome. In this way cross sectional studies provided a 'snapshot' of the outcome and the characteristics associated with it, at a specific point in time.

3.4 Research Setting

Katsina state was created out of the defunct Kaduna state on 23rd September, 1987 and it comprises Katsina and Daura Emirates. It borders Kaduna State to the south, Jigawa and Kano states to the east; Zamfara state to the west and shares an international border with Republic of Niger to the north. It occupies an area of about 24,192 square kilometers, with an estimated

population of about 5.8 million people as per 2006 projection. Katsina is a mono ethnic and monolingual state and the people are generally Hausa/Fulani.

Major cash crops produced in the state are millet, guinea corn, groundnut, cotton, maize, beans, rice and wheat. Minerals are also found in the region which includes: Kaolin, asbestos, gold, uranium, nickel, chromites and silica sand. (Katsina State Investor's Handbook: 2016). There are two seasons in the state which includes wet and dry seasons. The wet season starts from the months of June to September and the dry season from October to May. The dry season is usually dominated by the north-east trade wind which is dry and dusty, popularly called the "harmattan". The mean daily temperature ranges between 16 and 40°C while the annual rainfall ranges between 300 and 400 mm in the Sahel, 600 to 800 mm in the Sudan savannah and 900 to 1100 mm in the northern guinea savannah (Gambo: 2017). About 75% of the populations are involved in subsistent farming and livestock rearing.

There are several local markets, some of which are international because of their location and facilities of trade and exchange. These markets are spread through the length and breadth of the state. Prominent among these markets are: Mai'adua, Jibia, Charanchi, Kafur, Yar`goje Dandume, Sheme (International Markets) among others. (source: Katsina State Investor's Handbook:2016). Fishing activities are also carried out along rivers and on small, medium and large-scale dams such as Zobe Dam, Jibia Dam, Sabke Dam, Daberam Dam, Ajiwa Dam, Mairuwa Dam and many others. In terms of forestry, there are both public and private forests in different parts of the state which include forest reserves, plantations, woodlots, orchards shelter belts and trees on farmlands. Rumah/Kukar Jangarai Forest Reserve in the north western part of the state in Batsari, Safana and Danmusa local government areas is the largest forest reserve in Katsina state (Ladan; 2017).

The research setting consists of registered small holder farmers of three (3) selected Local Government Areas (LGAs) from the three agricultural zones in Katsina state. Local government areas affected are: Mashi from zone I (Ajiwa), Kafur from zone II (Funtua) and Kurfi from zone III (Dutsin-Ma) respectively.

3.4.1 Preliminary Study, Objectives and Findings

Preliminary investigation was conducted by the researcher at Katsina State Agricultural and Rural Development Agency (KTARDA) and some local government areas to determine the background information of the study. The preliminary survey was conducted to achieve the following objectives:

i. To determine the number of documented farmers cooperative associations in Katsina state.
ii. To determine the total number of registered members in each association.
iii. To determine the number of clusters of the three selected local government areas in the state under study.
iv. To find out the existence of agricultural rural libraries in Katsina state.

Findings of the preliminary survey revealed that there are three agricultural zones in Katsina State. Zone I (Ajiwa) which comprises 15 LGAs, zone II (Funtua) which comprises 9 LGAs and zone III (Dutsin-Ma) which comprises 10 LGAs. There are three (3) clusters from each local government areas. However, the result revealed that, there were no existence agricultural libraries in the whole state. It also revealed that, in the selected local government areas, there were three clusters, 8 registered farmers associations in Mashi LGAs, 9 registered farmers associations in Kafur LGAs and Kurfi LGAs respectively. This made a total of 26 registered farmers associations from the three LGAs.

3.5 Population of the Study

The population of this study comprised all SHFs belonging to the cooperative associations of farmers located in three selected local government areas in Katsina state. The total population studied was seven hundred (700).

Table 3.1: Population of the Study

LGAs/Zones	Cooperative Associations/Clubs	Total No. of Small Holder Farmers
Mashi Zone I	Fararkaya Multipurpose Cooperative Society.	35
	Aminchi Ung. Gabas Farmers Association.	30
	Mashi Youth Farmers Cooperative Society.	35
	Mashi Small holder Farmers Association.	35
	Alheri Farmers Cooperative Society.	27
	Mashi Women Farmers Association.	33
	Zauren Gungama Cooperative Society.	31
	Kwarin Korai Small Holder Farmers Club.	22
Total	**8**	**248**
Kafur/Zone II	Rafin Tukurwa Farmers Cooperative Club.	32
	S/Layin Siran Kagara Farmers Association.	20
	Mahuta Women Farmers Association.	22
	Mahuta"A" Farmers Cooperative Society.	30
	Yar'talata Kafur Farmers Association.	15
	U/Madugu Women Farmers Association.	21
	Kwalimbo Yan'bori Farmers Association.	21
	Hayin Jare Farmers Cooperative Society.	17
	Runar Kagara Farmers Cooperative Society.	20
Total	**9**	**198**
Kurfi/Zone III	Kurfi Farmers Association.	34
	Tashar Bara'u Women Farmers Association.	31
	S/Garin Kaya Farmers Association.	22
	Birchi Cooperative Farmers Association.	30
	S/Garin Rawayau Farmers Association.	28
	Kawari Fadama Users Association.	27
	Taka Tsaf Farmers Association.	29
	Banbadawa Farmers Association.	26
	Yan Nakawari Farmers Club.	27
Total	**9**	**254**
Grand Total	**26**	**700**

Source: Katsina State Agricultural and Rural Development Agency (KTARDA), 2017

3.5.1 Respondents Group

The respondents' group for this study consists of registered SHFs of cooperative association of three (3) local government areas (Mashi, Kafur and Kurfi) in Katsina state. SHFs were used and selected as respondents for the improvement and sustainable agricultural development in Katsina state, Nigeria. The researcher considered the educational background, technical skills and activities carried out by members registered with farmers' cooperative societies which assisted the researcher to identify and recruit the SHFs. The reasons for choosing this group of respondents are: many development efforts of international assistance organizations and agencies have been oriented towards cooperative groups of farmers. Therefore, a meaningful change can be achieved and new innovations for more successful farming activities through farmers' cooperative associations.

3.6 Sampling Technique and Sample Size

Sampling procedure is a technique, which helps in understanding the parameters or characteristics of the universe or population by examining only a small part of it (Tadesse,2008). Cluster Sampling was used in selecting the sample size for this study. Cluster Sampling was more convenient for this study because the population was large and it was not possible to randomly select from the entire population.

Cluster sampling is the total population divided into a number of relatively small subdivisions. Each local government areas in Katsina state has three (3) clusters. A Cluster contains a number of small units of villages and four to five (4 to 5) cooperative associations.

Two clusters each were randomly selected out of three clusters from the three selected local government areas. Sampling is the total area of study, which is more convenient in which sample

have been drawn and consisting of all registered small holder farmers belonging to the cooperative associations of the selected clusters.

Balloting method was used to select the local government areas and the clusters. The researcher used a plain paper and wrote the names of the local governments, and clusters. The names were folded and put inside a container these were thoroughly mixed and eventually, Mashi, Kafur, and Kurfi as well as 2 clusters each from the three LGAs were selected randomly.

Sample Size

It was difficult to study the entire population of the study; a sample takes a fair portion as representative of the entire population. The researcher used 40% of the entire population. Therefore, 280 was the sample size as representative of the entire population of this study. Cohen, Manion, and Morrison (2007) state that, when a population is too large a minimum of thirty per cent (30 %) can be held as sample size and get more than ninety per cent (90 %) confidence especially if researchers plan to use some form of statistical analysis on their data. Forty percent of the population was used. A logical and manageable sample was selected using percentage table as postulated by Cohen et al (2007), (See appendix iv).

Table 1.3 shows the sample size distribution of the associations and small holder farmers as well as the percentages distribution proportionately.

Table 3.2: Proportionate Percentage Distribution of the Sample Size

LGAs/Zones	Associations/Cooperative Clubs	Total No. of SHFs	Percentage (%)	Total Sampled
Mashi/Zone I	Fararkaya Multipurpose Cooperative Society	35	5	14
	Aminchi Ung. Gabas Farmers Association.	30	4.3	12
	Mashi Youth Farmers Cooperative Society.	35	5	14
	Mashi Small holder Farmers Association.	35	5	14
	Alheri Farmers Cooperative Society.	27	3.9	11
	Mashi Women Farmers Association.	33	4.7	13
	Zauren Gungama Cooperative Society.	31	4.4	12
	Kwarin Korai Small Holder Farmers Club.	22	3.1	9
Total	**8**	**248**	**35.4**	**99**
Kafur/Zone II	Rafin Tukurwa Farmers Cooperative Club.	32	4.6	13
	S/Layin Siran Kagara Farmers Association.	20	29	8
	Mahuta Women Farmers Association.	22	3.1	9
	Mahuta"A" Farmers Cooperative Society.	30	4.3	12
	Yar'talata Kafur Farmers Association	15	2.1	6
	U/Madugu Women Farmers Association.	21	3.0	8
	Kwalimbo Yan'bori Farmers Association.	21	3.0	8
	Hayin Jare Farmers Cooperative Society.	17	2.4	7
	Runar Kagara Farmers Cooperative Society	20	2.9	8
Total	**9**	**198**	**28.3**	**79**
Kurfi/Zone III	Kurfi Farmers Association	34	4.9	14
	Tashar Bara'u Women Farmers Association.	31	4.4	12
	S/Garin Kaya Farmers Association.	22	3.1	9

	Birchi Cooperative Farmers Association.	30	4.3	12
	S/Garin Rawayau Farmers Association.	28	4.0	11
	Kawari Farmers Association.	27	3.9	11
	Taka Tsaf Farmers Association.	29	4.1	12
	Banbabadawa Farmers Association.	26	3.7	10
	Yan Nakawari Farmers Club.	27	3.9	11
Total	**9**	**254**	**36.3**	**102**
Grand Total	**26**	**700**	**100**	**280**

Source: Field data (2018)

Table 1.4 shows the registered farmers associations and percentages distributed proportionately according to the size of each association from the three LGAs which the researcher covered by using forty percent (40 %) of the entire population which is 280 as sample size.

3.7 Instrumentation

In this study, the instrument used for data collection was survey questionnaire. The choice of questionnaire was based on the fact that it facilitates collection of data in a uniform manner from a large number of respondents, spread over large area within a short period of time which can be interpreted comparatively (Mathiyazhagan and Nandan; 2010). Kothari (2004) emphasize that, questionnaire is low cost even when the universe is large and is widely spread geographically, free from the bias of the interviewer; answers are in respondents' own words and have adequate time to give well thought out answers. Respondents, who are not easily approachable, were reached conveniently, and large samples were made use of and thus the results made more dependable and reliable.

However, copies of filled questionnairess were collected with the aid of research assistants and ensured timely collection of data from the respondents. Best and Khan (1989) cited by Eisenberg (2005) assert that questionnaire administered personally to a group of individuals have a number of advantages as the person administering the instrument has the opportunity to establish rapport and explaining the meaning of items that might not be clear. There was a subsequent follow up to ensure speedy completion and return of the questionnaire.

The questionnaire was structured into eight (8) sections 1-8, Section "1" contains demographic information of the respondents which was used for identification and classification of the respondents. The seven (7) sections contain items, which sought for data to answer the seven research questions as follows: Section “2” was on information needs of SHFs in Katsina state for farming activities, Section “3” was on the types of information sources of SHFs in Katsina state, Section “4” was on information seeking patterns SHFs in Katsina state use, Section “5” investigated information sharing strategies SHFs use, Section “6” was on information sharing platforms used for farming activities by SHFs in Katsina state use, Section “7” was on Challenges associated with the information seeking and information sharing strategies, and lastly section “8” sought for solutions to the challenges affecting information seeking and information sharing strategies SHFs use. The questions were formulated in line with the research questions and constructed using the five (5) Likert point scale of Strongly Agree (SA), Agree (A), Undecided (UD), Disagree (D), Strongly Disagree (SD) which required respondents to tick any of the options to indicate their level of agreement or disagreement with the statement of the five scale response format.

3.8 Validation of Research Instrument

The research instrument was subjected to extensive discussion and review with the supervisor, researchers and experts from the Department of Library and Information Sciences, Bayero University Kano and Umaru Musa Yar'adua University Katsina as well as Department of Extension Services

Federal University Dutsin-Ma, Ministry of Agriculture, specialists and professionals.

3.8.1 Reliability Test

The questionnaire was pre-tested to ensure the reliability of the instrument. The reliability was tested in terms of the Cronbach Alpha reliability coefficient which was 0.642. According to Al Barki & Kisswani (2014), a Cronbach alpha coefficient of 0.70 or more was more accepted, however, approximately 0.60 percent was argued as the most widely supported and SPSS (version 16.0) was also used. The researcher used 10 % of the sample size. Basavanthappa (2014) posits that, reliability test should be only large enough to be represented with 10 percent of the anticipated sample size and the result was reliable:

Table3.3 Reliability Test

Reliability Statistics

Cronbach's Alpha	N of Items
.642	29

This shows the reliability of the instrument. According to Abdullahi (2016) citing Malhotra (2004), the coefficient varies from o-1, Alpha coefficient below 0.6 is weak in reliability, and 0.6-0.8 is strong while 0.8-1.0 is very strong reliability.

3.8.2 Administration of Research of Instrument

The researcher engaged and trained two (2) research assistants from each of the three (3) selected local government areas making the total of six (6) research assistants. Questionnaire was interpreted to research assistants and appointments were also made with the farmers. Introductory letters were submitted through research assistants to the SHFs cooperative association in their respective local government areas (see appendix III). The research assistants play a significant role in assisting and facilitating the researcher for identifying the respondents at their own convenient time for the administration and collection.

3.9 Data Analysis Technique

The Special Package for Social Sciences (SPSS) was used to analyze for this study. The researcher used both descriptive and inferential statistics for analyzing data of this research. The descriptive statistic was used the research questions and to show some demographic information about the respondents, while the inferential statistics was used to test the hypothesized relationships between information needs and information sources as well as information sharing strategies and farming activities engaged by small scale farmers using Pearson Product Moment Correlation Coefficient (PPMCC).

Inferential statistics was used in testing the hypothesis formulated by the researcher by using Pearson Product Moment Correlation Coefficient (PPMCC). Because it is the most used method of measuring the degree of relationship between the two variables. Descriptive statistics was used for the description of basic features of data and summaries were provided for the analysis. Descriptive statistics allows for a multifaceted approach to data collection and analysis and the data collection allows for gathering in-depth information that may be either quantitative (survey) or qualitative (observation or case study).

CHAPTER FOUR

DATA PRESENTATION, ANALYSIS AND DISCUSSION

4.1 Introduction

This chapter is presented under the following sub-headings:

4.2 Response Rate

The response rate of SHFs in Katsina state for this study is presented in table 4.1.

Table 4.1: Frequency and Percentage of Questionnaires distributed to SHFs

Questionnaire	Frequency	Percentage %
Administered	280	100
Returned	255	91.1
Not returned	25	8.9

Table 4.1 shows that 280 copies of questionnaire were distributed from which two hundred and fifty-five (255) representing 91.1 % of the total number of instruments distributed were returned and found useful. This shows high response rate in terms of administration of the instrument for the study which could be attributed to the determination and commitment of both researcher and research assistants in terms of distribution and collation of the instruments as well as the good understanding between researcher and respondents.4.3 Demographic Data

The demographic data of respondents for SHFs in Katsina state is presented in table 4.2.

4.3 Demographic Data

The demographic data of the respondents (SHFs) are presented in table 4.2

Table 4.2: Demographic Data of the Respondents

SN	Items	Description	Number of Respondents	Percentage (%) of Respondents
1	Local Government Area	Kafur	67	26.27
		Kurfi	93	36.47
		Mashi	95	37.25
	Total		**255**	**100 %**
2	Gender	Male	217	85.10
		Female	38	14.90
3	Age	Below 20 years	13	5.10
		21 – 30 years	58	22.75
		31 – 40 years	49	19.22
		41 – 50 years	82	32.16
		51 years and above	53	20.78
	Total		**255**	**100 %**
4	Educational Level (Certificate)	Adult Mass Literacy	11	4.31
		Primary School Leaving certificate	33	12.94
		Secondary Sch. Leaving certificate	65	25.49
		NCE/OND	96	37.65
		Others	50	19.61
	Total		**255**	**100 %**
5	Experience in Farming activities	1 – 5 years	28	10.98
		6 – 10 years	59	23.14
		11 – 20 years	58	22.75
		21 – 30 years	65	25.49
		31 years and above	45	17.65
	Total		**255**	**100 %**

Source: Field Data (2018) by using SPSS version 16.0

Table 4.2 demonstrate a demographic data of SHFs in the area of study. Concerning the gender, most of the SHFs are males (85.1%), with insignificant percentage of female farmers. In terms of the respondent's age group, the result indicates wide differences with 5.10% of the respondents below 20 years of age. It revealed that majority of farmers fall within the range of forty-one to fifty years and the subsequent ages as indicated above. With respect to the respondents' educational

level, the study demonstrates that 37.7% of the respondents possessed the Nigeria Certificate in Education (NCE) and the National Diploma (ND) while 25.5% were Secondary School Certificate holders. The least privilege which was 12.9%, were Primary School Leaving Certificate holders; 4.31%, were holders of Adult Mass Literacy Certificate and 19.6%, were holders of other certificates. With regards to farming experience, the result revealed significant percentages of farming experiences across the levels of all ages with only wide differences of ages within the range of one to five years as indicated. It revealed that 25.49 % and 23.14 % are within the ages of 21 to 30 years and 6 to 10 years respectively. 22.75 % were within the ages of 11 to 20 years, and 17.65 % were within the ages of 31 years and above, only 10.98 % falls within the range of 1 to 5 years of experience in farming activities.

4.4 Information Needs of Small Holder Farmers

The information needs of smallholder farmers in Katsina state for their farming activities is presented in table 4.3.

Table 4.3: Information Needs for farming activities

SN	Information needs	Frequency	Percentage (%)
1	Agricultural credit/loan/subsidy	247	96.86
2	Weather and climate conditions	250	98.04
3	Marketing and price of farm produce	252	98.82
4	New seeds and fertilizer	247	96.86
5	Storage methods	222	87.06
6	New agricultural technology	246	96.47
7	Diseases and pest control	246	96.47
8	Any other information	237	92.94

Source: Field data (2018) by using SPSS version 16.0

According to the table 98.82% and 98.04% of the respondents needed information on marketing and price of farm produce, as well as information on weather and climate condition respectively. Likewise, 96.86% of them needed information on agricultural credits/loans/subsidy as well as new

seeds and fertilizer respectively. The result equally showed that 96.47% needed information on new agricultural technology, diseases and pest control. However, 87.06% needed information on storage methods while 92.94% showed that SHFs needed other information for successful farming activities.

4.5 Information Sources of Small Holder Farmers

The information sources used by smallholder farmers in Katsina State to meet their information needs are presented in table 4.4.

Table 4.4: Information sources used and obtained by SHFs

SN	Information Sources	Agree		Disagree	
		Frequency	Percentage (%)	Frequency	Percentage (%)
1	Relatives and Friends	231	90.59	24	9.41
2	Extension workers	225	88.24	30	11.76
3	Farmers' cooperative associations	219	85.88	36	14.12
4	Radio and television	226	88.63	29	11.37
5	Local government agricultural units	202	79.22	53	20.78
6	workshops and conferences	206	80.78	49	19.22
7	Agricultural dealers	242	94.90	13	5.10

Source: Field Data (2018) by using SPSS version 16.0

The results presented in table 4.4 revealed that 94.90% and 90.59% of the respondents agreed that agricultural dealers as well as relatives and friends respectively were their main sources of information. Similarly, 88.63% and 88.24% of the respondents agreed that radio and television, as well as extension workers respectively were their sources source of information. But 11.76% disagreed because do not have extension workers in their areas. In the same vein, 85.88% and 80.78% of the respondents agreed that farmers' cooperative associations, workshops and conferences are used as source of information. However, the result shows that 79.22% of the

respondents agreed, they sourced information from the local government agricultural dealers, while 20.78 disagreed because they are very far from the local government agricultural units.

4.6.0 Information Seeking Pattern of Small Holder Farmers

The information seeking patterns used by SHFs in Katsina state for their farming activities are presented in table 4.5.

Table 4.5: Information Seeking Patterns of Farmers

SN	Information obtained through	Agree		Disagree	
		Frequency	Percentage (%)	Frequency	Percentage (%)
1	Referral to information units	183	71.76	72	28.24
2	Asking questions	245	96.08	10	3.92
3	Social media chatting	207	81.18	48	18.82
4	Verbal conversation	230	90.20	25	9.80
5	Collaboration with extension workers	229	89.80	26	10.20

Source: Field Data (2018)

Table 4.5, revealed that 96.08% agreed to seek information through asking questions, followed by verbal conversation 90.20%, collaboration with extension workers (89.80%), social media chatting (81.18%) and 183 respondents equal to 71.76% agreed that they seek for information through referral to information units with significant percentages. These could be attributed to the personal interactions among the SHFs and their educational background to seek and obtain information through such patterns. But 28.24% disagreed for obtaining information through referral to information units; it could be as a result of lack of transportation to travel.

4.6.1 Farming activities engaged by Small Holder Farmers

The farming activities engaged by small holder farmers in Katsina state are presented in table 4.6.

Table 4.6: Farming activities engaged by SHFs

SN	Farming activities engaged	Frequency	Percentage (%)
1	Rain fed farming	219	85.88
2	Irrigation farming	185	72.55
3	Fadama farming	133	52.16
4	Livestock farming	217	85.10
5	Other farming	166	65.10

Source: Field Data (2018).

Table 4.6 indicated that farmers were fully engaged in different types of farming activities. Rain fed farming account for 85.88% of the SHFs is observed that, some of the SHFs relocated and left their farms as a result of insecurity situation. Similarly, 85.10% and 72.55% of SHFs also engaged in livestock and irrigation farming respectively. While 65.10% of them engaged in other farming activities. This showed that SHFs engaged in other farming activities such as; poultry, fishing etc.

4.6.2 Types of Crops Produced by Small Holder Farmers

The types of crops produced by SHFs in Katsina state for their farming activities are presented in table 4.7.

Table 4.7: Types of crops produced by SHFs

SN	Crops produced	Frequency	Percentage (%)
1	Sorghum crops	194	76.08
2	Maize/corn crops	218	85.49
3	Millet crops	222	87.06
4	Beans crops	247	96.86
5	Any other crops	226	88.63

Source: Field Data (2018).

Table 4.7, showed that, beans had the highest percentage of production by SHFs in Katsina state with 96.86%. It is also revealed with very significant percentages that millet and maize with 87.06% and 85.49% were third and fourth respectively. Sorghum was least to produce with 76.08%. It was also shown that, SHFs cultivated other crops with 88.63% in the study area. This signifies that, there are varieties of crops produced by farmers in Katsina state such as; grand nut, soya beans, sesame among others.

4.7.0 Information Sharing Strategies of Small Holder Farmers

The information sharing strategies employed by SHFs farmers to disseminate information among them are presented in table 4.8.

Table 4.8: Sharing Strategies Used by SHFs

SN	Strategies used through	Agree		Disagree	
		Frequency	Percentage (%)	Disagree Frequency	Percentage (%)
1	Face to face interaction	233	91.37	22	8.63
2	Extension workers	240	94.12	15	5.88
3	Oral/verbal communications	245	96.08	10	3.92
4	Phone calls	182	71.37	73	28.63
5	Farm visits	230	90.20	25	9.80
6	Town criers	185	72.55	70	27.45
7	Social medias	210	82.35	45	17.65

Source: Field Data (2018).

Table 4.8 shows that the information sharing strategies used by SHFs in Katsina state are very common.. The highest of the strategies as agreed by the farmers is oral/verbal communications with 96.08% followed by extension workers with 94.12%. It also revealed that 91.37% and 90.20% used face to face interaction and farm visits to share information respectively. Significant percentages also indicated that 82.35% and 72.55% used social media and town criers respectively. These could be also attributed to the farmers' experiences and background knowledge in farming activities as well as less stress to their satisfactions. However, the data revealed that, phone call being the least but with significant percentage of 71.37% while 28.63% disagreed in using phone calls as strategies for information sharing. This could be attributed as the result of cost of phones and money to buy airtime credits.

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4.7.1 Types of Information Shared by Small Holder Farmers

The types of information shared by SHFs in Katsina state for their farming activities are presented in table 4.9.

Table 4.9: Types of information shared by small holder farmer in Katsina state

SN	Information shared	Agree		Disagree	
		Frequency	Percentage (%)	Frequency	Percentage (%)
1	New methods of farming information	242	94.90	13	5.10
2	Problem solving information	248	97.25	7	2.75
3	New technology of farming	237	92.94	18	7.06
4	Maximum productivity of farm produce	231	90.59	24	9.41
5	Government new policies on agriculture	167	65.49	88	34.51

Source: Field Data (2018).

The type of information shared by SHFs in Katsina state is presented in table 4.9. It showed that farmers mostly shared information for many purposes of their farming activities by considering the highest levels of the percentages. Information shared on problem solving has the highest percentage 97.25%, followed by information on new methods of farming with 94.90%. It also revealed that, 92.94% of the farmers shared information for new technology while 90.59% for maximum productivity of farm produce. It could be said that, these are the reasons that push farmers to share information among them and extension workers for farming activities. However, the result revealed that 65.49% of the respondents shared information when government has new policies on agriculture, but 34.51% disagreed. It is observed that some government new policies are not suitable for SHFs to comply, that was the reasons for not sharing such information.

4.8.0 Information Sharing Plat Forms of Small Holder Farmers

The information sharing plat forms used by SHFs in Katsina State are presented in table 4.10.

Table 4.10: Information sharing platforms used by SHFs

SN	Platforms used	Frequency	Percentage (%)
1	Facebook platform	157	61.57
2	WhatsApp platform	152	59.61
3	Farmers' association platform	194	76.08
4	Farm visits platform	204	80.00
5	Personal relationship platform	219	85.88
6	Seminars, conferences and workshops	199	78.04

Source: Field Data (2018).

The information sharing platforms used by SHFs as shown in table 4.10 indicated that personal relationships come first with 85.88%, followed by farm visits with 80.00%, seminars, conferences and workshops came next with 78.04%, while farmers' association, Facebook and WhatsApp followed with 76.08%, 61.57% and 59.61% respectively.

4.8.1 Efficiency Level of the Information Sharing Platforms

The efficiency level of the information sharing plat forms used by SHFs in Katsina state for their farming activities are presented in table 4.11.

Table 4.11: Efficiency Level of the Information Sharing Platforms

SN	Information sharing platforms used by farmers in farming activities	High		Low	
		Frequency	Percentage	Frequency	Percentage (%)
1	Facebook platform	77	30.20	178	69.80
2	WhatsApp platform	93	36.47	162	63.53
3	Farmers' association platform	177	69.41	78	30.59
4	Farm visits platform	152	59.61	103	40.39
5	Personal relationship platform	178	69.80	77	30.20
6	Seminars, conferences and workshops	143	56.08	112	43.92

Source: Field Data (2018).

Table 4.11, the efficiency level of information sharing platforms of SHFs in Katsina state indicated that 69.80% and 69.41% of the respondents used personal relationship and farmers association platforms respectively to share information for their farming activities, 69.41% highly use farmers' association platforms. It was also revealed that 59.61% of them used farm visits platform. Similarly, 56.08% used seminars, conferences and workshops. In addition, 69.80% and 63.53% of the farmers used Facebook and WhatsApp respectively to share information on farming activities. Thus, only 36.47% and 30.20% share information through Facebook and WhatsApp platforms respectively. It could be said that, not all SHFs have mobile phones to communicate and share information.

The efficiency of low level for the information sharing platforms revealed a significant percentage with 69.80% and 63.53% of the respondents used Facebook and WhatsApp respectively to share information on farming activities. Similarly, 43.92% and 40.39% used seminars, conferences and workshops as well as farm visits platforms at low level. It was also revealed that 30.59% and 30.20% of them used farmers association platforms and personal relationship platforms at low level of use respectively. It could be said that, not all SHFs have mobile phones to communicate and share information.

4.9 Challenges of Information Seeking.

The challenges faced by SHFs of information seeking are presented in table 4.12.

Table 4.12: Challenges of Information Seeking

SN	List of Challenges	Frequency	Percentage (%)
1	Inadequate of extension workers	218	85.49
2	Lack of awareness of available information sources	222	87.06
3	Inadequate funds to travel or consult extension workers	219	85.88
4	Lack of knowledge to seek for information	210	82.35
5	Socio-economic status and age of farmers	191	74.90

6	Poor response from government authorities	222	87.06
7	Resistance to change by small holder farmers	167	65.49

Source: Field Data (2018).

According to the table 4.12 lack of awareness of available information sources with 87.06% was the first challenge the SHFs faced. Poor response from government authorities with 87.06% came next. These were inadequacy of funds to visit extension workers with 85.83% and inadequate number of extension workers with 85.49%. respectively. The results further revealed that lack of knowledge to seek for information had 82.35% while 74.90% for the socio-economic status and age of farmers had 74.90%. Resistance to change by SHFs with 65.49% was also a challenge that had the least percentage.

4.10 Challenges of Information Sharing

The challenges faced by SHFs of information sharing for their farming activities are presented in table 4.13.

Table 4.13: Challenges of Information Sharing

SN	List of Challenges	Frequency	Percentage (%)
1	Lack of transportation services in the rural areas	211	82.75
2	Poor knowledge sharing culture of small holder farmers	194	76.08
3	Lack of public libraries and information centers in the rural areas	208	81.57
4	Lack of technical knowledge on how to use ICT	242	94.90
5	Uncovered age network services in rural areas	217	85.10
6	High cost of smart phones and data for network plan by farmers	224	87.84
7	Lack of understanding and political conflict in rural areas	208	81.57

Source: Field Data (2018).

Table 4.13 indicated that lack of technical knowledge on how to use ICT with 94.90% was the challenge that had the highest percentage. High cost of smart phones and data for network plan had 87.84%. The result also revealed that uncovered age network services and lack of transportation services in the rural areas had 85.10% and 82.75% respectively. However, it revealed that lack of

public libraries and information centers as well as lack of understanding and political conflict in rural areas had 81.57%. Poor culture of SHFs with 76.08% was the challenge that had the least percentage.

4.11 Measures for Addressing the Challenges of Information Seeking

The measures for addressing the challenges of information seeking of SHFs are presented in table 4.14

Table 4.14: Measures for the Solution

SN	List of Measures	Frequency	Percentage (%)
1	Government should employ adequate extension workers and train them to deliver their responsibility effectively	218	85.49
2	Government should provide multiple sources of information and construction of good roads	222	87.06
3	Government should provide adequate funds for extension and rural information services	219	85.88
4	Repackaging of information using social media platforms	210	82.35
5	There should be prompt response from government on any problem facing farmers	191	74.90
6	Organizing workshops on ICT and strengthen internet connectivity	222	87.06
7	Farmers should have knowledge sharing culture	167	65.49

Source: Field Data (2018).

The results from table 4.14 showed that 87.06% of SHFs were of the view that government should provide multiple sources of information, construction good roads, organize workshops on ICT and strengthen internet connectivity. Other measures include; Government should provide adequate funds for extension and rural information services, and employ as well as train adequate extension workers so that they can deliver their responsibility more effectively with 85.88% and 85.49% respectively. The result also revealed that repackaging of information using social media platforms

had 82.35% while prompt response from government on any problem facing farmers had 74.90%. Farmers should have the culture of knowledge sharing had 65.4%.

Measures for Addressing the Challenges of Information Sharing

The measures for addressing the challenges of information sharing of SHFs are presented in table 4.15

Table 4.15: Measures for Solution

SN	List of Measures	Frequency	Percentage (%)
1	Information sharing strategies should be designed by considering sources available and socio economic of farmers	97	80.83
2	Extension workers to communicate information to farmers using farm field demonstration	101	84.17
3	To improve use of mobile phones and agricultural dealers for information sharing	96	80.00
4	Training farmers on the use of ICT, phones and reducing the cost of data for network access	87	72.50
5	Information flow should also be designed to improve timely access to information by farmers.	101	84.17
6	Change of attitude and understanding by farmers towards information sharing	97	80.83
7	Government should construct good roads for easy accessibility by farmers and extension workers	100	83.33

Source: Field Data (2018).

The results from table 4.15 showed that 84.17% of the SHFs who responded to the questionnaire agreed that extension workers should communicate information to farmers using farm field demonstration as well as information flow should also be designed to improve timely access to information by farmers. 83.33 % suggested that Government should construct good roads for easy accessibility by farmers and extension workers while 80.83 agreed that information sharing strategy should be designed by considering sources available and socio economic status of farmers as well as change of attitude and understanding by farmers towards information sharing. 80 % suggest that improved use of mobile phones and agricultural dealers for information sharing are

the best measures to be taken to tackle information sharing. However, 72.50 % suggest that training farmers on the use of ICT, phones and reducing the cost of data for network access.

4.13 Inferential Statistics

Correlation Analysis (Hypothesis Testing)

This analysis was done on Statistical Package for Social Sciences (SPSS) Software 16.0 version. In order to understand the correlations between the independent variables (Information Needs Information Sources and Information Sharing Strategies) on the dependent variable (Enhanced farming activities of SHFs) the researcher used the Pearson Product Moment Correlation Co-efficient (PPMCC) on SPSS to determine the relationships among the variables.

Null Hypothesis 1 of the Study

$H0_1$ There is no significant relationship between the information needs and information sources used by SHFs in Katsina state.

Table 4.16: Summary of Relationship between Information Needs and Sources

Descriptive Statistics

	Mean	Std. Deviation	N
Information Need	15.694	.8832	255
Information Source	29.569	4.4094	255

The results in table 4.16 present the summaries of the descriptive statistics of the relationship between the information needs and information sources used by SHFs for farming activities in Katsina state. A total of 255 samples were computed which revealed a mean score of the farmers' information needs as 15.69 while the mean score of farmers' information source was 29.57. This analysis showed there was a significant difference from the means of the variables.

To determine the relationships between the variables of the study, a correlation analysis was conducted and presented in table 4.17.

Table 4.17: Correlation between Information Needs and Sources

Correlations			
		Information Need	Information Source
Information Need	Pearson Correlation	1	.020
	P Value Sig. (2-tailed)		.756
	N	255	255
Information Source	Pearson Correlation	.020	1
	P Value Sig. (2-tailed)	.756	
	N	255	255

Table 4.17 represents the Pearson's Product Moment Correlation (PPMC) of the first hypothesis of the study on the level of Information Needs and Information Sources used by SHFs in Katsina state. The analysis revealed that the correlation coefficient was significant at the 0.01 level (2-tailed) and the relationship was positive ($r(253) = .020$, $n=255$, $p=.756$, i.e. greater than 0.05). This analysis revealed a very weak correlation that is only 20% in the variation of the level of Information Needs of SHFs was explained by the variation in the Information Sources of the SHFs in Katsina State. While about 80% of the variations were influenced by other factors in enhancing farming activities of farmers in Katsina State.

Accepting or Rejecting the Null Hypothesis One ($H0_1$) of the Study

According to this analysis, the Null Hypothesis Analysis 1(**$H0_1$**) was retained ($p > 0.05$ i.e. Sig = 0.756), because there was no sufficient evidence of significant correlation ($r(253) = .020$, $n=255$, $p=.756$)between the level of Information Needs and the Information Sources of the small holder farmers in enhancing their farming activities in Katsina State.

Null Hypothesis 2 of the Study

$H0_2$ There was no significant relationship between the information sharing strategies used and farming activities engaged by SHFs in Katsina state

Table 4.18: Summary of the Relationship between Information Sharing Strategies and Farming Activities

Descriptive Statistics

	Mean	Std. Deviation	N
Information Sharing Strategy	29.502	3.8790	255
Enhancing Farming Activities	8.749	1.4499	255

The results in table 4.18 presented the summaries of the descriptive statistics of the relationship between information sharing strategies and farming activities of SHFs in Katsina state. A total of 255 samples were computed. They revealed a mean score of the farmers' information sharing strategies as 29.502 while the mean score will enhance farming activities as 8.749. This analysis showed that there was a significant difference between the means of the variables.

To determine the relationships between these variables, a correlation analysis was conducted and presented in table 4.19.

Table 4.19: Correlations between Information Sharing Strategies and Farming Activities

		Information Sharing Strategies	Farming Activities
Information Sharing Strategies	Pearson Correlation	1	.480**
	Sig. (2-tailed)		.000
	N	255	255
Enhancing Farming Activities	Pearson Correlation	.480**	1
	Sig. (2-tailed)	.000	
	N	255	255

**. Correlation is significant at the 0.01 level (2-tailed).

Table 4.19 represented the Pearson's Product Moment Correlation (PPMC) of the first hypothesis of the study on the level of information sharing strategies can enhance farming activities of SHFs in Katsina state. The analysis revealed that the correlation coefficient was significant at 0.01 level (2-tailed) and the relationship was positive (r(253) = .480, n=255, p=.000, i.e. less than 0.05).

This analysis revealed a strong correlation between the variables, about 50% in the variation of the level of information sharing strategies of SHFs was explained by the variation to enhance the level of farming activities of SHFs in Katsina State, while the remaining percentage of the variation is being influenced by other factors.

Accepting or Rejecting the Null Hypothesis Two ($H0_2$) of the Study

According to this analysis, the Null Hypothesis 2(**$H0_2$**) was rejected ($p < 0.05$ i.e. Sig = 0.000), because there was sufficient evidence of significant correlation (r(253) = .480, n=255, p=.000, i.e. less than 0.05) between the level of Information Sharing Strategies and extent of Enhancing Farming Activities of SHFs in enhancing their farming activities in Katsina State.

Therefore, there was a statistically significant relationship between the information sharing strategies used and extent of enhancing farming activities engaged by SHFs in Katsina state. The

variations in the mean of the dependent variable (enhancing farming activities) was not by chance but as a result of the influences of information sharing strategies adopted by the SHFs.

4.14 Discussion of Findings

The findings of the study are discussed below:

The findings of the study established that farmers in Katsina state require variety of information relating to their farming activities and that the farmers were more interested in information about marketing and prices of farm produce as well as weather and climate conditions. They also have strong information needs on new seeds, fertilizer, agricultural credits/loan/subsidy, new technology, storage methods and diseases and pest control. These findings concurred with studies which included Mabuku, (2015) Bernard et al. (2014) Kalusopa (2005) which reported that SHFs have significant information needs on marketing, technology and agricultural policies. This result suggested that small scale farmers' productivity was largely dependent on the prices of farm produce and weather condition. In most developing countries, SHFs are producing at lost because of poor information on marketing strategies.

In terms of information on weather condition, global warming is adversely affecting agricultural production in so many ways. The impact of climate variability and change on small scale farmers in developing countries include productivity decline, increased poverty, food insecurity, shortage of water, death of animals and increase in bush fire (Awazi and Tchamba, 2018). To this end, farmers need a lot of information on weather related issues such as Seasonal Rainfall Prediction Report- a report which will indicate the amount, pattern and cessation of rain. Farmers equally need information on short and early maturing varieties, drought tolerant crops and flood occurrence to mention a few. Information on these elements can significantly help SHFs avoid

losing their investments in the farm as well as follow good agronomy practices that could give them good yield. Hence, climate-smart agriculture should be the watchword of farmers. These findings were similar to the studies of Emmanuel (2012), who conducted a study on Information Needs of Rural Farmers in Okpukwu LGA of Benue State, Nigeria. Therefore, farmers need information to improve their farming activities, enhance their productivity for maximum profit and awareness of issues surrounding their environment to meet up with any challenges that may arise in their farming activities.

The study findings demonstrates that almost all SHFs in Katsina State sourced information from agricultural dealers, extension workers, farmers' cooperative associations, radio and television, local government agricultural units and workshops and conferences. In particular, the finding revealed that agricultural dealers seem to be a key reliable information source among the farmers. No doubt, agricultural dealers have always served as information intermediaries between farmers and agro-allied industries. They provide information from agro-allied industries to farmers and vice versa. The study also revealed that most SHFs depend on relatives and friends for information. These findings are consistent with studies by Qiao et al. (2018), Brhane, et al (2017), Sharma (2015), Lwogo, et al (2014), Bachhav, (2012), Daudu, et al (2009) and Kalusopa (2005).

Kalusopa (2005) argued that small scale farmers have continued to rely on indigenous farming knowledge because they could not access reliable information source, hence, they rely on local groups, relatives and personal experiences. In this situation, friends and relatives provide several advantages over other information sources in supporting agricultural development. Their supportive features, such as quick and timely access to information as well as proximity, may attract more farmers' attention and help to drive their agricultural productivity. Cooperative associations as sources of information bring a lot of benefits. The literature demonstrates that

formations of cooperative associations will help improve the livelihood of SHFs in terms of easing market access, improving capacity building and increasing bargaining power (Qiao et al., 2018).

The study also identified that farmers obtained more information through asking questions, verbal conversations, collaboration with extension workers than through social media charting and referral to local area information units of their LGAs to solve problems related to the farming activities. These findings are similar to those of Mugwisi (2013), Odini (2014) and Adetimehin, et al (2018) who revealed that SHFs seek information through asking questions from friends, families, and farmers, through collaboration with extension workers, agricultural researchers, and social media chatting with mobile-phone. The result of this study indicates that SHFs use information seeking pattern to identify their information need and sources. In addition, the study also revealed the major farming activities engaged by SHFs in Katsina state that includes; rain fed, irrigation and livestock farming activities. Only 85.88 percent engaged in rain fed farming, this could be attributed as the result of having dams and Fadama close to some areas of the study. The major types of crops produced and cultivated include; sorghum, maize, millet and beans. Findings of this study also concurred with the study of Ladan (2017) on analysis of the constraints to agricultural development in Bakori local government area Katsina state Nigeria.

However, information seeking patterns linkages with information sharing strategies used by farmers in Katsina state in which the result demonstrated that majority of SHFs in Katsina state shared information using different strategies. Farmers are very interested in face to face interaction, verbal communications, farm visits than social Medias, town criers, extension workers and phone calls. This study corroborated the findings of Ndilowe (2013), Masuki (2010), Mbenka, et al (2013) and Hillary et al (2017) that, SHFs take face to face interactions, verbal

communications, social media, and extension workers with more important strategies for information sharing than phone calls and town criers.

The study showed that farmers prefered traditional method of getting information through oral communication strategies which brings more benefits. At the present time, there is a high-speed of cellular network, that multimedia files can be used to share information which needs to be improved. The use of face book, whatsApp and mobile phones to make calls or send messages have increased the effectiveness of information sharing strategies which gave assurance for effective and efficient communication that need farmers also to use and adopt. Though there are challenges on how to use smart phones and unreliable network connectivity, high costs of air time credit. Abbas (2015) also supported that farmers in Nigeria share and disseminate information via mobile telephones. The finding further revealed that majority of SHFs in Katsina state share information among themselves to solve problems and enhance their farming activities in order to have a maximum productivity of their farm produce.

The finding showed that, farmers in Katsina state had a variety of information sharing platforms. The major and most commonly used platforms included; farm visits, personal relationship and farmers' association for enhancing their farming activities. This finding corroborated the finding of Abcic (2016), in his study conducted on Potential of ICT Mechanisms for Sharing Variety of Information in Africa, Malaango, Mlozi and Timbo (2012) but in contrast to views of scholars likes; Hei and Zon (2006), Gloy, Akrige and Whisker (2000) and Geng (2001).

The researcher suggested that SHFs can use social media (WhatApp and Facebook) and mobile phone as platforms to communicate with extension workers, cooperative members, agricultural dealers and fellow farmers conveniently in emergency situation. These can be an alternative way for effective information sharing strategies among small holder farmers, because they can

communicate with their local dialog through chatting, sending messages or phone calls. Abcic (2016) revealed that, farmer's information sharing strategies are linked with the Information and Communication Technologies (ICT). Therefore, farmers should use and accept new technology being introduced than using traditional strategy. This is also in line with Diffusion of innovation theory.

The study also discovered that farmers face serious challenges of information seeking information for their farming activities which include; unavailability of extension workers, lack of awareness of available information sources, inadequate funds to travel or consult extension workers, lack of knowledge to seek for information, socio-economic status and age of farmers and poor response from government authorities as mentioned earlier. This corresponds with the findings of Tologbonse, et al (2008) which revealed that, language barrier, lack of awareness on existence of different information sources, lack of funds and poor format of information carrier are the major challenges of information seeking of SHFs. Adetimehin, et al (2018) were in the same views that, small holder farmers were facing infrastructure shortage (power), lack of money to buy mobile phone, radio and service fee, incompatible format where the information is packed, inadequate knowledge and skills on how and where to access the required information and distance of information source. Mahendra (2012) in a study conducted revealed the challenges of information seeking faced by small holder farmers included low level of formal education and skills, the literacy and mean years of education are lower for SHFs compared to medium and large farmers. In the study findings, the literacy among males and females for marginal farmers respectively were 62.5% and 31.2% while the corresponding number for medium and large farmers were 72.9% and 39%. Similarly, the mean years of education for males among marginal farmers were 3.9 as compared to 5.3 for medium and large farmers. It is important for SHFs to have a reasonable level

of awareness regarding their information needs. Similarly, the findings of Brhanel, et al (2017) revealed that farmers faced the challenge of lack of money to buy ICTs apparatus and pay service fees, poor information packaging and low level of small holder farmers' skill in using modern ICTs tools for searching agricultural information.

Nnenna (2011) argues that SHFs encountered challenges in their quest for seeking agricultural information from their community with poor public relations of extension officers being rated first, then inability to read and write (illiteracy), poor radio and television signals, agriculture information on radio aired at odd hours, lack of electrification, lack of access roads for easy community visits of extension workers and lack of money to purchase newsletters, leaflets of agricultural information.

Moreover, the study discovered that the major challenges of information sharing faced by SHFs in the study area which include; lack of transportation services in the rural areas, lack of public libraries and information centers in the rural areas, lack of technical knowledge on how to use ICT, uncovered age network services in rural areas, high cost of smart phones, data for network plan by farmers and lack of understanding and political conflict in rural areas and the least is poor knowledge sharing culture of SHFs. This corresponds with the findings of Hilary,et al. (2017) that revealed some challenges of information sharing which include: language barriers; in which almost all information hand books from NGOs are written in English, limited knowledge on use of smart phones, unavailability of extension workers, low awareness of available information sources, inadequate resources and high levels of illiteracy. (Byamugisha et al (2008), Lwoga et al (2010), Ikoja-Odongu and Moster's (2006) and Churi et al (2012).)

The study suggested the ways to curtail the problems faced by farmers in rural areas when seeking and sharing information for farming activities. If the measures are taken into consideration accordingly, it would increase the production capacity of small holder farmers. It is suggested that, government should employ more extension workers, establish rural information centers, organize training and workshops to extension workers and farmers, provision of more sources of information and knowledge, prompt response from government and repackaging of agricultural information into simple and understandable language. These are in line with Lwoga et al (2010) and Brhane1, et al (2017).

However, many scholars suggested that improving on the strength of internet connectivity, creating of online farmers' discussion forum, organizing of ICT and agricultural information literacy for rural farmers, repackaging of information using social media platform, provision of online agricultural advisory and consultancy services can effectively improve information seeking and sharing of small holder farmers. Churi et al (2012), suggested that a communication strategy should be designed for sharing agricultural information and knowledge considering the sources available, socio-economic status of small holder farmers. But Mbagwu, et al. (2018), argued that those suggestions cannot work, he believed that information sources are very limited; socio economic background and ICT knowledge of SHFs' as well as the strength of internet connectivity are the most challenges faced when seeking and sharing information.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.0 Introduction

This chapter is presented under the following sub headings: summary of the study, summary of the major findings, conclusion, recommendations and suggestions for further studies.

5.1 Summary of the Study

The study investigated information needs and sharing strategies of smallholder farmers in Katsina State, and the thesis is divided into five chapters as follows:

Chapter 1: the chapter contains introduction and background of the study which focuses on information needs and sharing strategies of smallholder farmers relating to their farming activities from general to specific down to the Nigerian context of small scale farming systems. The chapter also discussed statement of the problem, research objectives, research questions, hypothesis of the study, significance of the study, scope and limitation of the study as well as operational definition of terms.

Chapter 2: the chapter presented a literature review in relation to each research question the study, these includes; information needs, information sources, information seeking patterns, information sharing strategies, information sharing platform, challenges of information seeking and sharing used by smallholder farmers for their farming activities. Moreover, literature was critically analysed, synthesised and gaps were also established on each variable reviewed in the study. A theoretical and conceptual framework was also extensively discussed in relation to the study as well as model relevant to the study. Additionally, summary of the literature review and uniqueness of the study was discussed.

Chapter 3: This chapter discussed research methodology, research design, research setting of the area of study, preliminary study and its findings, population of the study, sampling techniques and sample size used, reliability test of the research instruments used for data collection and data analysis technique used in the conduct of this thesis were all discussed.

Chapter 4: This chapter presented the data analysis and discussion of the findings. This includes; response rate, demographic data, questions on the questionnaire that are related to research questions, inferential statistics used for testing the hypothesis formulated and interpretations of the findings.

Chapter 5: This chapter discussed summary, conclusion and recommendations of the study, this includes; summary of the study, summary of the major findings, conclusion, recommendations, contribution of the study to knowledge and indicated area for further research.

5.2 Summary of the Major Findings

1. The information needs of SHFs include; agricultural loan, fertilizer, new technology, pesticides and storage methods, market and price of farm produce, weather conditions, diseases and pest control.
2. The information sources used by SHFs are; families, friends, relatives, extension workers, radio, television, farmers' cooperative associations, agricultural dealers, workshops and conferences.
3. The information seeking patterns are; verbal conversations, asking questions, collaboration with extension workers and referral to information units.
4. Information sharing strategies used by SHFs are; face-to-face interactions, oral communications, farm visits, extension workers, town criers, phone calls and social media.
5. The information sharing platforms used by SHFs are; personal relationship, farm visits platforms, farmers association platforms, workshop and conference platforms and social media platforms.
6. The challenges of information seeking faced by SHFs are; unavailable extension workers, lack of awareness of available information sources, inadequate fund, lack of knowledge, poor response from government and socio economic status of farmers. The challenges of

information sharing are; lack of transportation, poor knowledge sharing culture, lack of public libraries, problems of network, lack of technical knowledge, high cost of phones and data for network plan as well as lack of understanding and political complicit in rural area.

7. The suggestions to address the challenges are; available extension workers, adequate fund, awareness of available information sources, immediate response from government, training and re-training of farmers and extension workers, establishment of public libraries in rural areas, efficient network services, reducing the cost of data plan, provide subsidy loans and establishing a good understanding among farmers to have sharing culture.
8. The findings of null hypothesis for the relationship between the information needs and sources used by SHFs revealed that the level of information sources for farming activities are not influenced by the information needs of the small holder farmers.
9. The findings of null hypothesis for the relationship between the information sharing strategies used and farming activities engaged in by SHFs revealed that there is strong correlation between information sharing strategies used and extent of enhancing farming activities.

5.3 Conclusion

It can be concluded that SHFs needed varieties of information for their farming activities in Katsina state. The information on marketing and price of farm produce, weather and climate condition, agricultural loan and subsidy, fertilizer, information on new agricultural technology, new method of farming, disease and pest control were also the major needs by farmers. Effective information sharing strategies vital for increased farming production. The study also revealed that farmers shared information for their farming activities and most strategies used include oral and verbal communication, extension workers, face-to-face interactions and farm visits.

The study revealed that farmers obtained information from variety of interpersonal sources which included; relatives, friends, families, extension workers and farmers cooperative associations with little emphasis on radio, television, social media, conferences and workshops. This is to say that SHFs in Katsina do not heavily rely on the afore mentioned sources. Moreover, the farmers were faced with major challenges of information seeking and sharing strategies which included; inadequate extension workers, lack of awareness of available information sources, inadequate fund, social and economic status of farmers, cost of data for network plan and smart phones, network problem in rural areas, technical knowledge on how to use ICT, poor response from government authority, lack of knowledge to seek for information among others. However, correlation analysis showed that information need was not influenced by the information sources used by the farmers. It further shows that, there was a high significance relationship of information sharing strategies for enhancing farming activities of SHFs in Katsina.

5.4 Recommendations

The recommendations are as follows:

1. Katsina state government should create awareness for more sources of information so as to help farmers to access information from variety of sources, and to repackage agricultural information into various formats to meet SHFs' information seeking pattern.
2. Government of Katsina state and farmers' cooperative associations should create discussion forums at local government and ward levels to attend to SHFs when seeking and sharing information.
3. Information sharing by SHFs in Katsina state should be combined with personal traditional and electronics communication methods.

4. Government should provide training on ICT skills and knowledge on how to use modern communication platforms for farmers to access and share agricultural information like free interest loan to farmers. Service providers should also be providing effective network services in rural areas and reduce the cost of data.
5. Extension services should be funded to provide training, mobility, smart phones, incentives and necessary support so that it increases its services to SHFs for enhancing farming activities in Katsina state.
6. Katsina state should establish agricultural libraries equipped with relevant information resources and services in each local government area to improve information dissemination and knowledge sharing among farmers.

It is hoped that government and relevant agencies should consider the recommendation of this research study to address the problems and ensure that policies are tailored at helping farmers to meet their information needs and effective information sharing strategies. This will go a long way in different angles to facilitate farming activities of SHFs in Katsina state.

5.5 Area for Further Researches

Considering the scope and limitations of the study, there are many areas through which other researches can be conducted. Researches may be focused in the following areas:

1. The roles of social media platforms for effective information sharing among SHFs.
2. A comparative study on information seeking and sharing among SHFs.
3. The application of Diffusion of Innovation Theory for information sharing among SHFs.

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APPENDIX I

Department of Library and Information Sciences

Faculty of Education

Bayero University Kano

BUK/DLS/216 13th March, 2017

…… ……

……

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Dear Sir,

Introductory Letter in Respect of Abubakar Magaji

(SPS/15/MLS/00020)

The bearer whose names and registration number are so indicated is a Postgraduate Student of the Department of Library and Information Sciences, Bayero University Kano.

He is conducting a piece of research **Titled: "Information Needs and Sharing Strategies of Small Holder Farmers in Katsina State".**

Kindly provide him with assistance he may require to carry out his data collection exercise. The Department would appreciate if you would kindly give him all the necessary assistance.

Thank you for your consideration and cooperation.

Prof. S.O. Bello

APPENDIX II

QUESTIONNAIRE FOR SMALLHOLDER FARMERS (QFSHF) IN KATSINA STATE

Dear Respondents,

I am a postgraduate student of Bayero University Kano, carrying out a research work on **"Information Needs and Sharing Strategies of Small Holder Farmers in Katsina State".** I hereby solicit for your kind assistance to complete the questionnaire objectively. Confidentiality and anonymity would be duly observed and compiled with. Be assured that all information provided would be strictly used for the purpose of the study. Thank you in anticipation of your cooperation.

Abubakar Magaji.

Section '1' Demographic information of the small holder farmers

Q1. Local Government Area.....

Q2. Gender (a) Male ( ) (b) female ( )

Q3. Age

a) Below 20 years ( )
b) 21- 30 years ( )
c) 31- 40 years ( )
d) 41- 50 years ( )
e) 51 years to above ( )

Q4. Educational Level

a. Adult and Mass literacy Certificate ( )
b. Primary School Leaving Certificate ( )
c. Secondary School Certificate ( )
d. NCE/OND Certificate ( )
e. Others (please specify).....

Q5. How long have you been in farming activities?

a. 0-5 years ( )
b. 6-10 years ( )
c. 11-20 years ( )
d. 21-30 years ( )
e. 31years to above ( )

Q6. Please kindly tick (√) the option appropriate for you: -

Sec. 2	**Information needs of small holder farmers for farming activities in Katsina state**	**Yes**	**No**
6.1	Do you need information on agricultural credit /loan /subsidy?		
6.2	Do you need information on weather and climate conditions?		
6.3	Do you need information on marketing and price of farm produce?		
6.4	Do you need information on new seeds and fertilizer?		
6.5	Do you need information on storage methods?		
6.6	Do you need information on new agricultural technology?		
6.7	Do you need information on diseases and pest control?		
6.8	Do you need any other information?		

Q7. Please kindly tick (√) the option appropriate for you: -

Sec.3	**Information sources used by small holder farmers for farming activities**	**SA**	**A**	**UD**	**DA**	**SD**
7.1	Farmers source information from families and relatives.					
7.2	Farmers' source information from extension workers.					
7.3	Farmers source information from farmers' cooperative associations.					
7.4	Farmers source information through radio and television.					
7.5	Farmers source information from LGA agricultural unit.					
7.6	Farmers source information through workshops and conferences.					
7.7	Farmers obtain information from agricultural dealers					

Q8. Please kindly tick (√) the option appropriate for you: -

Sec.4a	Information seeking patterns used by small holder farmers	SA	A	UD	DA	SD
8.1	Farmers seek information through referral to information units.					
8.2	Farmers seek information through asking questions.					
8.3	Farmers seek information through social media chatting.					
8.4	Farmers seek information through verbal conversation.					
8.5	Farmers seek information through collaboration with extension workers.					

Key; SA=Strongly Agree, A=Agree, UD=Undecided, DA=Disagree, SD=Strongly Disagree.

Sec.4b	Farming activities engaged by small holder farmers	Yes	No
8.6	Do you engage in rain fed farming activities?		
8.7	Do you engage in irrigation farming activities?		
8.8	Do you engage in Fadama farming activities?		
8.9	Do you engage in livestock farming activities?		
8.10	Do you engage any other farming activities?		

Sec. 4c	Types of crops produced by small holder farmers	Yes	No
8.11	Do you cultivate sorghum crops?		
8.12	Do you cultivate maize/corn crops?		
8.13	Do you cultivate millet crops?		
8.14	Do you cultivate beans crops?		
8.15	Do you cultivate any other crops?		

Q9. Please kindly tick (√) the option appropriate for you: -

Sec.5a	**Information sharing strategies used by small holder farmers for farming activities**	**SA**	**A**	**UD**	**DA**	**SD**
9.1	Farmers share information through face to face interactions.					
9.2	Farmers share information through extension workers.					
9.3	Farmers share information through oral communications.					
9.4	Farmers share information through phone calls.					
9.5	Farmers share information through farm visits.					
9.6	Farmers share information through town criers.					
9.7	Farmers share information through social medias.					

Sec.5b	**Types of information shared by small holder farmers for farming activities**	**SA**	**A**	**UD**	**DA**	**SD**
9.8	Information for new methods of farming is shared by farmers.					
9.9	Information for problem solving is shared by farmers.					
9.10	Information for new technology of farming is shared by farmers.					
9.11	Information for maximum productivity of farm produce is shared.					
9.12	Information for government new policies on agriculture is shared.					

Key; SA=Strongly Agree, A=Agree, UD=Undecided, DA=Disagree, SD=Strongly Disagree.

Q10. Please kindly tick (√) the option appropriate for you: -

Sec.6 a	**Information sharing platforms used by small holder farmers for farming activities in Katsina state**	**Yes**	**No**
10.1	Famers use Facebook platform to share information?		
10.2	Famers use WhatsApp platform to share information?		
10.3	Farmers' association platform is use for information sharing?		
10.4	Farmers use farm visits platform for information sharing?		
10.5	Farmers use personal relationship platform for information sharing?		
10.6	Farmers use seminars, conferences and workshops platform for information sharing?		

Q11. Please tick (√) the option appropriate for you: -

Sec. 6b	**Efficiency level of information sharing platforms used by farmers for farming activities in Katsina**	**High**	**Low**
10.7	What is the efficiency level of Facebook platform?		
10.8	What is the efficiency level of WhatsApp platform?		
10.9	What is the success level of farmers' association platform?		
10.10	What is the success level of farm visits platform?		
10.11	What is the efficiency level of personal relationship platform?		
10.12	What is the efficiency level of seminars, conferences and workshops platform?		

Q12. Please kindly tick (√) the option appropriate for you: -

Sec. 7a	**Challenges associated with information seeking of farmers for farming activities in Katsina state**	**Yes**	**No**
11.1	Inadequate of extension workers are challenges to information seeking?		
11.2	Lack of awareness of available information sources is problems to farmers?		
11.3	Inadequate funds to travel or consult extension workers are challenges to farmers?		
11.4	Lack of knowledge to seek for information is a problem?		
11.5	Socio-economic status and age of farmers is a challenge to farmers?		
11.6	Poor response from government authorities to farmers is a problem?		
11.7	Resistance to change by small holder farmers is a challenge to information seeking?		

Sec. 7b	**Challenges associated with information sharing of farmers for farming activities in Katsina state**	**Yes**	**No**
11.8	Lack of transportation services in the rural areas is a challenge to information sharing?		
11.9	Poor knowledge sharing culture of small holder farmers is a challenge?		
11.10	Lack of public libraries and information centers in the rural areas is a problem?		
11.11	Lack of technical knowledge on how to use ICTs is a challenge for information sharing?		
11.12	Uncovered age network services in rural areas are problem to information sharing?		
11.13	High cost of smart phones, data for network plan by farmers is a challenge?		
11.14	Lack of understanding and political conflict in rural areas is a problem?		

Section "8" Solutions to the challenges of information seeking and information sharing strategies used by small holder farmers for farming activities in Katsina state

Q13. What are the possible solutions to the challenges mentioned above?

Measures	Yes	No
Government should employ adequate extension workers and train them to deliver their responsibility effectively		
Government should provide multiple sources of information and construction of good roads		
Government should provide adequate funds for extension and rural information services		
Repackaging of information using social media platforms		
There should be prompt response from government on any problem facing farmers		
Organizing workshops on ICT and strengthen internet connectivity		
Farmers should have knowledge sharing culture		

APPENDIX III

Reliability Statistics

Scale Statistics

Mean	Variance	Std. Deviation	N of Items
58.0357	65.369	8.08511	29

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Do you need information on agricultural credit/loan/subsidy	56.7143	63.989	.152	.638
Farmers source information from farmers' cooperative associations	54.9286	56.069	.314	.619
Farmers source information through radio and television	55.6429	64.090	.004	.654
Farmers source information from LGA Agric Unit	55.1786	60.819	.135	.643
Farmers source information through workshops and conferences	54.5357	54.999	.441	.601
Farmers obtain information from agricultural dealers	55.1786	58.893	.250	.627
Farmers seek information through asking questions	55.6071	59.803	.232	.629
Farmers seek information through collaboration with extension workers	55.3571	60.979	.145	.641
Farmers share information through extension workers	55.1786	59.263	.205	.634
Farmers share information through oral communications	55.0357	58.776	.263	.626
Farmers share information through phone calls	55.3929	55.433	.408	.605
Farmers share information through farm visits	55.4643	59.739	.184	.637
Farmers share information through twon criers	54.8571	52.571	.569	.582
Farmers use WhatApp platform to share information	56.6786	64.745	.049	.643

Farmers's association is use for information sharing	56.5714	65.587	-.058	.648
Farmers use farm visits platform for information sharing	56.7857	64.397	.110	.640
Farmers use personal relationship platform for information sharing	56.8571	64.571	.103	.640
Farmers use seminars, conferences and workshops platrofm for information sharing	56.2143	64.693	.083	.641
Unavailability of extension workers are challenges to information seeking	56.7500	63.972	.161	.637
Inadequate funds to travel or consult extension workers are challenges to farmers	56.8929	65.358	-.020	.644
Lack of knowledge to seek for information is a problem	56.8214	63.560	.245	.634
Poor response from Govt. Authorities to farmers is a problem	56.8571	65.164	.008	.644
Poor knowledge sharing culture of small holder farmers is a challenge	56.7857	60.989	.608	.617
lack of technical knowledge on how to use ICT is a challenge for information sharing	56.6429	63.720	.177	.636
Uncovered age network services in rural areas are problem to information sharing	56.6071	63.803	.163	.637
Lack of understanding and political conflict in rural areas is a problem	56.6429	64.312	.101	.640
Farmers source information from families and relatives	55.5000	61.370	.152	.639
Do you need information on storage methods	56.6786	63.634	.192	.636
Do you need information on new seeds and fertilizer	56.6429	64.534	.073	.641

APPENDIX IV

Sample Size Confidence Levels and Confidence Intervals for Random Samples.

Population	Confidence level 90 percent			Confidence level 95 percent			Confidence level 99 percent		
	Confidence	Confidence	Confidence	Confidence	Confidence	Confidence	Confidence	Confidence	Confidence
30	27	28	19	28	29	29	29	29	30
50	42	45	47	44	46	48	46	48	49
75	59	64	68	63	67	70	67	70	72
100	73	81	88	79	86	91	86	91	95
120	83	94	104	91	100	108	102	108	113
150	97	111	125	108	120	132	122	131	139
200	115	136	158	131	150	168	154	168	180
250	130	157	188	151	176	203	182	201	220
300	143	176	215	168	200	234	207	233	258
350	153	192	239	183	221	264	229	262	294
400	162	206	162	196	240	291	250	289	329
450	170	219	182	207	257	317	268	314	362
500	176	230	301	217	173	340	285	337	393
600	187	249	335	234	300	384	315	380	453
650	192	257	350	241	312	404	328	400	481
700	198	265	364	248	323	423	341	418	507
800	203	278	389	260	343	457	363	452	558
900	209	289	411	269	360	468	382	482	605
1000	214	298	431	278	375	516	399	509	648
1100	218	307	448	285	388	542	414	534	689

1200	222	314	464	291	400	565	427	556	717
1300	225	321	478	297	411	586	439	577	762
1400	228	326	491	301	420	606	450	596	796
1500	230	331	503	306	429	624	460	613	817
2000	240	351	549	322	462	696	498	683	959
2500	246	364	581	333	484	749	524	733	1061
5000	258	392	657	357	536	879	585	859	1347
7500	263	403	687	365	556	934	610	911	1480
10,000	265	408	703	370	566	964	622	939	1556
20,000	269	417	729	377	583	1013	642	986	1688
30,000	270	419	738	379	588	1030	649	1002	1737
40,000	270	421	742	381	591	1039	653	1011	1762
50,000	271	422	745	381	593	1045	655	1016	1778
100,000	272	424	751	383	597	1056	659	1026	1810
150,000	272	424	752	383	598	1060	661	1030	1821
200,000	272	424	753	383	598	1061	661	1031	1826
250,000	272	425	754	384	599	1063	662	1033	1830
500,000	272	425	755	384	600	1065	663	1035	1837
1,000,000	272	425	756	384	600	1066	663	1036	1840

Source: Cohen, Marion and Marrison (2007).

APPENDIX V

Results of SPSS

Correlations

Descriptive Statistics

	Mean	Std. Deviation	N
Info need	15.694	.8832	255
Info source	29.569	4.4094	255

Correlations

		Info need	Info source
Info need	Pearson Correlation	1	.020
	Sig. (2-tailed)		.756
	N	255	255
Info source	Pearson Correlation	.020	1
	Sig. (2-tailed)	.756	
	N	255	255

Correlations

Descriptive Statistics

	Mean	Std. Deviation	N
Sharing strategy	29.502	3.8790	255
Farming act engaged	8.749	1.4499	255

Correlations

		Sharing strategy	Farming act engaged
Sharing strategy	Pearson Correlation	1	.480**
	Sig. (2-tailed)		.000
	N	255	255
Farming act engaged	Pearson Correlation	.480**	1
	Sig. (2-tailed)	.000	
	N	255	255

**. Correlation is significant at the 0.01 level (2-tailed).