ACCESS TO AND USE OF LAND RELATED AGRICULTURAL INFORMATION BY FARMERS IN KIAMBU COUNTY, KENYA

BY

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DEDICATION

This thesis is dedicated to my late sister Jean Wanjiku Hutchinson whose encouragement is greatly appreciated.

To my husband Dr. Mbui Wagacha and to our children Wangui, Njeri, Njambi and Wagacha.

Mrs. Virginia Muriuki, the late Muriuki Mugwandia, and Mrs. Murray Ngoima for their unfailing support.

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ABSTRACT

Farmers require information to carry out their agricultural activities and improve production and hence their livelihoods. There are many factors that inhibit farmers from accessing information, including shortage of information sources, and absence of information systems and services that are aligned to their needs. The aim of this study was to investigate access to and use of land-related agricultural information by farmers in Kiambu County with a view to suggest possible solutions: to identify farmers' land-related agricultural information needs; examine how the farmers access and use the information; establish the extent to which their information needs are met; determine the challenges of accessing the information; and suggest possible solutions; The study was informed by Niedzwiezka's theoretical framework, "New Model of Information Behaviour. Qualitative research approach with some aspects of quantitative techniques was used in embedded Mixed Method. The study sampled 150 subjects randomly selected from a population of 897 farmers from the largest and the smallest segments in a register of 28 cooperatives. Stratified random sampling technique was used with an aim to achieve representativeness. Qualitative data was analyzed using qualitative techniques on identified categories while quantitative data was analyzed using descriptive statistics to summarize the findings in terms of frequencies, percentages, and intensities. The study findings were that information sources were deficient, and that available information systems and services were not aligned to the needs of the farmers. Further, information infrastructure in Kiambu County is poor and information technology is largely untapped. The study concludes that access to and use of land related agricultural information was inadequate and therefore farmers' information needs were not being met sufficiently to enhance their agricultural productivity and hence improve their livelihoods. The study recommends that the information providers should provide information that is tailored to the varying information needs of the farmers: national and county governments should establish policies aimed at bringing information close to the farmers. It is also recommended that farmers need training on access and use of information source available in various information Centres.

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ABBREVIATIONS AND ACRONYMS

AERC	African Economic Research Consortium
CBO	Community Based Organization
FAO	Food and Agricultural Organization
GoK	Government of Kenya
ICT	Information & Communications Technology
IFLA	International Federation for Library Associations
ILRI	International Livestock Research Institute
INSU	Studies of information needs, seeking and use
IPAR	Institute of Policy Analysis and Research
KARI	Kenya Agricultural Research Institute
KIPPRA	Kenya Institute for Public Policy Research and Analysis
NGO	Non- Governmental Organization
UNCHS	United Nations Centre for Human Settlement
UNDP	United Nations Development Programme

CHAPTER ONE

INTRODUCTION AND BACKGROUND INFORMATION

1.1 Introduction

This chapter presents an outline of the research aims, objectives, research questions and significance of the study. The background situates Kiambu County in the political and cultural history of land and agriculture in Kenya, in relation to access to and use of information, and the factors influencing access to and use of that information. Farmer's land related agricultural information needs, sources of information and methods they use to access and use the information, and the challenges they encounter are explored.

1.2 Background Information on Land Related Agricultural Information

Access to and use of land related agricultural information is a major concern in agricultural production and farmers livelihoods worldwide. Farmers' land related information needs are diverse and are guided by information needs of farmers, information seeking, information sources and distribution, and the challenges that are encountered by the farmers in those perspectives. Several variables influence land related agricultural information access and use. These include demographic factors, land ownership and size, cultural aspects, land administration and management and land use. Globally however, the livelihood of people living in the rural areas depends on access to land as a natural resource, since most people depend on agriculture**.** Murtazashvili I and Murtazashvili J. (2016), believe that land ownership improve the household when discussing land tenure in Afganistan. This is so in Africa as observed by Mugwisi, Mostert and Achola (2015). Access and use of information therefore on land has been a great concern to not only farmers but also farmers and policy makers as noted by Adetimehin, Okunlola and Owolabi (2018) when discussing the

utilization of agricultural information in Nigeria. Adio, Abu and Yusuf (2016), discussed the use of agricultural information sources by farmers in Kwara State, Nigeria. Lwoga, Stilwell, and Ngylube (2011), on access and use of agricultural information in Tanzania. These studies do not discuss land related issues. However, information on land tenure is not easily made available. In Kenya for example land information, especially on ownership (titles deeds) is highly protected. There are unnecessary physical and administrative barriers imposed upon the availability of such information, owing to corruption as noted "Ndungu report" (2004) in Kenya, and hence information becomes costly to obtain. This has promoted large-scale corruption and only those who pay are given the information they require. As a result, information becomes unaffordable to the poor, particularly the rural farmers who therefore cannot access such information. However, access to information depends on the information needs of the farmers as noted by Phiri, Chipeta and Chawinga (2018). They consider the importance of being mobile as most important. However, there is general lack of awareness among rural farmers on availability of information. Some farmers do not always know precisely what information they want and cannot articulate their information needs accurately as noted by Kaane (1997). However, information needs can only be fulfilled if information is made available.

Regarding land-related agricultural information, the main suppliers of information are the NGOs, churches, cooperatives, banks, sometimes sellers of agricultural products and equipment, among others. Sometimes this information does not meet the specific information needs of farmers because it might not be relevant. Furthermore, unless this information is taken to the farmers in the rural areas, the farmers hardly go to look for it owing to several reasons that include lack of time to search for information,

lack of knowledge about the existence of such information, and the travel cost to reach the information centers, among others.

Electronic media, radio and television now broadcast a vast array of information, so that information seekers including farmers now have little difficulty traversing repositories of availed information. However, this has further complicated information access and use. This is because the information broadcast might not be in a language that is understood by the farmers. There are multiple languages spoken in each one of African countries and in Kenya there are 42 languages. It is not easy to translate, especially the official written material, usually from the English or French to all the local languages. Further, some technical and scientific terms available in official languages are not available in local languages hence the possibility of distorting facts in the process of translation. Communication infrastructure, which is a basic framework of information organization and communication, is wanting in many African countries, Kenya included. Yet, effective information access and use depends on communication infrastructure such as telephones, the Internet, computers (not so much telex, fax and postal services which have become outdated and obsolete), all powered by electricity, which is also not easily available in the rural areas.

As mentioned earlier, many information seekers may not be able to travel from one place to another to obtain information they need. Most land related information is in capital cities, and the cost obtaining it is expensive. Logistically, accessing information even within the record keeping offices has been a problem. Arguably, this is largely owing to corruption, where some officers in charge of information custody actively hide files to solicit bribes. Some lack a clear perception of the importance of their duties or are untrained and unqualified and therefore lack motivation. Besides government offices, information centers and university library have staff who are not

motivated, and they do not care when some information seekers resort to mutilation and theft of material.

1.2.1 The Kenyan Situation

Land was at the centre of Kenya's fight for independence, and the accompanying colonial struggle and is well-documented. In a study by Njonjo (1978) on agrarian class struggles in Kenya, between 1850 and 1974, it is revealed that land holdings of African farmers were significantly reduced in Kenya during the colonial period. Most land was taken over by European farmers and many local subsistence farmers were forced to migrate or to continue to eke out a living in small farm holdings.

The occupation of land by colonial settlers diluted and substituted traditional customary rights, (Kenya Human Rights Commission Report, (1996) and the Standard (May 9, pp. 10), while the external system deepened the inequality of ownership and access to land permanently, Syagga (2006). Other consequences were that misinformation or lack of proper information perpetuated poverty in the residual land on which Africans subsisted, in the rural sector. Although the colonial government perpetuated biased and partisan agricultural development, unfortunately, post-Independence regimes have made only marginal progress in establishing corrective measures (Kenya Human rights Commission Report, 1996). This has been confirmed by the Report of the Commission of Inquiry into the Illegal/Irregular Allocation of Public Land), (2004), the so-called 'Ndun'gu Report'. The report and its recommendations contribute to information on the consequences of access, uses, and misuses of land related information. Demand for land and land rights have remained, and they were some of the most combative issues in the Constitution debate prior to the successful referendum in August 2010. However, outside ownership, issues of

access to and use of land related information for agricultural development, and hence improved livelihoods, has received relatively scant attention.

Three main characteristics explain why access to land related information and its uses are critical to agricultural development. Firstly, Kenya faces an acute scarcity of land, with only 17% of its territory being arable land. Yet over three quarters of the people reside and make their livelihoods in rural areas, which have varied land uses and potential. Besides some 60% of rural households in Kenya own less than 0.5 hectares. Access to and use of information on land related issues can have far-reaching consequences for agricultural development and livelihoods.

Secondly, land uses fall into diverse categories linked to livelihoods and development. The information needs of rural Africa are therefore diverse. The diversity is because of the state of existing development, communication infrastructure, and proximity to towns/institutions. The kind of information needed also depends on the uniqueness of the communities and their way of life and this also varies, from one rural area to another. For example, a rural setting around the lake region is more receptive of information on fishing, as opposed to pastoralist needs in Northern Semi-arid Kenya.

The third concern relates to regulations, whereby about 68 pieces of legislation govern land uses, with laws targeting mainly land exploitation, land control, land planning and land conservation (Odhiambo 2000). The above uses and regulations differentiate not just the interaction of specific land uses with other sectors of the economy, such as industry and manufacturing services (finance and banking, utilities, and others), but also types of information access and uses on land that will impinge on different segments of land users. In this context, agriculturalists may suffer little from the lack of access and use of information (public or private) intended for industrial

users, users in forestry and mining, users in the rearing of livestock in the fields, or users for public enjoyment, relaxation, or leisure.

Access to and use of information for livelihoods and economic development therefore differ, depending on the characteristics of traditional livelihoods and ownership characteristics in Kenya's counties. Access and uses for pastoralism differ from that for agriculture, and that of smallholdings from large ones. Varied cultural practices can limit or expand opportunities to access and use land related information.

This dissertation focuses access to and use of information on land related agricultural issues in a mainly agricultural county, Kiambu, where land holdings are relatively small, and used mainly for agriculture and some livestock rearing. Efficiency in the use of land is thus critical.

1.2.2 Kiambu County

Kiambu County lies in the central area of Kenya. It comprises twelve constituencies which are Gatundu North, Gatundu South, Githunguri, Juja, Kabete, Kiambaa, Kiambu Town, Kikuyu, Lari, Limuru, Ruiru and Thika Town. The administrative centre was known as a district before the 2010 referendum that steered a new Constitution that brought in a devolved government and administration that resulted in the County system. Kiambu is an agricultural county with good climate, except for some dry areas in Limuru and Gatundu. Dairy farming is highly practiced in most of these areas. Most of the land is arable, cultivated for crops like maize and beans, and other subsistence crops, as well as permanent cash crops like coffee, tea, and pyrethrum, which are not replanted after each harvest. The other areas include permanent pastures, forests and woodlands, built-up areas, roads, barren land, and quarries.

Kiambu County had a population of 1,623,282 according to Kenya Bureau of Statistics report of 2009. The county covers an area of 2,543.42 square Kilometres. The county is spread over an agro-ecological zone in the central Kenyan highlands with altitudes ranging from 1,400m to 1,800 m above sea level.

The multiplicity and complexity of land uses, including their regulations, influence the consequences of good or poor access to land-related information. As aforementioned, the range of land use, for example, extends to agricultural crops, livestock, natural resources (including mining), water, wildlife conservation, environmental conservation, public utilities, leisure and more. Access to and use of information in this agricultural setting has a special impact on the future of the county's economy and livelihood.

1.2.2.1 Land and Politics, Cultural Issues and National Resources and Agriculture

In Kenya, as in many other countries, the people in power and the middlemen have used their authority to execute illegal uses of land, leading to contested tenures. This has caused unwarranted problems, related to the general validity, authenticity, and utility of existing information on land, where for example there is politically motivated allocations of public land, or sales of one piece of land to several buyers simultaneously, or where the buyers are denied access to and use of correct information, and deliberate concealing of information because of corruption.

In Kiambu County land issues are cultural issues in that cultural practices can limit or expand opportunities to access and use information on land, Njonjo (1978). Women are usually are excluded from such information, even though it can empower them economically (notably information on land and therefore on tenure). Taole (1998)

notes that empowering women through information is almost equal to empowering the whole nation. The cultural practices rule out entirely or in part, the role of women in livestock economies, or in the economic exploitation of land, and therefore act as a barrier to their acquiring the knowledge that could enable them build livelihoods. Access to and use of information on land and land related uses, in such cases, directly compromises livelihoods.

Substantial land in Kenya is allocated to use as a natural resource (including wildlife conservation, environmental conservation, mining, water, public utilities, leisure, etc.). Some information also focuses on land and soil composition, natural disasters, and disaster preparedness. In Kiambu County, several people have lost their lives in quarries, in attempts to make livelihoods from mining stone or clay. Although this study concentrates on agricultural aspects in provision of information, land related information in relation to natural resources is important and relevant. Information should be organized, ideally to help promote development, by alleviating the constraints that are encountered in the above array of the land system and its uses.

Agriculture is the segment that hosts a majority of (three quarters) of the Kenyan population in the rural sector. Yet, it is the poorest segment of Kenyan society, and the origin of factors that push the poor to migrate to urban settlements. Kiambu County's main economic activity is agriculture, tea, coffee, and dairy, among others. However, access to and use of land related information to exploit it for livelihoods and agricultural development have received relatively scant attention especially by the small farmers owing to several reasons ranging from lack of knowledge, infrastructure and communication, illiteracy, and poverty. The main provider of information especially to the poor farmers, has been government agricultural extension workers,

the NGOs, and churches, while the not so poor and those growing cash crops have been assisted by cooperatives.

An important dimension of access to and use of information on land, relates to the availability of agricultural inputs like seeds, fertilizers, and pesticides. Also, services like marketing of products and credit facilities, and methods of land exploitation leading to satisfactory livelihoods. Information affects land use, method and cost of production and technology of land uses, and hence its productivity and livelihoods creating potential. The providers of the information are mostly traders, stockists, agri-business players, research institutions, NGOs, Community-based Organizations (CBOs), churches and others.

1.3 Statement of the Problem

Farmers require relevant, accurate, up- to-date and timely information to advance their knowledge on agricultural production and hence improve their livelihood. Granted that farmers in Kiambu County need to improve their livelihood, without articulating their information needs, improvement in the use of relevant existing information, knowledge of sources of information, systems and services, there will be no improvement in their agricultural production and the result is poor livelihood.

The study postulates that identification of farmers' information needs, sources of and availability of relevant and timely information would enhance agricultural production and improve farmers' livelihood in Kiambu County.

Sharma and Bhadauria (2017), think that information is vital for prosperity. Bii and Otike (2003), state that the development and quality of rural community will depend on information to effect development considering that the main problem in socio-economic development of rural communities is access to and ability to use that

information. Weiss et.al (2000) define information as the cornerstone of successful social-economic development because it contributes to decision making.

For the farmers to prosper and satisfy their needs and improve their livelihood, they require relevant, timely and accessible information. The information providers, the government, NGOs, CBOs, and the churches, have not grasped or established farmers' real information needs, and they provide the farmers with information sometimes based on their own assumptions. Consequently, the existing few information services which are hardly tailored to changing needs of the rural farmers have not been able to serve farmers adequately. According to Kiplang'at (1999) and Bii (2001) provision of information services to the farmers is essential and critical because it enables them to participate in the democratic processes and decision making as well as improve their livelihood.

Moreover, the existing information systems and services in the rural areas, are inadequate and do not meet the information needs of rural farmers. Odini (1993) notes that "for information systems and services to be accessible and satisfy the information needs of a particular group, they must take into account the characteristics of the user group" such as farmers.

Most information services are confined in urban areas. The result is that farmers in the rural county, lack adequate, up to date, appropriate and relevant information to enable them to transform their agriculture and improve their livelihood. Aligula (1995), states that the information seekers and users are forced to spend more time trying to locate the information they need, hence generally do not get the information they need in time. The failure to meet user needs in relation to availability, timeliness and sometimes to relevance of information required, is a considerable setback to

agricultural production and development. As noted by Koskei (2008) and Kiambi, (2018), the use of modern information technology would cater for farmers' varied information needs, enhance agricultural production and improve the farmers' livelihood.

1.4 The Aim of the Study

The aim of the study was to investigate, access to and use of land related agricultural information by farmers in Kiambu County, suggest possible solutions, and develop a model for accessing information in the county.

1.5 Specific Objectives of the Study

The specific objectives of the study were to:

1. Identify land related agricultural information needs of farmers in Kiambu County
2. Examine how agricultural farmers access and use land related information
3. Establish the extent to which the information needs of farmers are met
4. Determine the challenges of accessing land related information in the county
5. Suggest possible solutions

1.6 Research Questions

The following research questions were used to guide the researcher:

1. What kinds of land related information do the agricultural community in? Kiambu County require?
2. How do agricultural farmers seek information on land related matters?
3. What are the most preferred methods of getting this information?

4. To what extent does the existing information meet their land related agricultural information needs?
5. What are the challenges faced by farmers in closing the existing information gaps?
6. What suggestions can be offered to improve access to and use of land related agricultural information in Kiambu County?

1.7 Assumptions

This study was based on the following assumptions:

1. That farmers in the rural area of Kiambu County are not able to access and use land related information and therefore, their information needs are currently not met, which is a constraint to agricultural development and to their livelihoods.

2. That lack of access to and use of current, relevant, adequate, and timely land related information, acts as a challenge to farmers in their planning and performance of their agricultural activities effectively and efficiently, and that if their information needs were met, they would improve their agricultural performances and their livelihoods.

3. That the establishment of a relevant information system based on farmers' land related information needs would promote agricultural development and improve livelihoods.

1.8 Significance of the Study

The findings of the study will help influence the way land related agricultural information is disseminated so that it eventually reaches the agricultural farmers and help them utilize it for the improvement of their agricultural activities and therefore their livelihood.

Secondly although there exist sizable volumes of literature on studies conducted on various aspects of land related agriculture issues especially by non- information professionals, literature reviewed, however indicate that none of the studies have addressed at length issues covered in this study. Existing studies on accessibility, provision and use of information in Kenya by information specialist and on rural areas, like Bii (2001) Kaane (1997) Kombo (2001) on health issues; and on professionals, like railway workers, Odini (1997) lawyers (Otike and Mathews) and Amoth (2000) Oduwole and Okorie (2010) Okwu and Umoru (2009) on agricultural information, none of these studies have covered the issues under study which is the accessibility and use of land related agricultural information by farmers in Kiambu county and Kenya. A knowledge gap, therefore, exists and this study attempted to create information and generate knowledge hoping to fill up this gap.

This study will contribute to the existing body of knowledge, on access to and use of information in general but specifically on access to and use of land related agricultural information in Kiambu County. The information on land related agricultural aspects advances the farmers' knowledge and help them improve their livelihood and provide a foundation for conducting further research studies on the significance of information as an instrument for development.

The study will also help influence development policy and especially assists decision-makers to formulate appropriate policies for the promotion of accessibility and use of information by farmers. Also, policies regarding promotion of information and communication. The study findings are expected to contribute to the body of knowledge on information access and use in Kiambu County

1.9 Scope of the Study

This study focused on small- and large-scale farmers who are land users living in Kiambu County. These are dairy farmers, cash crops like coffee, tea and pyrethrum who also grow subsistent crops. Farmers were targeted because they own, live, and use land for agricultural purposes, others hire land for agricultural use, but all are the direct seekers and users of information. Some farmers know what information they need, others do not know what information that might help them improve their land and their farming. They contribute to agricultural development and to social, economic development in general, as well as promote food security. A farming community however requires information that can advance their production for livelihood, agricultural development, and poverty alleviation.

1.10 Limitations of the Study

Land information is a sensitive issue, and the farmers especially men, were not sure at first what the researcher intended to do with the information gathered. However, the women farmers (in situations where the women were the head of the family) were cooperative and engaged in discussion. Married women who did not at first want to volunteer information for fear of repercussions from their spouses and family, ended up encouraging their men to participate and the researcher managed to secure appointments with most farmers (the interviewees). Men kept time but women were in some instances, disrupted by children running around them and others seeking their attention. Though the farmers did not solicit favours (monetary or otherwise), they did expect to receive something in return. Transport to some areas in the county was a problem. Transport cost to and from the rural areas was a major limitation and there were areas without any means of transport.

1.11 Chapter Summary

The chapter starts with the development of the context, laying the background of the study. Here the research problem is articulated, along with the aims and specific objectives. Research questions that are set to lead the study are derived from specific objectives. Accordingly, assumptions along with significance of the study, scope and limitations are presented.

1.12 Definitions of Terms and Concepts

Chama: refers to an informal cooperative society that is normally used to pool and invest savings particularly women in Kenya.

Chiefs' *Barazas*: public meetings addressed by a location Chief, aimed at informing the community living in his location on administrative issues including government policies, health matters, security, among others.

Environmental aspects: refers to characteristics of the natural environment that communities consider important to them, including climate change.

Information needs: a psychological state associated with uncertainty, and the desire to fill information requirements by farmers, for example, in carrying out their day-to-day activities, aimed at improving their livelihood, economically, socially etc.

Information seeking: an expression of want, demand, need or requirement that entails looking for information. In this study, information seeking is the process used by farmers to identify and choose among alternative information sources, or an action undertaken by farmers at a given time, to identify and satisfy information needs.

Information source: a document, person, system, or organization that holds information, or from which information can be found and/or stored for ease of accessibility and utility.

Information users: refers to the farmers who are the final users of information, after the information has been transferred to them from various information sources.

Information systems: centers that collect, process, store and disseminate information, such as libraries, documentation centers, resource centers, and archives. They can also refer to an entire infrastructure, i.e., organization, personnel, and computers, with organized methods of transforming data into information that can be used.

Land tenure: refers to land ownership. It defines the right or methods by which individuals or groups acquire, hold, or transfer the rights to land.

Legal aspect: refers to legislation attributes including legal standpoint.

Mungiki: refers to a politico-religious group, and the name means united people or multitude in the Gikuyu language. Kiambu County is mainly dominated by Gikuyu ethnic group.

Physical planning: refers to the way the farmers planned to use their land, to the farmers' active process of organizing the structures and function to ensure orderly and effective location of their land uses.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter presents the theoretical framework and reviews the relevant literature in attempt to answer the research questions of the study. The review is guided by the study objectives given in chapter one, which set up the background of the study. Literature review is key to the research because it indicates where the research fits into the existing body of knowledge. It is also central to the research process in providing a general understanding of the research problem. Therefore, the aim of the literature review was to therefore identify similar research works to the present study. To identify gaps to be addressed and establish a yardstick against which the researchers can compare the ensuing research work.

The chapter is organized thematically into eight sections. The first section provides theoretical framework and models which includes Niedzwiedzka's new proposed behaviour model which guide the study. In the second section, an overview of the literature on information needs and information seeking methods is discussed. The third section reviews studies on land related agricultural information needs. The fourth section reviews studies on information access. Section five reviews literature on information access and use. The review of studies in section three, four and five are presented under categories which are: land tenure, physical planning, agricultural activities, environment, access to credit and legal aspects, in section six. The seventh section review studies on information repackaging. The eight and last section examines the use of ICT in the provision of information to farmers. The chapter ends with a summary of main themes discussed.

2.2 Theoretical Framework

The theoretical framework is the structure that can hold or support a theory of a research study. “Theories are formulated to explain, predict, and understand phenomena and, in many cases, to challenge and extend existing knowledge, “within the limits of the critical bounding assumptions”, (Swanson 2013).

In seeking a framework therefore, it is necessary to consider the reasons why a researcher theorize. In most cases it is for systematic examination and creation of knowledge a. The term “theory” has been used in the sense of providing a general explanation of data and observation. It has been proposed that a theory has three characteristics: generality, accuracy, and simplicity but not all at the same time (Weick, 1984). A theory brings to light and explains something that one would otherwise find mystifying (Haralambos, 2000). Often it is an answer into the “why” question. In this study, for example, the presupposition is that farmers need information, the question is “why can’t they get the information they need? Therefore, an important characteristic of a theory is that it can be used as an explanation and provide answers that a researcher can affirm with an assured perspective

The purpose of this study was to find out whether farmers access and use information that they need. This is supported by the Sense- Making theory discussed later in this study, in information seeking and use which postulates that humans generally seek information when they encounter an obstacle, or gap of some kind that they see as a block in their life path.

Most library and information science theories are drawn from social sciences, especially education. However, different theories are known to operate using different

types of definitions, expressions, ideologies, and research assumptions and practices. Information needs and information seeking behavior have been the subject of many studies, resulting in several models that explain human behavior about how information needs arise, and how users seek information and how they use that information. Studies on information seeking include, among others: Wilson (1981) Information Behavior Model; Wilson (1999) Information seeking and Dervin (1992), Ellis (1989) Information Searching Model and Kulthau (2006) and Information searching and retrieval (in automated environment by Ingwernsen, (1999).

Since no theory can comprehensively explain a phenomenon, this study has adopted Niedzwiedzka's (2003) "New model of information behavior" to guide the study. However, it refers to Wilson's (1981, 1996) information behavior model because Niedzwiedzka's model was an improvement on Wilson's model. The study cites Dervin's "Sense-Making theory". These models contribute intellectually to pointing out that information seeking is vital, and demonstrates the interaction of thoughts, feeling and action. Therefore, the models of information needs, information seeking and access to, and information use will contribute intellectually to the study. Derwin and Wilson models portray intellectual process of problem solving. They define sequence of activities which lead to acquiring information, information needs, problem recognition and problem identification.

2.3 The Sense-Making Theory

The Sense- Making theory of Dervin (1983, 1992, 1996), has been used for several years in a wide variety of contexts. However, its primary application has been in information seeking and use. Savolainen (1992) refers to a general theory as "a theoretical net, a set of assumptions and propositions, and a set of methods which have been developed to study the making of sense that people do in their everyday

experiences". The cognitive view interprets how that information affects or changes the state of a mind. In this study, access to and use of information is as important as having cognizance that a gap exists in information, and that there is need to fill that gap. Sense-Making is based on the concept that humans generally seek information when they encounter an obstacle, or gap, of some kind that they see as a block in their life path. To bridge that gap, the individual seeks or revises information, methods, and new approaches that they find helpful.

Sense-Making builds on a core "time-line" interview. This is a structured, open-ended interview that allows the participant to construct a view of the world from their own perspective. The interview starts with the participant's experiences in a particular situation, for example lack of information on land, and hence information seeking and use. This is supported by Wilson's (1981, 1996) Models on information needs and seeking behavior. The 1981 model suggests that information-seeking behavior arises because of a need perceived by an information user, who, "to satisfy that need, makes demands upon formal or informal information sources or services, which result in success or failure to find relevant information. If successful, the individual then makes use of the information found and may either fully or partially satisfy the perceived need –or, indeed, fail to satisfy the need and have to reiterate the search process". The model also shows that part of the information-seeking behavior may involve other people, through information exchange, and that information perceived as useful may be passed to other people and be used by them, in addition to or instead of being used by the person himself. This model appeals to this study because of its relevance to information seeking by the farmers, who seek information because they need it and then share that information with other farmers.

2.4 Wilson's Model of Information Behaviour, 1996

In his model, Wilson points out that information needs are secondary needs, caused by primary needs which, in accordance with definitions in psychology, can be defined as physiological, cognitive, or effective. Cognitive needs rise as an attempt to make sense and order of the world and are the realization of a need to explain and make sense out of phenomena, but also can be simulated by common, non-utilitarian curiosity. The rise of a particular need is influenced by the context, which can be the person or the role the person plays in work and life, or the environment (social, political, economic, technological etc.). Wilson also points out that the information needs of one person can vary, depending on the changes in their environment. Wilson states that there are different modes of acquisition, processing and use of information.

Passive Attention, Passive Search, Active Search, and Ongoing Search are the four types.

When the TV or radio is on, for example, the passive attention mode of information from the environment can be used.

One acquires information unintentionally, and it could prove useful. Behaviors can result in the acquisition of information that could be relevant, and one can obtain useful information un-purposefully.

The idea that we simply use information to satisfy a given need does not seem to fully recognize the power of information today, as there are other needs that emerge. For example, the need to access information on land related issues like growing of agricultural produce may lead to the use of that information to satisfy the need of, say, the marketing of the same product, and hence to monetary gain.

2.5 Niedzwiezka's New Proposed Model of Information Behavior, 2003

Niedzwiezka's new proposed model, (Niedzwiezka, 2003) a behaviour model based on Wilson's theoretical propositions is most applicable to this study. The model was chosen because it incorporates aspects of information needs, information seeking and information use, that were the subject of the investigation and it is a newly modified model, which is an improvement on Wilson's model. Key aspects of the model based on Wilson's model of 1996 were used in the design of the research instruments, supported by propositions of Sense-Making, which build on a core "time-line" interview. This is a structured, open-ended interview that allows the participant to construct a view of the world from their own perspective.

The interview starts with the participant's experiences in a particular situation, for example, lack of information on land, and its basis on lack of (or opportunity for) information seeking and use. All the components of Wilson's model were preserved, even if some were compressed into one type (e.g., demographic variables included in a category of personal variables).

Farmers are forced to plan and divide their activities to fit a certain time. Every farmer is constantly thinking about how to divide up their limited time between various tasks and priorities. They therefore apply problem-solving heuristics that they have learned from experience. Their work-related demands imply that farmers operate in a rather unusual environment for information use. Farmers do not have the energy nor the cognitive need to be comprehensive in their information searches. While seeking information, time is of the essence, as farmers are often required to act or respond swiftly. Since many of the problems they face involve uncertainty and ambiguity (weather conditions etc.), farmers typically prefer information sources and communication channels that can provide them with a sense of the hidden, or informal

dimensions of the situation. For these reasons, researchers have repeatedly found that farmers prefer human information sources, and that they spend an overwhelming proportion of their time in their work environment. Farmers do not necessarily try to find the optimal answer when searching for solutions to their problems. They are generally ready to make decisions when they are satisfied that the discovered alternatives are good enough choices to withstand the test of time (or an urgent time).

Niedzwiezka's (2003) has identified some of the weakness of Wilson's 1996 model both in its conceptual content, and in graphical presentation as follows:

- That the diagrammatical representation of the differences between the phase of the occurrence of information need and the phase when a decision to seek information is undertaken can be improved.
- That there is no need of separating psychological and demographic variables in the intervening variables section. They can be under one broad heading –personal variables.
- That there is no need of separating the features of the information source from the information environment (context). They can be a general class of environmental variables; and
- That variables should be considered not just at the stage of seeking, but also at the need occurrence for decision-making stage.

Niedzwiezka's new proposed model, (2003) brings in a few additions to Wilsons model. The proposed new model encompasses the main concepts of Wilson's model, such as: person-in-context, three categories of intervening variables (individual, social and environmental), activating mechanisms, cyclic character of information behaviours, and the adoption of a multidisciplinary approach to explain them.

The new model introduces several changes which include.

1. Identification of ‘context’ with the intervening variables.
2. Immersion of the chain of information behaviour in the 'context', to indicate that the context variables influence behaviour at all stages of the process (identification of needs, looking for information, processing and using it).
3. Stress is put on the fact that the activating mechanisms also can occur at all stages of the information acquisition process.
4. Introduction of two basic strategies of looking for information: personally and/or using various intermediaries.

This study chose Niedzwiedska model to serve as its theoretical framework because it has attributes that could help to address the principal research question. The model was derived from studying a group of information users and is applicable to all information users, Niedzwiedzska (2003) and can therefore appeal to farmers within their environment in Kiambu County. Farmers are a distinct group of information users, whose information needs, and information use are largely dictated or conditioned by their activities. The activities of farmers are open-ended, because farmers must deal with a wide range of issues both theoretical and practical. Further, many of the problems that they encounter are continuous, and are only resolved with time. Farmers find that they must deal with multiple and varied issues, from land ownership and land planning to weather conditions, among others.

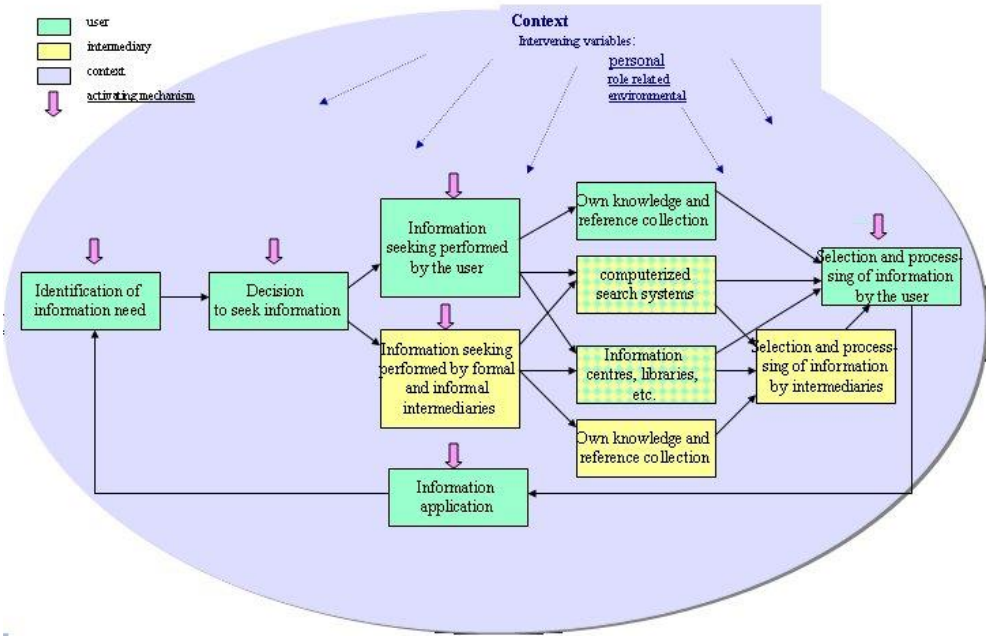


Figure 1: Niedzwiezka's new proposed model, 2003
Source: Information research, vol. 9.no. 1 October 2003

2.5.1 Application of Niedzwiedzka B. (2003) Model to the Study

Niedzwiedzka shows approaches of information seeking which can be applied by farmers themselves or intermediaries. Farmers can obtain information by visiting information centers or their cooperatives.

Farmers can, however, use the services or aid of other persons who are likely to supply the knowledge they need, such as government agencies, including Chiefs, extension workers, and NGOs, as a result of their operations, according to Niedzwiedzka, B (2003).

Niedzwiedzka' s new model considered policy makers and managers, as relying on others to seek information., a situation, we are likely to see with farmers who at any position seek for help in relation to information seeking. Again, Niedzwiedzka new model pronounced that everyone can seeks information regardless of their position, so that farmers as individuals could seek information they need.

2.6 Information Needs and Information Seeking Behaviour

User studies have been pursued for an exceptionally long time and, until the 1980s, these studies mainly concentrated on "document use" according to Odini (1993). They concentrated on the description of the behavior, rather than factors affecting the behavior, and hence their conceptualizations were shallow, their theories and methodologies poor. They left out non-users of libraries, and especially the rural folk, whose information needs were communicated informally and orally. Wilson and Streatfield (1977), found out that people depended more on oral information transfer and, because of this, they were used to embracing all kinds of information in this way and recommended oral information dissemination be encouraged. According to Wilson (1994), user studies were not person centered but system centered. The new change in basic assumptions recognized the user, and led to the design of better information systems, mostly in the developed world, Odini (2005).

Several early studies recognized user studies as an important approach to user involvement in identifying user information needs These include Ellis's (1993) behavioral model of information seeking strategies and Kuhlthau's (1991) model of the stages of information-seeking behaviour. Wilson sees information seeking process in relations to feelings, thoughts, and actions. For him, the first stage is the realization of lack of knowledge or understanding, wherein a person becomes aware that he lacks knowledge. The second is a feeling of doubt or uncertainty and apprehension. Then action follows, which encompasses engagement and discussion of possible tactics or methods that can be used. On Information needs and seeking behavior as Lin (1969), Dervin (1982, 1999), Bruce (1997), Solomon (1997a, 1997b), Bystrom, Pelligrew (2001) and others saw information as that instrument that would "further a job of research and would be recognized by the recipient"; Broadbent (1990) was interested

in information needs of the rural community. Niedzwiezka's new model introduces the chain of information behavior in the 'context', to indicate that the context variables influence behavior at all stages of the process (identification of needs, looking for information, processing and using it) and two basic strategies of looking for information: personally and/or using various intermediaries.

The user of information and information use has been recognized globally. In the early days by Odini (1993) and (1995) established that the information systems in Kenya were designed without a proper analysis of the needs of the user, and hence provided no overall picture of the information needs in the country. Ojiambo (1993) looked at the information needs of users within a population. He felt that, if users could be identified, then an information system for that user group could be designed. According to Ojiambo, user studies was a three-way system. First you needed to identify the users, both the potential as well as actual groups of users, obtain an adequate understanding of their needs, and then identify how to represent these needs in an appropriate form. Thus, several writers on information needs are of the opinion that information systems and services that can successfully and efficiently provide the relevant information are those that are founded on the identification of the needs of their users. A few studies later appeared, which considered the information needs of users. Studies by Brittan (1970), Amoth (2000), Otike and Mathews (2000) in their study on the legal information needs of lawyers in Kenya. Also, Odini, Tumuti, Ogoji and Otike, all writing in the same year (1997), had similar opinions that identification of information needs, and users is essential to the design of information systems in general, and the provision of effective information services. Elly and Silayo (2013), identifies the agricultural information need and sources of the rural farmers in Iringa, Tanzania and discovers that for farming and livestock keeping the use traditional

methods of interpersonal relationships in getting information. For any other activities they try to use modern methods of communication. In Kenya, Koskei (2008) discusses access and use of information by small holder tea farmers in Bureti, Kenya. These farmers are interested in modern technology. These studies show the uniqueness of information needs of farmers from different regions.

2.7 Land Related Information Needs

Land related information needs in this study focused on six categories which are land tenure, physical planning, agricultural activities, environment, access to credit and legal aspects.

2.7.1 Land Tenure, Information Needs

Need for information on land tenure is supported by Kanogo (1987). He notes that there is not enough information on land tenure in Kenya. However, the available information is produced by the government like the Ndungu Report (June 2004), the report of the Commission of Inquiry into the Illegal/Irregular Allocation of Public Land. Ndungu Report and its recommendations provide detailed information on improper distribution of land, the misuses of resources and the associated socio-economic and political consequences. Doss et al (2013), discuss gender inequalities in land distribution and land ownership in Nigeria and draws a parallel with the state in Kiambu County. In Kenya there is no study that address this situation and this need to be addressed.

2.7.2 Physical Planning, Information Needs

Economic, financial, and dietary needs have forced farmers to physically transform their land so that it can generate income, such that there are, for example, quite several farmers growing fish in Kiambu County. Ikonja-Ondongo and Ochola (2004),

believe that the benefit of information seeking is to create access to new and better method of resolving particular problems for example of entrepreneurs, This study looks at information as advancing knowledge to farmers and that the kind of information needed depends on the uniqueness of the community activities and their way of life. For example information needs of dairy farmers in Kiambu County is different from information needs of fishermen living in the lake region of Homabay or pastoral needs in Northern Semi-arid Kenya.

2.7.3 Agricultural Activities Information Needs

This has to do with the many varied farming activities found in the county. Several studies on agriculture in Africa have women as the main users of land especially in food production. Okwu and Umoru (2009), in their study of women farmer's agricultural information needs and accessibility in Benue State of Nigeria, they noted that since most women were less educated, they relied on their husbands, sometimes their fellow women and mass media as the main sources of agricultural information.

2.7.4 Environment Information Needs

Most studies on climate change have been produced by geographers and environmentalists. For example, Andresen, Jeff. et al. (2008). His view is that climate change is happening in Kenya and that it is largely caused by human activities. He goes further to say that temperatures in Kenya have been increasing since the 1950s, "in a trend that is similar to the global average". This implies that the impacts of unmitigated climate change in Kenya are likely in turn to have significant impact on human livelihoods, health, water resources, agricultural production, therefore food security and even tourism. This is supported by a study done by Maina I., Newsham, A., and Okoti, M., (June 2013) on Agriculture and climate change in Kenya: climate chaos, policy dilemmas. They observe that the agriculture sector features many

economic activities, all impacted upon by climate change in different ways. Wangui, E. E. (2013).

2.7.5 Access to Credit Information Needs

Most farmers especially the small-scale farmers find bank and insurance-based information complicated because of the way it is packaged. The information is sometimes presented in a format that is not user-friendly. In Ikoja-Ondongo and Ochola (2004), looking at the information seeking behavior of the informal sector entrepreneurs in Uganda, the authors are of the opinion that such information as banking, marketing, training, and record keeping needs to be repackaged. Anang, B.T et al (2015), looks at situation in Ghana and finds out that the size of loans required by small farmers and gender as the factors that frustrate farmers**.** Wachekeh, (2013) considers the type of loan farmers need as a factor in her study on factors influencing smallholder dairy farmers' choice of agricultural credit in Githunguri, Kiambu County. However, lack of access to information on credit facilities is a factor. Nyangito, et al., (2004) noted that on average, credit to agriculture was estimated at less than 10% of the total credit provided through the domestic financial system.

2.7.6 Legal Aspects Information Needs

The need for legal information relates mostly to unfair distribution of land between men and women through land allocation to men only by inheritance and the changing nature of land use. In his study, Kameri-Mbote, et al. 2002 found that men own 76% of agricultural land and women 8%, while joint ownership stood at 11%. There is therefore need for legal information for the rural people. Farmers need information on legal matters to enable them to make informed decisions especially on land rights, land ownership and matters related to agricultural production and marketing Women especially need information on inheritance rights, information on spousal registration

and documentation of land rights and consent of land disposal. Night Roselyn (2016), discusses land tenure in relation to gender disparity. Unmarried daughters and their children are particularly disadvantaged in Kiambu County in relation to land ownership, owing to cultural bias. Information on laws that protect the rights of women, information on availability of lawyers and their specialization needs to be taken close to farmers. Otike (1996) discusses legal information needs of rural population. Otike (1997) also talks of the legal information needs of the public about developing countries.

2.8 Information Access

Information access can be conceptualized as a component of information needs, information seeking, and use, which research explains as "how people need, seek, give, and use information in different contexts, in everyday living" (Pettigrew, Fidel, & Bruce, 2001). Yet, before one can seek out or make sense of information, it must be accessible. "Access stands at the centre of information behaviours" (Jaeger, 2007). If access to information is restricted, or the information is censored, then it cannot be available. In information use, technically, a need for information may precede its accessibility (even its existence). An individual may need or desire information that is not accessible, but once that need is acted upon (for example, by searching for the information), access to that information becomes central. Accessibility of sought-after information is crucial to the success of the seeker.

Information access is an important part of answering questions concerning the creation, organization, dissemination, and use of information. Information access as defined by Jaeger & Burnett (2005),is "the presence of a robust system through which information is made available to citizens and others." Adio, Abu and Yusuf (2016), is of the opinion that farmers should identify and seek information they need.

Information access is an important research concern in this study. In Kenya, Information access has been linked to law, freedom of speech and human rights which is in line with theories related to searches for truth, democracy and or individual empowerment within the domain of information ethics (Carbo & Smith, 2008; Froehlich, 1992; Hauptman, 1988; Himma & Tavani, 2008; Mathiesen, 2004; Vaagan, 2005). Indeed, most literature on information access indicate that information access in general has not been developed conceptually, methodologically, and theoretically. However, Burnett, Jaeger, and Thompson (2008) article on Normative Behavior and information: the social aspects of information access, proposes that information access can be studied from the angle of physical, intellectual, and social inclinations. Where physical relate to the location and format of the document and the condition, technology or abilities required for reaching that document; Intellectual refers to access to information contained in a document (Suetonius, 2000). It revolves around the ability to understand how to get to and in a particular, how to understand the information itself once it has been physically obtained, the ability to comprehend the information provided and by the language provided; and Social aspects based on Chatman's theory of Normative behavior that as presented by Burnett, Besant, & Chatman, (2001), suggest that the value of information is not universal, but is rooted within the norms and attitudes of a particular social world, a community or a group of people

In an introduction to a recent special issue of the Journal of the American Society for Information Science and Technology, Carbo and Smith (2008) define information ethics as "concern with the moral dilemmas and ethical conflicts that arise in interactions between human beings and information (creation, organization, dissemination, and use), information and communications technologies (ICTs), and

information systems". Mathiesen (2004) argues that information ethics attempt to answer questions of "whether or not it is morally required, prohibited, laudable, or permissible to deny or provide some person(s), or their agents, access to some piece(s) of information". Methodologically, this means that the literature employs a more advocating tone, rather than employing empirical research methods to investigate information access.

The user-centered cognitive approach in INSU emphasizes that information is constructed by individuals to make sense out of their lives (Dervin & Nilan, 1986). Before sense can be made from information, it must be physically accessible, intellectually accessible, and socially accessible (Burnett, Jaeger, & Thompson, (2008). Jaeger and Burnett (2005) note that "in a social context, the mere availability of information does not account for the full spectrum of information behavior".

2.9 Information Access and Use

Many information studies in the developed world made use of theoretical models focused on information systems and retrieval (mainly library systems) and later to the study of the behavior and attitudes of information users in general using information behavior models. According to Wilson (1994), user studies were not person centered but system centered. These information behavior models present avenues which lead to obtaining information and not use of information. Studies on information-seeking behavior; on library surveys and user-focused studies; information transfer and exchange and user satisfaction. They recognized the user, and led to the design of better information systems, mostly in the developed world and not the use of information, yet acquiring information by the user is not, for the most part, an end. The use to which the acquired information is applied is essential for a full comprehension of any form of information seeking and access. There are those which

focus on problem identification such as Dervin' sense –making model (1983) and Wilson's problem-solving model (1999). Others like Wersig and Windel (1985) and Katzer and Fletcher (1992) models show problem solving as environmentally conditioned. Some models give a static picture of the user (for example, Wersiget al., (1982); Ingwersen (1985), and Prochnicka, (1991). Others are restricted to the stage of information search, Ellis (1989) or Kuhlthau (1991).

This study makes use of Niedzwiedzka's (2003) model and refers to Wilson's (1981, 1996, 1999), 1996). The two models show the user in action progressing from the problem definition, through information seeking, interaction with certain information systems to the stage of information processing and use. They have the aspects of information use. The interest of an information researcher in a rural setting in Kenya is on models that relate to information in everyday life, like Broadbent (1990) who was interested in information needs. How the use of available information can make a difference to the lives of rural farmers, the development of information services that can improve their livelihood rather than how information systems work or how information is retrieved. These models result from a well thought out research literature and they are generalizable across other fields of study. Niedzwiedzska has also the two basic aspects of looking for information: personally and/or using various intermediaries, which is the case with farmers in Kiambu county, the subject of this study. The development of effective information services for rural people, and the policies governing their implementation and use, depends on sufficient knowledge of rural people's information environment and behaviour. Farmers are dependent on non-bibliographic, non-research data some of it of a very timely nature such as price and weather. Agriculture in most countries is dependent on a structure of translators of technical information like agricultural extension agents. Information must even be

packaged and repacked for the those who are less educated and from the formal language to local languages. Lancaster and Beecher (1981) suggest that there is growing recognition of the needs of the nonscientific user of information, of the fact that information must flow from research to extension services in the form suitable for practical application under local conditions.

This study is inspired by a perspective of information science that proposes information as 'the sense created at a specific moment in time-space by one or more individuals' (Dervin 1992: 63). This strand of information science raises a set of questions on information use that presuppose that the information use can be seen and understood only from the perspective of the information user, the farmers. The questions that this approach raises especially for the user is, what might make the information more convenient for use? What would make the information more accessible to a potential user? what information did a person use to move forward? What strategies did the person use to determine that the information was appropriate for the purpose?

Thuo and Njoroge (2018), discuss information needs and seeking behavior of young small- holder farmers. Mabomba (1985) who was concerned with people living in the rural areas noted that people, whether literate or not, should have access to any kind of information which will help them to be more capable and productive in their daily occupation. Musoke (2006) sees the use of information in terms of its value and impact to the user. She sees health information in terms of its application, for example in giving people information on HIV/ Aids forestalled the spread of the disease. They two studies do not address the plight of farmers and they are involved with solving immediate problems. Farmers need long time solutions

Ugah (2007) is of the opinion that Information access and use can only flourish in a society that appreciates the need for it, and where government recognizes that information is the key to national growth and prosperity. He describes problems associated with access to information as economic, social, environmental, occupational, and compounded by poor infrastructure. Others are technical and managerial capabilities; lack of awareness; inaccessibility; information explosion; bibliographic obstacles; declining budgets and rising costs; costs for users; staff attitude toward users; and crime.

User studies in Kenya as revealed by Odini (1993) are designed without taking note of the needs of the user, so that there is no overall understanding of the information needs of different groups such as farmers in the country, and therefore in different counties. He notes that the information user community can be classified: farmers and rural communities (the concern of this study); students, teachers, and technicians; professionals in various fields; and policy makers, planners, and administrators. He also identifies some of the factors that obstruct information use in Kenya as the lack of suitable information systems, language barriers, illiteracy, and lack of skills. This study attempts to fill the gap by focusing on access to and use of land related agricultural information by rural farmers. This is in line with Odini (1993). His view is that user studies should inform information systems to direct their services to fulfilling the specific needs of users, rather than users trying to adapt to existing information systems that might not meet their needs.

Broadbent (1990) explored information needs for rural development, and found that "no one information system, service or networks can hope to cover every (information) need". He is of the view that the information the rural people need to acquire should be targeted and usable and should be "Location specific and impact

bearing". This means that the basic needs of the eventual user of information should be the goal as compared to perceived institutional needs. Rural development is broad and needs to be subject specific where information is concerned. That information should further reflect local conditions and be based on demand rather than supply and services. This study was designed to examine farmers' land related information needs and uses in Kiambu County.

2.9.1 Land Tenure Information Access and Use

According to Ogolla and Mugabe (1996), land tenure depends on how people relate to land socially, that is the process by which individuals or groups acquire, hold, transfer or transmit property rights in land, including the right to use and transfer it. This signifies that farmers need be aware of information they require in their use of land. According to Taylor's model (1991), Information Use Environment is a composite whole made up of four dimensions 1. Sets of people 2. Kinds of problems 3. Setting and 4. Problem resolution. This relates to access to and use of agricultural information on Land tenure by farmers in Kiambu county. Access and use of information are complicated by the fact that land policies and reforms have focused on land narrowly as commodity but ignored the wider meaning of land and its relation to politics. Hence problems of land distribution and titling process and inequalities. Land continues to be subdivided to gratify cultural practices of land inheritance. This fragmentation of land has made difficult for agricultural production, economic gain for livelihood and therefore several farmers are converting their small farms into residential plots to supplement their income from the farms. If as Wilson (2000) signified that users would manage to understand information cognitively, and information has effect on user's knowledge structure, users may put it into use according to the information they learned. Cultural practices can also limit or expand

opportunities to access and use information on land. Farmers need to be aware of this and a lot more. Lack of awareness is not however limited to the rural or less educated farmers, but as Ugah (1982) observes, even the highly educated lack awareness of the crucial role that information play.

2.9.2 Physical Planning Information Access and Use

Physical planning here refers to the farmers' active process of organizing the structures and function to ensure orderly and effective location of their land uses. This means land planning, physical and managerial but does not include spatial patterns as practiced by the government but has the aim of achieving the most optimum level of land utilization. There is hardly any literature in the information field that relates to the way the farmers would like to plan their land. However, there are books on physical planning from geographical and spatial studies which are found in institutional libraries. Kaniki's Chapter on "Knowledge, information and development: an African perspective", is of the opinion that libraries and information services in Africa especially, have become increasingly "elitist, euro-centric and irrelevant" to a large part of the population. Farmers in Kiambu county should have information taken close to them, especially information that will lead to better plan of their use of land.

2.9.3 Agricultural Activities, Information Access and Use

Aina (1995) is very much aware of the role information plays if information is relevant and timely. In reference to agricultural sector, he sees it as important in making informed decisions. He points out that agricultural development in rural areas is dependent upon interacting resources, which are land, capital, labour, entrepreneurship, and information. He notes that information is a resource that cuts across other resources and it's a major factor in agricultural production and hence

development. He points out that information is important for decision making. Okwu and Umoru (2009) are of the view that age, educational level, and income of women farmers showed significant relationships with their accessibility to agricultural information. Oyeniyi and Olofinsawe (2015), point out that rural women farmers account for the greatest part of the population of any developing county. Kiprang'at and Ochola (2005) note that there is lack of appreciation not only for information in general, but for relevant and timely information. They also note that there are ineffective linkages between agricultural researchers, extension workers, farmers and other actors in research and extension. Thus, channels of communication among stakeholders are important for information, as lack of adequate information support to all the persons concerned results in low agricultural productivity.

2.9.4 Environment, Information Access and Use

Andresen (2008) is of the view that climate change is happening in Kenya and is largely caused by human activities. He goes further to say that temperatures in Kenya have been increasing since the 1950s, "in a trend that is similar to the global average". Access to environmental information is important for Kenyan people especially the farmers to be able to participate in decision making processes that affect their daily lives. Farmers should have access to information in accordance with their constitutional obligations provided for under Article 69 of the Constitution of Kenya 2010. Access to and use of information on environment ensures that farmers are equipped with at least basic facts and knowledge that can help them identify any anomalies like for example changes in weather conditions**.**

2.9.5 Access to Credit, Information Access and Use

Access to credit information is important both from the farmers' perspectives and from the perspectives of the financial providers. According to Akobundu (2007),

information seekers and users may not know about the resources available. Farmers need information on where to get credit to improve and increase their farm produce. Hence, they need to know where to get it, the cost involved and repayment period, among other things. Farmers are usually more credit constrained than other segments of the economy because of low level of access to information on credit and complicated borrowing procedures (Abdullah and Manan (2011), The financial service providers require information with which to evaluate the risk of the farmers within the market segment. The farmers, especially the small farmers possess more information about the potential of their financial needs but in some situations, it can be difficult to articulate and give detailed information required especially by formal institutions like the banks. Sometimes farmers do not qualify to get loans due to the lack of information. Speaking about entrepreneurs, Kinyanjui (2006) records that some entrepreneurs felt that it was difficult to obtain loans as they had to show credit records and they did not fully understand the requirements of getting and paying loans. This applies especially to farmers in the rural areas especially the illiterate or the less educated.

2.9.6 Legal Information, Access, and Use

Shibanda (2006) notes that, among Kenya government publications, 50% are official publications published by government ministries, local government, judiciary, parastatals, commissions and government education and research institutions. These are materials on legal policy, health, environment, economic development, and agriculture, including information on issues related to the exploitation of land. Most of this information is kept at the ministries and at the Government Printer. Occasionally, specific information on land issues is disseminated in the field by government ministries, parastatals and/or international agricultural research centres.

As analysed by Rees et. al (2000), much of the information is marked by two major constraints: centralization in Nairobi, where the ministries are concentrated, and delivery. Such information has an immediate impact on the day-to-day lives of Kenyans to keep up with government directives and development. Yet, delivery is fragmented in the field, i.e., there is poor coordination between delivering ministries and departments, so that the information is neither timely, adequate nor in the right format, especially for the rural people.

Srikantaiah (1993) noted in his book that developing countries are unaware of the information that exists, especially at the levels of low income, and poor education. He says that in these countries, the precise nature of information needs and the format in which it is sought varies, and much is influenced by the level of literacy, which leads to the less developed becoming more marginalized. This is true in relation to legal information in Kenya. The language used in legal documents is not easily understood by the less educated, which include most farmers in Kiambu County. Such information needs to be repackaged.

2.10 Information Sources

Menou (1993) citing King et al. (1976); Borko and Menou (1983) points out that information activities should not be restricted to those in any institution, such as libraries or documentation centres. What is important is to consider all the roles and functions in the communication cycle, from information generation to use, and not to exclude any medium, process, or organizational arrangement. This approach again focuses the array of users and suppliers of information and is sympathetic to diversity in the sources and uses of information.

AgREN (2002) points out that churches in Kiambu district play a big role, especially in information and knowledge dissemination, because of their long-term commitment to development. Their main activities however differ, from district to district.

AgREN (2002) also points out that community-based organizations (CBOs,) are known to have had great influence in providing information to the rural community. Since independence in 1963, the Harambee movement ("Working together for Development") has supported and encouraged self-help groups. These groups have played a key role in information generation and dissemination. Their primary focus is usually fund raising for agriculture, education, and training, but they have also been active in food distribution efforts. Their main constraints have been inadequate human resource and poor local leadership.

Rosenberg (1993) sees the need to provide alternative libraries as resource centers, classroom libraries and decentralized academic libraries services to meet the information needs of the rural population. In 1994, the government established the District Documentation Centers, as Rosenberg would have wished, but these are only found in town centers, and have hardly any information on land that appeal to farmers' livelihoods, such as information on land ownership, contemporary land prices, changes of user, land rates, agricultural activities, market information for agricultural products, physical planning, and environment, among others.

2.10.1 Land Tenure, Information Sources

Land tenure is derived from the Latin word 'tenere', which means "to hold". It defines the right or methods by which individuals or groups acquire, hold, or transfer the rights to land or other property (Kimaru and Jama, 2006).

An early and important source of information that has had an impact on land is the politically designed Kenya's Sessional Paper no. 10 of 1965. This report expounds on how land was to be developed after Independence. Although elaborate, the roadmap contained little on "a persisting divergence among legal and regulatory stipulations, their costs, and the relative poverty of potential users that reduced accessibility and use". "It left untouched the development of the dichotomies focused upon in this study, accessibility of institutional and proprietary information, and accessibility to developmental or livelihoods-creating information".

Considering the land categories discussed earlier, the same Sessional Paper showed that development was surprisingly directed towards the wetlands, completely bypassing the dry areas (non-agricultural uses and users). Overall, rural people did not benefit, as they were not aware of such developments since no information was directed to them. They would arguably have exploited it to some degree, which would likely have distinctly and positively impacted poverty.

Use of the information would have exposed some of the problems probed in this study early on. In addition, in terms of dissemination, only the people in power knew and know the existence of this report. To date, many other pieces of land information demonstrate a "diversity of sources and stipulations, and skewed access and preponderance of legal/regulatory controls".

Equally, information sources in the private sector, the NGOs, CBOs, and churches appeal to the agricultural community in rural Kenya. The private sector source of information has been analyzed by (Rees, et al, 2000) in discussing intensive features of overall access, and the use of information in Kiambu. He notes that information

supply is manipulated by the existing information gaps, which encourage suppliers to charge exploitative prices in dealing with smallholder farmers.

Menou (1998) expounds his view that information is produced to satisfy societal needs at all levels, and that in the recognition that "society" is a heterogeneous concept, information can be misused. This is also supported by Kanogo (1987, pp.169-71) who brings in the issue of lack of proper information, misinformation, concealing of information whether deliberate or not, or through corruption. Ndungu Report (June 2004) mentioned earlier, supports the issues discussed by the two authors. This is a "Report of the Commission of Inquiry into the Illegal/Irregular Allocation of Public Land". The report and its recommendations constitute a key recent body of information on land and misuses of the resource, and the associated socio-economic and political consequences in Kenya to date. It has far reaching consequences on the general validity, authenticity, and utility of some existing land information especially the Title Deeds.

A national land policy (2009) was formulated and finally passed as an Act of Parliament in 2009. This is an important document whose content has implications on land and development in the rural setting. The policy addresses access to land, land ownership, land use and environment. The National Land Commission (2009) ensure land rights for all citizens. The national land policy recommends the following:

- That the Government shall recognize and protect the land rights of all Kenyans regardless of gender or marital status, and expand their enforceable legal rights of access, control, ownership and inheritance, access to credit and co-registration in all tenure systems.

- That the tenures adopted should therefore strive to satisfy various policy objectives, such as efficiency in land use, by providing a smooth functioning land market, and permit maximum productivity of land resources for all types of uses.
- The system should also be responsive to various changes in demand. It should aim at equity by ensuring that the tenure system provides reasonable access to all groups, especially those of low income or vulnerable groups. The system should be comparable with other policy instruments dealing with economic development and must not contradict existing legislation.
- The continuity should avoid abrupt breaks in the existing political and cultural set up. These objectives should be achieved whether the land is held in freehold, leasehold, customary or other interests.

Another source of information whose content has implications on land and development in the rural setting is the Constitution that was promulgated in 2010. The Constitution recognized community land rights, namely that all land can be held by the people as communities. This was a right that had been denied by the colonial government. The colonial government had introduced laws and policies whose effect was to disregard communal approaches to land. In Kiambu County, there is hardly any communal land left intact, owing to the scramble for land and corruption and the government should aim to protect, especially the rural poor. The ongoing effort to develop a community land law gives the country an opportunity to deal with some of these issues in a manner that is fair and just and results in security of tenure. Odote (2013) in his article on Daily Nation, of Wednesday June 5, 2013 agrees that the national land policy and the adaptation of the Constitution in 2010 will have positive contribution to communities' ownership and use of land.

There are a few Acts of parliament and policies that have embraced agricultural growth and development within the area of land tenure that the farmers should be made aware of. These are the Agriculture Act (Cap 318), Land Control act (Cap 302), Government Lands Act (Cap 280), Land Consolidation Act (Cap 283), Land Titles Act (Cap 282), Land Adjudication Act (Cap 284), Trust Land Act (Cap 288), Registration of Titles Act (Cap 281) among many others. An important policy document is Vision 2030. These can only be found at the Government Printer and in other government offices. There should be a policy of devolving such information to the farmers in the rural areas.

2.10.2 Physical Planning and Land Administration Information Sources

Physical planning in this study refers to the way the farmers planned to use their land. Land administration is defined as the "process of determining, recording, and disseminating information on ownership, value and use of land when implementing land management policies" as defined in the UN Land Administration Guidelines (UN/ECE, 1996). According to Van der Molen (2006), from this definition, 'information' could be said to be the pivot of land administration.

Dale and McLaughlin (2000) in their book 'Land Administration' identified "three key attributes of land that every country must manage –its tenure, value, and use". They further stated that "Access to information on the ownership, value, and use of land helps to further social and political objectives". From these two statements the three attributes can be said to be the pillars of land administration such that, in a situation where even one is absent, there cannot be stable land administration.

The Information on Land Control Act (cap 302) set up the Land Control Boards responsible for controlling land transactions. It demonstrates that although Kenya has

attempted a more comprehensive formalization of land administration than most African countries, land laws regulate the agricultural land market as well as the use of land as financial assets, hence the lack of relevance to users and uses of land. The Ministry of Lands and Settlement (2004) has pointed out that the numerous laws and statutes governing the leasing of land ensure the exclusion of the use of this information by farmers, who cannot afford its stipulations. Informal leasing and rental arrangements substitute for the available legal information. Furthermore, among land sellers and buyers, the laws and the costs of transfers are costly.

The Physical Planning Act (No. 6, 1996) is one among a plethora of laws and regulations focusing on the use of land. These laws are not easily accessible to rural farmers, despite the important fact that they form the cornerstone of physical planning in Kenya, with specific policing powers on land development, and penalties for violations thereof. Although the information is technical, land users are required to submit development plans for approval, before investing in their projects or activities. One immediate implication is that the requirements can only be processed by trained professionals, for a fee. Users of the information are thus also obliged to seek out the relevant service, which is costly. Ng'ang'a (1998), reviewed earlier, points out that the information needs, and the kind of information needed depends on the uniqueness of the community and its way of life, and that this also varies, from one rural area to another.

The Republic of Kenya Economic Survey (1994) reports that Kenya has a total area of 582,646 Sq. Km and can agriculturally be classified into three broad zones: high, middle, and low. The high and medium potential areas cover about 18% of the total land area, while the low potential areas include the arid and semi-arid areas covering about 82% of the total land area. The main economic activities in the high and

medium potential areas are intensive agriculture and livestock husbandry, while in the low potential areas are pastoral, ranching and wildlife-based systems and, in some places, dry-land farming.

2.10.3 Agricultural Aspects Information Sources

The role of cooperatives as providers of information has been confirmed by a research paper presented at the faculty of Veterinary Medicine Biennial Conference, Kabete Campus, University of Nairobi (August 1998) by Wambugu et. Al., which was a result of a survey conducted to determine the sources and delivery of technical information to smallholder dairy farmers in Kiambu County. The study revealed that, for Kiambu County, which has a well-established smallholder dairy industry, the most effective dairy information delivery channel especially for poor farmers were meetings organized by cooperatives as well as frequent neighbour to neighbour discussions.

A study of the Limuru area of Kiambu County by Mbugua (2012) confirms that most farmers in Kiambu County own small pieces of land, and that nearly 60% of small-scale farmers have nearly 80% of their lands on food crop production.

In support of the fact that information sources for rural agricultural farmers is passed through the consultation of neighbours, fellow farmers, and relatives Ngimwa (1996) did a study on the rural women of Kinangop and their accessibility and utilization of media and found that women hardly used mass media as a source of information, owing to their workload, resulting in a shortage of time, as well as those inhibitions associated with cultural practices. There is also the illiteracy and or low literacy levels and communication problems brought about by lack of adequate communication infrastructure in the rural areas.

The use of informal communication channels, and indeed interpersonal communication, has been found to be effective even by Kaane (1995), who carried out a study to determine the effectiveness of visual media in the promotion of child immunization in Kakamega County. Her study found that the use of friends, meetings in public places such as churches and market centres were important channels for the rural community. This study in relation to Kaane's study explores the use of oral and other media as sources and communication channels in the access to and use of information on land by agricultural workers.

2.10.4 Environment, Information Sources

The Kenya National Land Policy (2009) stipulates that land is not just a commodity that can be traded in the market, it represents the following multiple values which should be protected by both policy and law:

a) Land is an economic resource that should be managed productively.

b) Land is a significant resource to which members of society should have equitability.

c) Land is a finite resource that should be utilized sustainably.

d) Land is a cultural heritage which should therefore be conserved for future generations.

Wabwoba and Wakhungu (2013) have established, in their study of the Karai and Ndeya divisions of Kiambu County, on factors affecting the sustainability of community food security projects funded by various organizations between 2005 and 2009, that the sustainability of community food security is affected by rainfall patterns, among other factors such as leadership, management and funding of food security projects, and goes further to recommend that farmers need to be empowered

with knowledge on irrigation and the off-season intensive farming of high-value crops. Seasonal variations were a major concern by farmers in this study.

A study done by Maina, Newsham and Okoti (2013) on Agriculture and Climate Change in Kenya: climate chaos, policy dilemmas, observe that the agriculture sector features many economic activities all impacted upon by climate change in different ways. The study observes that Kenya has many and varied agro-ecological zones, which make the agricultural sector overly complex, as it attracts many players and actors with differing interests, roles, responsibilities, and spheres of influence.

Maina et al (2013), reveal that the country lacks localized data and (possibly) the critical technical manpower to implement projects that deal effectively with the impacts of climate change, and to plan for the varied regions and compounds in the whole sector. These are underlying challenges that include high poverty levels, low capacities to adapt and dynamic cultural practices.

Otsuka and Pace (2001) state that land-use policy is concerned with the way land and natural resources are used and managed. Chiuri and Nzioki (1992), Khasiani (1992), Slayter and Rocheleau (1995), and Wangari (1996) have recognized the role of women. They point out that women operate economic activity along with environmental information and its consequences during drought, when they must provide food for their families (Slayter 1988), and that they are the main savers of seeds for the planting season. Further, women's groups in Kenya form a major plank of environmental management initiatives at the grassroots level. Government policy should aim to support them by providing them with relevant information.

2.10.5 Access to Credit, Information Sources

A study done on factors influencing smallholder dairy farmers' choice of agricultural credit by Wachekeh (2013) in Githunguri, Kiambu County, reveals that most farmers have small pieces of land. Their needs are: Land, Labour and Capital, out of which Capital is the most important, since labour can be supplemented with a free familial labour, as opposed to hired labour, whereas Land can only be improved through use of improved technologies which require Capital. Capital could be obtained either from savings or credit. Mostly farmers opt for credit due to their low marginal tendency to save, (Staal, 2007). The study also found that farmers prefer to approach the cooperative (or Sacco) for financial assistance, as it also offered them loans for purposes other than agricultural development, such as school fees and food stuffs. Further, the Sacco processed their loans within a short time, and could reschedule their loan repayments to suit their income availability. The author agrees with this study, and confirms that the cooperatives were less formal, and that their products were geared towards the interest of their members.

A case study on the capital on land and land tenure effects on agricultural sustainability in Limuru, Kiambu, by Mbugua (2012) agrees that capital on land is one solution to agricultural productivity and sustainability. Though the area may have small pieces of land, farmers can still inject capital for greater output. The study also ratifies the role of the co-operative movement in county agricultural development. Information on access to credit, is therefore particularly important to farmers in Kiambu County where nearly 60% of small-scale farmers have nearly 80% of their land on food crop production.

Staal et al., (1997) observed that the intensification of dairy production in Kiambu, where zero glazing is practiced, (because of the small sizes of farmland), can

potentially raise milk production and income, especially where demand and infrastructure are favourable, and consequently has the potential to improve the incomes of smallholder farm households in an economically sustainable manner. Access to credit would augment production, and consequently agricultural development

2.10.6 Legal Aspects, Information Sources

Kenya had no clear or comprehensive land laws and policies until a national land policy (2009) was formulated and finally passed as an Act of Parliament in the same year. Before then, all that it had were inherited colonial laws that did not guarantee the security of land tenure, especially to vulnerable groups, including the farming community, and this had slowed agricultural development. The laws that relate to land administration, such as the Consolidated Land Act, (CAP 283), the Law of Succession, Women's Property Rights, and the Registered Lands Act, need to be fully availed to all, and especially to women, in simplified form. The Kenya Section of the International Commission of Jurists, "A Critical Review of the Women's Property Right in Kenya" (2006) sheds light on a number of legal issues concerning women in Kenya, including land law and property rights Kanji, Braca and Mitullah (2002), look at the impact of NGO advocacy in the area of land rights, consider the examples of Mozambique and Kenya and examine how NGOs may have had policy influence, especially pro-poor, and in improving the living conditions of the poor groups. There are a few studies on the legal aspects of land such as Odhiambo and Nyangito (2002), on land law and its implications for agricultural development in Kenya, and Ogendo, (1976) on the Constitution and Land.

2.11 Information Repackaging

Sturges (1996) in his article "Information repackaging in Malawi", talks of "information famine" referring to the people starved of information, mainly because of the cost associated with obtaining that information. In Kenya, information on land issues emanating from the public sector, mainly the Government, is to be found in government offices in Nairobi and at the Government Printer Bookshop also in Nairobi, and at a fee. Besides the time the user must take to access the information, there are also transport fees to and from the rural areas that must be factored in. Most of these publications are in the English language. This information should be repackaged in simple form, and in a language that farmers can understand, either Gikuyu or Kiswahili. This is supported by Villanueva (2004), who defined repackaging of information as "transforming information into more understandable, readable and acceptable presentation, and putting it into more usable forms."

Munyua (1998) in an article FAO (1998:3) advocated the participation of the rural community in packaging information, even in local languages, in relation to repackaging and local content development. Although the Kenyan Government tries to publish some government reports in the Kiswahili language, most materials are published in the English language, and hardly at all in any local languages.

Munyua (2000) in "Information communication technologies for rural development" notes the lack of local content, and the barrier caused using foreign languages. She adds that information available through ICTs is mostly in English, which most people in developing countries, especially rural communities, cannot use. She advocates the use of video-based models which can be translated into the language of the user. The concerns regarding repackaging and the search for suitable forms of access to and use of land related information are motivated by this literature.

Kenya's District Focus for Rural Development (Revised Feb. 1995) recognized the key role of information in land use. It states: "Public participation in support of rural development requires an informed citizenry." Further elaborating on the important role of information, the report continues: "The DDC must maintain a programme of public information to explain the District Focus Strategy to the general population. All avenues of communication, such as radio, mobile cinemas, and local newspapers should be used. The public information programme should be based on the experiences gained in various rural development activities in the country. Knowledge generated through relevant research should also be disseminated to the public as soon as possible," (Republic of Kenya, 1999) Sessional paper no.3 of 1999 on National Poverty Eradication 1999 - 2015.

Bii (2001) on the provision of health information to the rural communities in Kenya supports the use of many channels. He found that one must use many formats to provide the information, and these include oral, audio/visual, print, audio as well visual. He notes however that the oral and audio channels were the most popular. In line with Bii's study, this study on the access to and use of land related information based in the rural area of Kiambu county explores the channels used in information seeking and dissemination among rural farmers.

Stilwell and Burton (2003) see communication policies and the use of technology as important in the provision of information, especially government policies, to the needy. The rural community in Kiambu County, who are mainly farmers, is in most need of modern technology and with it, information.

Most NGOs act as a source of information and knowledge for the community. They publish and disseminate information on a wide range of topics on agriculture

production techniques, environment, and market information. In addition, they actively support the exchange of information among community development workers, through documented experiences in books, videos, CD-ROMs among other materials. Some have developed community development knowledge centres.

2.12 Land Related Information and the Use of ICT

The use of ICT in providing of information to farmers has gained prominence in Kenya, as reported in the Daily Nation, Wednesday April 16, 2014 (Business News p. 36). The Nation Correspondent, under the title "Farmers to Access data on the go" reported that the Ministry of Agriculture had launched a website that will enable farmers countrywide to access information on proper crop and animal husbandry, in a bid to boost agricultural production, and by enhancing extension services. "The site will offer data on when to plant, the right seeds and fertilizer to use. It will have videos to guide growers on best farming practices and answer questions through text messages," reported the writer. Ogada, Germano and Muchai (2014) consider the importance of farm technology. This study underscores the need for an information system that would incorporate information technology

The ministry will have to ensure that infrastructure is improved. Lack of and/or poor communication infrastructures like electricity, telephones and even roads in the rural areas has heretofore hindered access to information, as noted by Aina (1995). He points out that the lack of these services impeded the use of such services as radio and television as communication channels for agricultural information. He also cites the high levels of illiteracy which inhibits the use of print media. He notes that the level of computer communication technology is wanting in many countries in Africa, and therefore agricultural information could not be communicated using electronic media. This makes it difficult for not only the rural population, but also for decision makers,

planners, and extension workers to access information. The present study also explores the use of information technology as a source and channel of communicating land related information to agricultural farmers in Kiambu County.

A study done by Mutunga (2013) found that radio was as an important source of information for the smallholder farmers in Machakos County, and that this was because radios have been in existence for longer than other known information communication technologies, and were cheaper to own, to use and to maintain compared with other communication technologies. This study went further and found that women hardly used the radio when the men were at home, since they could not listen to the programmes of their choice. Men controlled and oversaw all "gadgets" at their homes including radios. However, several women said that they often listened to the radio during the day, while doing their household chores.

Ochieng and Radloff (1998) have highlighted the use of ICTs as a tool for African women to be able to access information through group meetings like conferences. They cite the Beijing Conference of 1995 and the African Know-How Conference of 1998, arguing that they were educational to women. This is important, as African women, especially peasant farmers, are mostly classified in the poor and illiterate group.

Radio effectively fits into the category of the most efficient means for the dissemination of knowledge, information, and technologies. Ogutu, Ngunjiri and Chege (2003) in their study/review, sought to determine the impact of radio broadcasting as a medium for the dissemination of agricultural information and technologies, with a view to strengthening the uptake of information and technologies for increased production. The study/review also aimed at documenting the success of

radio broadcasting in disseminating information and technologies in a cost-effective manner, especially to the smallholders in Kenya. Radio broadcasts feature music, news, discussions, interviews, descriptions of sports events, and advertising. Their study found radio to be one of the more effective models of accessing information especially by the rural agricultural communities. This study sought to determine whether agricultural farmers, tea, coffee, pyrethrum, and subsistence farmers accessed land related information through radio broadcasts.

Martin (1995) in describing an information society, notes that it is "A society where people know and appreciate what information they need, where to get it, how to get it and in the end how to use it." Some farmers know what information they need, but where and how to get it is a challenge.

Adeya (2002) a literature review, gives examples from India on how information technologies have been used in poverty eradication, especially in connection with the needs of women farmers. These range from information concerning agronomic practices and farming methods, to information on how to access and use new technologies or market news and agricultural commodity price. ICT has also been used to provide other information such as weather predictions and rainfall patterns, recommended crops for the season, as well as information on upcoming meetings and workshops on relevant issues. The report gives guidance on how Kenya, and indeed Kiambu County, can emulate India in the use of information technology, especially in the case of women farmers, who generally remain isolated from the mainstream of agricultural training, research, and development, partly due to their limited literacy levels. The author hopes that the Government and such organizations as the UNDP will address this issue by processing and disseminating information.

Menou (1993) has brought out many topics on the impact of information technology on development, including measuring the impact of information availability, accessibility, and usage. The National Land Policy (2009) proposes the translation of information into electronic forms for easier access, dissemination, and pricing, as well as the sharing of available information across government agencies, and support for public-private partnerships in widening the scope and uses of information on land. An electronic approach needs to be linked to an array of grassroots gaps and their causes, which affect access to and use of information for livelihoods e.g., the role of literacy levels, use of language, agro ecological factors, access to communications and other infrastructures.

2.13 Chapter Summary

The chapter has presented the theoretical framework and reviewed relevant literature in a bid to answer the research questions of the study. The review was guided by the study objectives in chapter one of the study, which set up the background of the study. Literature review is key to the research because it indicates where the research fits into the existing body of knowledge. The aim of the literature review was to therefore, identify similar research works to the present study. To identify gaps to be addressed and establish a yardstick against which the researchers can compare the ensuing research work. The literature review has revealed that previous studies cannot be regarded as complete or satisfying as regards the specifics of this study. Consequently, there are information gaps, and this study is focused on filling these gaps.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter outlines and describes the philosophical world views, research approaches, research design, population and sampling, data collection techniques and tools, data analysis and presentation, reliability and validity, and ethical considerations. The chapter ends with a summary.

3.2 Philosophical World Views

Research world over is based on philosophical assumptions that structure, organize and validate research. Among them are positivism, constructivism/interpretivism, and pragmatism. According to Terre Blanche and Durrheim (1979), a research paradigm is an all - encompassing system of interrelated practice and thinking that define the nature of enquiry along three dimensions which are ontology, epistemology, and methodology. This is supported by (Creswell 2009; Lincoln et al. 2011), who affirm that these comprise common elements which are ontology- assumption about the nature of reality, epistemology- assumption about how we know the world, how we gain knowledge, and axiology – which is the beliefs about the role of values and morals in research. Also, methodology, shared understanding of best means of gaining knowledge about the world and rhetoric which is shared understanding of the language of research.

The study ontology or reality is seen from the farmers or the people who shape that reality, where the nature of reality is socially construed and there is an intimate relationship between the researcher and what is studied. The epistemological assumption about how we know the world, how we gain knowledge, is that qualitative

researcher has perception of the world from an individual perspective. Tesch (1990) states that qualitative research is profoundly concerned with meaning and seeks to understand social member's definition of a situation).

Ontology is the nature of reality According to Ozane (1988), Carson et al (2001). It refers to the nature of social reality (does social reality exist?), where social world is tangible and made up of relatively immutable structures that exist independently of our individual descriptions. It is concerned with identifying the overall nature of existence of a particular phenomenon. It could be one universal reality as seen from the eyes of positivist paradigm, and one solution. or many realities as seen from interpretivist paradigm, depending on people who shape reality. According to Carson et al (2001), Ontology is the nature of reality and the philosophy of existence and the assumptions and beliefs that we hold about the nature of being. In this study ontologically the realities do exist within the realm of the farmers in natural setting. The researcher is looking to understand the farmers' reality of access to and use of information by face-to-face interview and acquiring the knowledge.

Epistemology is the relationship between the researcher and the reality or how this reality (Ontology) is captured or known. It is the philosophy of knowledge or how we know. It refers to the nature of knowing. It is the theory of knowledge and the assumptions and beliefs that we have about the nature of knowledge. How do we know the world? What is the relationship between the inquirer and the known? It is the relationship between the researcher and the reality. How knowledge is received or collected, how it is uncovered to learn about reality. Epistemology is internal to the researcher. Knowledge can be measured (truth or false) and quantified hence (Quantitative) as understood by positivists. Knowledge can also be interpreted as understood by interpretivists (qualitative) because of many opinions or thoughts. The

objective ontology and positive epistemological assumptions follow a quantitative research methodology. The subjective ontology and interpretive epistemology conform to qualitative research methodology. Interpretivist paradigm sees many realities depending on people who shape reality.

The study sees reality from the farmers or the people who shape that reality, where the nature of reality is socially construed and there is an intimate relationship between the researcher and what is studied. The epistemological assumption about how we know the world, how we gain knowledge, is that qualitative researcher has perception of the world from an individual perspective.

This study on access to and use of land-related agricultural information and designed in the field of the social sciences is based on subjective ontology and interpretivism paradigms. The study investigates the farmers' reality in relation to social phenomena, their environment and individual experiences which conform to qualitative research method. According to Pansiri (2005) and Jogulu and Pasiri (2011) qualitative method provide important attributes in subjective interpretation approach that offer conceivable answers to social phenomena during the subjective interpretation of experiences. Quantitative method was also used to complement qualitative approach in an embedded mixed method since it applies qualification on data analysis in an embedded mixed method. Qualitative (constructivist/interpretivist) is dominant and the addition of quantitative approach add value to the study through sampling, measurement, and illustrations.

3.2.1 Positivist Paradigm

Positivists use a paradigm that relies on scientific method. According to Walsham (1995), the positivist position maintains that scientific knowledge consists of facts

while its ontology-nature of reality, considers the reality as independent of social construction. This implies that the reality is objectively given and is measurable using properties which are independent of the researcher and his or her instruments; in other words, knowledge is objective and quantifiable. Therefore, positivism advocates the application of the methods of the natural sciences to the study of social reality. Reality is single, tangible and fragmentable. Further, there are real causes and effects and that causal relationships will help to understand and predict the social world. According to Neuman (2006), the relationship of knower and known is independent, dualism – a researcher acts as an independent observer. Positivist researchers maintain a clear distinction between science and personal experience and fact and value judgement. According to Hudson and Ozanne (1988), positivist researchers also attempt to remain detached from the participants of the research by creating distance between themselves and the participants. This is an important step in remaining emotionally neutral to make clear distinctions between reason and feelings as well as between science and personal experience.

According to Carlson et al (2001) and Hudson and Ozanne (1988), positivist researchers seek objectivity and use consistently rational and logical approaches to research. The positivist believes that observation and reason are the best means of understanding human behaviour; true knowledge is based on experience of senses and can be obtained by observation and experiment. The positivist paradigm takes a view of “the nature of reality in studying the parts to understand the whole”, for example, using a sample population to represent total population, and to produce related numerical and alphanumeric data, thereby adopting the statistical study viability assessment aspects of a positivist. Positivism assumes an objective world. Hence, he or she searches for facts conceived in terms of specified correlations and associations

among variables. The positivist focusses on experimental and quantified methods used to test and verify hypotheses. Hence Statistical and mathematical techniques are central to positivist research, which adheres to specifically structured research technique to uncover single and objective reality (Carson et al, 2001). In conducting research, the researcher uses a controlled, structural approach, identifying a clear research topic, constructing appropriate hypothesis and by adopting a suitable research methodology (Churchill, 1996, Carson et al, 2001). According to Carson et al (2001), positivist research seek objectivity and use consistently rational and logical approaches to research. According to Neuman (2006), the relationship of knower and known is independent, dualism – a researcher acts as an independent observer.

According to Gephard (1999), positivist remains detached, neutral, and objective as he examines social life which means he as a researcher remains detached from the participants of the research by creating a distance, which is important in remaining emotionally neutral to make clear distinction between reason and feeling (Carson et al, 2001). He examines evidence and replicates the research of others. Positivist researchers use a paradigm that relies on scientific methods, which produce numerical and alphanumerical data, it is supported by the quantitative research methodology. However, some researchers argues that positivists researchers remove contexts from meaning in the process of developing quantified measures of phenomenon, according to Guba and Lincoln (1994). Consequently, quantified measures often exclude members' meanings and interpretations from data which are collected and impose outsiders' meanings and interpretation on data. Since positivist researcher use a paradigm that relies on scientific methods, which produce numerical and alphanumerical data, it is supported by the quantitative research methodology. This

study has made use of quantitative method to strengthen and compliment the qualitative study in an embedded mixed method.

3.2.2 Interpretive Paradigm

Interpretivist approaches to research are understood as "the world of human experience" (Cohen and Manion, (1994) suggesting that "reality is socially constructed" (Mertens, 2005). This means that social reality needs to be interpreted, not just observed. Interpretive approach relates to how individuals or groups view and understand the world and form or construct meaning out of their experiences hence its orientation is practical and not theoretical. This is in contrast with positivist paradigm, whose philosophy is determined by cause and effect (Creswell, 2003). The interpretive paradigm is concerned with understanding the world as it is from subjective experience of individuals. The paradigm uses meaning (versus measurement) oriented methodologies, such as interviewing or participant observation, that rely on a subjective relationship between the researcher and the subjects. Interpretive research does not predefine dependent and independent variables but focuses on the full complexity of human sense making as the situation emerges (Kaplan and Maxwell, 1994). According to Creswell (2003), the interpretivist/constructivist researcher tends to rely upon the participants' views of the situation being studied" and recognizes the impact of their own background and experiences during the research". According to (Hoepfl, 1997), the interpretive approach is the systematic analysis of socially meaningful action through detailed observation of people in natural surroundings to arrive at understanding and interpretations of how people create meaning and maintain their social life. This study relied on the farmers' views, and experiences in their own rural environment in Kiambu County. The study adopted the interpretive approach, in line with qualitative

research approach. The intention was finding the meaning of what was required by the farmers, the people being studied. The study also wanted to establish how the farmers perceived the meaning behind accessibility and use of information, their social reality. Hence, social reality in this case was based on the farmers' definition of a need for information, and the fact that individual farmers may not have experienced lack of information same way. Interpretive paradigm allowed the researcher to view the world through the perceptions and experiences of the farmers and discover how the farmers construct meaning in their natural settings

3.3 Research Approach

Quantitative and qualitative research method may be considered as the main empirical research approaches within the human or behavioural social sciences of which this study belongs.

3.3.1 Qualitative Research Approach

According to Jupp (2006), researchers work within two broad research paradigms in the social sciences, the quantitative and the qualitative. Each paradigm leans upon philosophical traditions or foundations which are distinctive and with different epistemological and ontological assumptions and applies a specific approach to researching the social world. Tesch (1990) states that qualitative research is profoundly concerned with meaning and seeks to understand social member's definition of a situation). According to Hoepfli (1997), research reports in qualitative research are descriptive, incorporating expressive language and the "presence of voice" in the text while Flick (2007) consider qualitative research as formal organization of talk. Hoepfl (1997) believes that qualitative research has interpretive research character aimed at discovering the meaning events have, for the individuals who experience them, and the interpretations of those meanings by the researcher

According to Aggarwal (2008), descriptive qualitative research is dedicated to the gathering of information about prevailing conditions or situations for the purpose of description and interpretation. In recent times, Denzin, and Lincoln (2005) and Creswell (2011) consider qualitative research naturalistic, that it collects data using a naturalistic approach focusing on the meaning actors assign to their actions.

This study used a qualitative approach complimented by quantitative techniques in an embedded mixed method. Qualitative methodology adheres to interpretivist and constructivist paradigm, where perception of the world is seen to be obtained from an individual perspective. In this study, a qualitative paradigm was adopted on the assumption that our knowledge of reality is socially constructed in line with interpretivist tradition.

Qualitative research is well articulated by Hoepfl (1997), who considers it important that qualitative research uses the natural setting as the source of data. The researcher went to the location or farms where the farmers were. The researcher acted as the human instrument of data collection. Hoepfl (1997) believes that qualitative research has interpretive research character aimed at discovering the meaning events have, for the individuals who experience them, and the interpretations of those meanings by the researcher. According to Aggarwal (2008), descriptive qualitative research is dedicated to the gathering of information about prevailing conditions or situations for the purpose of description and interpretation.

Although qualitative research has an emergent (as opposed to predetermined) design, and researchers focus on emerging process, as well as the outcomes of research, its subjectivity of researcher in methodology is subject to biases, which is not the same with quantitative research.

In this study qualitative paradigm aims to understand the world from the viewpoint of farmers, through description of their cognitive actions. Integral to qualitative paradigm is the believe that farmers assign meaning to the objective world, and that there can be multiple realities. By adopting interpretive approach, the study wanted to establish how farmers perceive information and the meaning behind access to and use of that information. In this way social reality is seen from farmers' definition of this reality and farmers may not experience access to and use of information the same way. Also, that realities cannot be studied independently from their content.

The qualitative approach was adopted in this study to establish a holistic or all - inclusive understanding of the general accessibility and use of information in study. Qualitative approach helps in digging deep into the experiences of participants that the researcher needed to understand. The approach helps to address the complexities of farmers information seeking and the contextual factors required for the utilization of the same. The purpose is to understand the world from the viewpoint of farmers, through description of their cognitive actions since, central to qualitative paradigm is the believe that farmers assign meaning to the objective world, and that there can be multiple realities.

3.3.2 Quantitative Research Approach

The epistemological basis for quantitative research is characterized as positivist though not exclusively. In this study, the positivist paradigm takes a view of the nature of reality in studying the parts to understand the whole, for example, using a sample population of farmers to represent total population, and to produce related numerical and alphanumeric statistics, thereby uncovering truth and facts. Hence using quantitative technique to support the qualitative study. According to Guba and

Licoln (1999), in research design, the general approach in quantitative approach is to deduce cause and effect relationships to predict patterns of behaviour.

Quantitative approach is used in this study to strengthen the qualitative aspects of the study because of its precise numerical form of data in explaining events since it is a research strategy that emphasizes measurement in the collection and analysis of data. According to Taylor et al (1995), some researchers claim that unless human behaviors can be expressed in numerical terms, it cannot be accurately validated. The advantage of quantitative research is that it reduces complex problems to a limited number of variables for example numbers and percentages. It is more reliable and objective but less detailed than qualitative data and may miss a desired response from the participant. While as qualitative research can be more biased on the side of the participant because it is subjective. Quantitative technique was applied in sampling, and in the later phases of the study to strengthen the qualitative aspects of the study in the analysis notably in the use of numbers and percentages.

3.3.3 Mixed Method Approach

In this study the researcher takes in the thoughts of Stake (2000). that “no observations or interpretations are perfectly repeatable” This means that using qualitative and quantitative method to analyze a phenomenon from different perspectives would serve to strengthen research. The study made use of embedded mixed method approach in which one data set provides a supportive, secondary role in a study based primarily on the other data type According to Creswell, Plano Clark et al, (2003).

3.4 Research Design

According to Yin (2003) research design is a logical, illustration that relates the data to be collected and the conclusions to be drawn in the initial questions of a study. It is the process of gathering, assessing, inferring and data (Creswell and Plano Clark, 2007).

This study was conducted through a descriptive survey research. In survey research, the researcher selects a sample of respondents from a population, and administers a standardized questionnaire used as interview schedule with the intent of generating useful data. Creswell (2012), states that survey researchers engage in the processes of: sampling from a population; collecting data through questionnaires or interviews. Babbie (2001) states that the purpose is to generalize from a sample to a population so that inferences can be made about some characteristic, attitude, or behaviour of this population. This is supported by Corbetta (2003), who observes that survey research design is a technique of gathering information by questioning individuals who the object of the research is and who belong to a representative sample through a standardized questioning procedure, usually, but not necessarily a questionnaire or interview. Surveys are well suited to descriptive studies but can also be used to explore aspects of a situation, or to seek explanation and provide data for testing hypotheses.

Descriptive Survey was the preferred research design in this study. According to Salaria (2012), descriptive survey is concerned not only with the characteristics of the individuals but with the characteristics of the whole sample thereof and provides information useful to the solutions of local problems. Orodho (2003), points out that the descriptive survey research is a method of collecting information by interviewing or administering a questionnaire. According to Aggarwal (2008), descriptive research

is devoted to the gathering of information about prevailing conditions or situations for the purpose of description and interpretation. Since the present study was undertaken to study access to and use of land related agricultural information by farmers, the descriptive survey research

3.4.1 Target Population and Sampling

The target population consisted of all farmers selected from among smallholders and big cash crop growers living in the rural area of Kiambu County. They were drawn from a list of farmers registered among as members of 28 farmers' cooperatives as of Kiambu/East Annual District Report, and Kiambu/West Annual District Report (2009). The concentration of farmers was not uniform as majority were found to come from Githunguri and Limuru constituencies. Githunguri constituency, has a concentration of farmers involved in all the identified category research areas, and farming activities as indicated by the register of the members of farmer's cooperative. Initially the researcher wanted to zero in on only four groups of farmers, dairy, tea, coffee, and pyrethrum farmers, but from groundwork and consultations the researcher decided to include all farmers in the research. Hence an inclusive category of farmers living in the rural area of Kiambu County was chosen to participate in this study. Since it was not feasible to collect data from the entire population, the researcher selected a representative sample using stratified sampling technique to have fair representation as possible. The final selection was done using the stratified sampling technique to include all the members of the farmers of cooperatives. The researcher therefore used a small sample size to minimize redundancy in the data collection process and attain critical results.

3.4.2 Sample Size

The study sample consisted of 150 respondents who were selected using stratified sampling technique because the population was not homogenous.

Table 1 presents Kiambu Farmers' Cooperatives ranked by membership.

Table 1: Kiambu County Farmers' Cooperatives Ranked by Membership

KIAMBU COUNTY-FARMERS' COOPERATIVES RANKED BY MEMBERSHIP		
Name	Members _ n=)	Percentage
1. Githunguri Dairy	17900	37
2. Kiambaa	5212	10
3. Gatamaiyu	4620	9.6
4. Kamahia	3702	7.7
5. Ndumberi (Dairy)	3677	5.9
6. Lari	2830	5.4
7. Limuru	2597	5.0
8. Kiriita	2438	2.9
9. Kikuyu	1296	2.4
10. Kabete	1157	1.4
11. Cigona	686	0.8
12. Gikambura	372	0.7
13. Kinari	350	0.7
14. Ndumberi (coffee)	340	0.3
15. Kiambaa	178	0.3
16. Nyakari	160	0.3
17. Numa -Kiambaa	160	0.3
18. Mutari –Kiambu	158	0.3
19. Gititu	127	0.2
20. Komothai	64	0.1
21. Thimbigua	56	0.1
22. Kabete /Muguga	52	0.1
23. Nyakivi-Kiambu	40	0.1
24. Mutari –Kiambu	40	0.1
25. Ndagoreti/Karai	40	0.1
26. Kiriita	38	0.1
27. Limuru	38	0.1
28. Muguga	35	0.1
TOTALS	48,363	100

Source: Kiambu/East Annual District Report, 2009/ Kiambu/West Annual District Report 2009

3.4.3 The Sampling Procedure

According to Fink (2003), small sampling can be studied more quickly than the entire target population. It is less expensive, and it allows for efficiency and precision in research study. Fink in addition stated that increases in sample size would increase the complexities of the data collection, management and analysis but not necessarily improve the quality of the results. Different sampling techniques were used to draw the sample in line with the study's concern for seeking information from farmers in the population. These were Multi-stage, stratified, systematic random sampling technique, and purposive sampling methods. These were used on the basis that the population from which the sample is drawn does not constitute a homogeneous group.

Multi-stage cluster sampling divided the population into groups of cooperatives. The total population of farmers from the 28 cooperatives was 48,363. The largest co-operative had a membership of 17,900 while the smallest a membership of 35. The sampling frame thereby focused on 50% of 28 co-operatives i.e., 14 co-operatives, chosen randomly from large and small clusters. The total participants in the sampled farmers' co-operatives were 31,760, of which 5% of this randomly selected group was 1,588. However, the author chose two geographical areas of Githunguri and Limuru to arrive at a sample size. The theory behind this was that the constituency of Githunguri has a sample of 895 members which is more than half of the 1,588 members and has the highest concentration of farmers involved in all the identified category of farming activities as indicated by the register of members of farmers' cooperatives. Limuru returned the lowest number (2) of the sample members but had also the highest concentration of pyrethrum growers. The researcher therefore decided to take a sample of 120 farmers which is 13.3% of a total number of 897, made up of 895 farmers from Githunguri and 2 from Limuru. The sample of 120 was made up of

30 dairy farmers, 30 tea farmers, 30 coffee farmers and 30 pyrethrum farmers. However, the researcher did not strictly follow this plan, as there were farmers among them who did subsistence farming. She used purposive sampling to *increase* the sample by 30 respondents, so that the final decision was to interview 150 (16.7 %) of the 897 farmers including subsistence farmers. Kiambu membership-sampled cooperatives is shown in table 2.

Table 2: Kiambu County-Farmer's Membership-Sampled Cooperatives…

KIAMBU COUNTY-FARMERS' COOPERATIVES RANKED BY MEMBERSHIP-SAMPLED COOPS			
Name	No.		Number in Sample
1. Githunguri Dairy	17900		895
3. Gatamaiyu	4620		231
5. Ndumberi (Dairy)	3677		184
7. Lari	2597		130
9. Kikuyu	1296		65
11. Cigona	686		34
13. Kinari	350		17
15. Kiambaa	178		9
17. Numa -Kiambaa	160		8
19. Gititu	127		6
21. Thimbigua	56		3
23. Nyakivi-Kiambu	40		2
25. Ndagoreti/Karai	40		2
28. Limuru	38		2
TOTALS	31765		1588.

3.4.4 Data Collection Procedures

The researcher first obtained a permit from the Ministry of Science and Technology and thereafter reported to Kiambu District Commissioner, informing her about the intension to conduct the research within Kiambu. The researcher thereafter conducted face to face interviews with the farmers using a semi- structured questionnaire as the interview guide. Creswell (2012), states in qualitative research, interviews make it possible to obtain specified and detailed data required to meet specific objectives of the study.

The first section of the interview schedule comprised of questions on biographic characteristics of the farmers, gender, age, levels of education, main farming activities, and land ownership and size that enabled the researcher to generate quantitative data. The sections that followed comprised open-ended questions that explored the information needs, information sources, Information use, adequacy of information, mode of information delivery and challenges encountered. The open nature of the interview questions enabled the researcher to generate qualitative data. The research was also able to probe the farmers' descriptive responses in which the farmers can give their own views and opinions thereby enriching the qualitative data. The interviews were conducted in the English language. However, there were those in the sample who did not comprehend the language very well though educated, and there were those who were illiterate. These, wanted to give detailed descriptions in Gikuyu language, and since the researcher is a *"Mugikuyu"* (a person whose mother tongue is Gikuyu), and she had deliberately selected assistant interviewers who spoke and understood the language, it was possible to interpret key terms and phrases without losing their meaning or context.

3.4.5 Instrument Validation and Reliability Determination

The researcher used the pilot study to test the interview instrument and prepare for main fieldwork. This pilot study was used as a small initial study, a prelude to the full study as a test to get experience in carrying out a study. The researcher pre-tested the instrument for validity and reliability first on a sample of ten respondents. According to Wiersma: and Jurs (2005) a pilot study is when initial drafts of questionnaires and interviews are tried out with a pilot run. A pilot run should be done with a limited number of participants usually between five and ten. Usually these are people who should assist the researcher in answering the questions, so that the researcher would

be able to identify the errors in the research instruments before proceeding to the field to collect data.

For this study however, two tests were done. First, ten interview questions were tested by 5 assistants each one checking and going through their questions, checking, and pointing out any errors. These assistants helped the researcher improve on the questions. Besides, the data collection instruments were also tested for content validity by professional researchers. The researcher worked at Kenya Institute for Public policy Research and Analysis and had the opportunity to consult resourceful staff colleagues for views and comments. This helped to establish the reliability of data collection instruments to ensure that all collected data was relevant. Kerlinger (2000) sees reliability as the accuracy or precision of a measuring instrument. The questions were also checked for suitability and adequacy. The responses and information gathered were used to polish and refine the research topic as well.

The second pilot test was done to a small group of farmers with similar characteristics as the target population, in Mwimuto village, near Nairobi. According to Fink (2003), pilot testing is a process of simulating the use of the test in its intended setting. That pilot testing is necessary and an important stage in survey development, and that it has three benefits; to identify errors, it allows researcher to adjust the design, and it predicts possible problems with the survey instruments. Litwin, 2003) contends that pilot testing helps in error identification needed for item redesigning and predicts possible problems that will be encountered in its administration.

The pilot was done also to test the feelings of farmers, to find out whether farmers elsewhere in the rural Kiambu area, would find the instrument helpful, to make sure that there were no misunderstanding and misinterpretations especially because

although the interview questions were in the English language, interviewers were expected to translate/interpret in the local language if it deemed necessary, during the interviewing. The interviewees contributed to pointing out issues they did not understand whereby the research took notes that she used to iron out any unclear issues. Hence any misunderstandings and misinterpretations that would have been encountered in the field during data collection were ironed out.

The pilot study helped to ascertain the time required for a single interview. It also helped to make changes, mainly concerning the interviewers. Two interviewers who claimed that the work was boring left on their own. Two others were recruited and found the work interesting. The five interviewers who included the three who stayed on, were energetic and motivated, ensuring that data collection proceeded smoothly.

3.4.6 Data Collection Method

The main data collection instrument used was semi-structured questionnaire as the interview guide (Annex 2). This is in line with the qualitative data collection method. The researcher collected data with the assistance of five research assistants.

3.4.6.1 Semi -Structured Questionnaire

The semi structured questionnaire was used as the interview guide, the instrument used to collect data. It started with questions on respondent's profile that brought out biographic characteristics of the farmers, gender, age, levels of education, main farming activities, and land ownership and size that enabled the researcher to generate quantitative data. The rest of the schedule sections, comprised of open-ended questions that explored the information needs, information sources, information use, adequacy of information, mode of information delivery and challenges encountered. The nature of the questions (Schedule Annex 2) of this study, allowed for probing into

the responses, which enriched the data collected. The interviewees could ask questions to gain a comprehensive understanding of the issues raised in the study. Open-ended questions were directed at individual farmers to ensure that answers to all questions were recorded. Interviewers helped interpret key terms and phrases for example, legal and other land-related language or terms. Besides, some farmers were not familiar with some of the terms relating to information technology such as the 'Internet', and the language and forms of information repackaging. Some of the illiterate farmers wanted to communicate in the Gikuyu language and could.

Generally, the respondents were engaged. Women especially showed great interest in the concerned issues, while men were a bit reserved. Although land-related issues are overly sensitive, especially at the rural community level, the interviewees responded very positively. Sometimes the respondents introduced land related political issues which were interesting, and the interviewer had to cleverly note the relevant response and bring the respondents back to the formal interview to save time. Precise results, however, will be brought out by data analysis. 150 farmers were interviewed on access to and use of land related agricultural information on information needs, information access, information access and use, information sources.

The open-ended interview allowed respondents to express themselves freely and confidently, and to add alternative views and opinions. This enabled deeper responses and enhanced the quality of the data collected. Although the researcher had conducted a pre-test of the semi structured questionnaire guide in a pilot study and rectified some issues for reasons of validity and reliability, the respondents still requested further information, and two questions that were extremely popular before the interview started were "Why are you interested in land related agricultural issues?" and "Where are you taking the information?" When the reason was given that the research was

university based, and not government based, the respondents became more comfortable in answering the questions.

3.4.6.2 Face to Face Interviews

Face to Face interview facilitated interaction between the researcher and the respondents. This was conducted to gather information from each individual farmer selected from a representative sample of agricultural farmers to find out answers to the research questions. What kind of information they needed; how they sought information; how the information met their needs; the problems associated with accessing and using information and how the farmers preferred information to be provided to them. Open-ended nature of the questions allowed interviewees enough room to provide detailed and descriptive responses (Myers, 2009) and express their views and opinions and this led to quick and efficient means of collecting information. The advantages of face-to-face interviews were that the interviewer could follow up and probe responses, motives and feelings from non-verbal communications, facial expressions and gestures and record it. This recording enriched the qualitative aspects of the data (Jupp, 2006). Respondents were assured that the information they gave would be treated confidentially and only used for the research. The researcher ensured that the confidentiality of respondents was maintained.

The researcher and the assisting interviewers, recorded responses in notebooks. All were required to arrive at the interview venue in time, and therefore were required to have watches or any other time keeping device as found in mobile phones, to make sure they were in time for interviews. This was because the researcher had assured respondents of punctuality. Time was of concern to respondents because they had agricultural and other activities to attend to daily, both within and outside their

environs. The researcher had prepared instructions for the assisting interviewers that pointed to punctuality, the time the interview will take (two hours for each interview) among others, and this saved a certain amount of time. Interviews can be time consuming if not well focused, although they can produce rich and detailed data.

The researcher minor disruptions. First, taking notes took a lot of time since some respondents kept being distracted, moving in and out, to attend to minor activities around them. There were some questions related for example, to land tenure which respondents wanted to discuss more but the researcher and the assisting interviewers had to keep in check. Some words, phrases and even content and thoughts had to be communicated in Gikuyu language especially for the illiterate farmers and recorded in English language. The research however managed to gather enough data which helped to generate new information. This was analyzed in the following Chapter 4.

3.4.6.3 Documentary Evidence

Documentary evidence entails perusing through existing documents and records. The researcher used documentary information sources from the cooperatives. Documents like farmers' Annual reports, for example Kiambu East and Kiambu West Annual District reports that list members of farmers' cooperatives were used to sample farmers in Kiambu County. Other documentary sources were Annual reports obtained from the Ministry of Lands, and from the Ministry of Agriculture which helped to develop the researcher's ideas and the study overall. Other materials from banks, NGOs, churches, and others gave insight into the history, and current and future information that is relevant to the study.

3.4.6.4 Ethical Issues

This study considered ethical issues as moral standards that the researcher considered in all the research methods in all stages of the research design and specifically in relation to research participants, reporting and the use of the research results. The researcher first got the approval from Moi University to conduct research, then later obtained a permit from the Ministry of Education Science and Technology. Thereafter the researcher reported to Kiambu County Commissioner, informing her about the intension to conduct the research in Kiambu County.

The researcher felt that to gather quality data, building up good and effective relationship with participants was key. Creswell (2003) states that the researcher has an obligation to respect the rights, needs, values and desires of the informants. From the start, the researcher decided to consider herself in the place of the participants, trying to see from their perspective how she would want to be treated in terms of the nature and extent of information about the study to be assured that the participants were happy in participating and contributing to the research study. Miles and Huberman (1994) list the following issues that researcher should consider when analyzing data:

- Informed consent (Do participants have full knowledge of what is involved?
- Harm and risk (can the study hurt participants?
- Honesty and trust (Is the researcher being truthful in presenting data?
- Privacy, confidentiality, and anonymity (Will the study intrude too much into group behaviors?
- Intervention and advocacy (What should researchers do if participants display harmful or illegal behavior?

At the very beginning the researcher conveyed full information on the purpose and uses of participants' contributions, as well as the aim of the study. The participants were not obliged to participate in any way. Hence participants were requested to give consent to be involved. They were also assured that information that they provided to the researcher was not going to be used against them. Although physical harm was not envisaged, however the researcher bore in mind that the psychological consequences needed sensitivity especially as far as the women were concerned and land related issues are sensitive issues in Kiambu County.

The researcher was sensitive to the participants' beliefs, habits, culture and emotions and lifestyles. Since the study was conducted in the farmers natural setting the researcher was not apprehensive and remained confident when children run to their mothers during the interviews. The natural setting was advantageous in that there was no intrusion of privacy about information provided.

The researcher also made sure that the participants understood what the research meant for them and why each participant had been selected. During the interview, the participants were informed that they did not have to answer any questions they were uncomfortable with. The open-ended questions gave the participants opportunity for self-expression and for their views to be recorded. The researcher also made sure the participants were at ease by starting the interviews with informal chats and comments, for example asking how many children they had. After the interviews, the participants were assured of confidentiality of the information they gave and anonymity regarding their identity.

The study was done for academic reasons, and not for personal gain. The study tried as much as possible to produce accurate and unbiased research report which is

expected to make a positive impact on policy makers, agricultural farmers, landowners, and land users who are not necessarily landowners, among who are the poorest in Kenya, partly because they are not well informed. The data collected as well as the contact details of participants will not be used for any other purpose other than for research purpose but with permission sought from participants.

3.5 Rigour and Trustworthiness

In the present study the issues of rigour and trustworthiness were addressed by adopting the terminologies and viewpoint suggested by Lincoln & Guba (1985) as criteria for judging the soundness of qualitative research. These are Credibility, Transferability, Dependability, and conformability. According to Lincoln and Guba (1985), a researcher is required to show that a study is valid, credible, and rigorous. Validity in mainly associated with positivist and quantitative standardized methods of data collection. In qualitative research, it signifies trustworthiness and credibility.

3.5.1 Credibility

Credibility' is the term that is analogous to "Internal validity" which is the traditional criteria for judging quantitative research and focuses on truth –value. To increase credibility (data validity) in this study, face to face interviews was used as data collection methods. This gave the researcher the opportunity to be acquainted with the respondents. The truth value of this research was enriched by the unearthing experiences as they are lived and perceived by farmers. The credibility of the research was further enhanced by ensuring accurate description of the study on access to and use of land related information by farmers. Newman (2003) states that the reader needs to be provided with enough evidence so that the reader may "believe the recounted events and accept the interpretations as plausible". To ensure truth value this study applied first prolonged field experience which meant the researcher

examined his actions and role as research throughout the research project. Secondly, the researcher applied reflexivity. Reflexivity involves making the research process itself a focus of inquiry, laying open pre-conceptions and becoming aware of situational dynamics in which the interviewer and respondent are jointly involved in knowledge production. Reflexive practices in this study meant carrying a pilot interview and revising the questions in the early stages of research and even re – framing the research topics as the project unfolded. The research also used triangulation as multiple data collection procedure, collecting data, using interviews techniques, and documentary evidence. The research also used qualitative methods and then the quantitative methods to enhance research results credibility. Since the purpose of the qualitative research is to describe or understand the phenomena of interest from the participants' eyes, the participants are the only ones who can legitimately judge the credibility of the results.

3.5.2 Transferability

Transferability" is a term analogous to "external validity". It refers to the degree to which the results of qualitative research can be generalized or transferred to other contexts or settings. According to Lincoln and Guba, (1985), a researcher in qualitative research must provide a "thick description" necessary for anyone interested in making a transfer to reach a conclusion about whether transfer can be contemplated. Creswell (1998) also believes that to make sure that findings are transferable between the research and those being studied "thick description is necessary". Accordingly, this study produced a thick description of the phenomenon being studied including sampling, literature control, interviews, and provided some verbatim quotes which facilitated the inclusion of as much information as possible to make transferability as the criterion against which the application of this qualitative

data could be assessed. This criterion was particularly important as through the dense description, themes and categories emerged that formed the basis on which the researcher based her research, mainly information needs, information sources, information access and use. By providing detailed information the results hopefully provided sufficient descriptive data to make transferability judgment possible. The person who wishes to "transfer" the result to a different context is responsible for making the judgment of the adequacy of the application of the study's findings to the new setting.

3.5.3 Dependability

Dependability" in naturalistic inquiry is analogous to "reliability". This refers to the stability or consistency of the inquiry process used over time. Dependability in qualitative study ensures that the validity between replicated studies can be accounted for. The idea of dependability emphasizes the need for the researcher to account for the ever-changing context within which research occurs. This study used detailed description of the research method and triangulation as dependability strategies to ensure and increase the consistency of research study.

3.5.4 Conformability

Conformability" is the term used in the naturalistic inquiry that is analogous to "objectivity" and it addresses the issue of neutrality i.e., the extent to which the findings are reflective of the participants' perspective as shown in the data rather than reflecting the researcher's perception. Babbie and Mouton (2002) add that conformability is the degree to which the findings of the research were the product of the focus of the inquiry and not the biases of the researcher. To enhance conformability in the present study, the researcher stated explicitly his assumptions about the topic of interest in relation to her own contributions and the interviews

contained open ended questions that allowed for gathering a more comprehensive view of the context.

3.5.5 Chapter Summary

The chapter presented the philosophical world views, research approach, research design, population and sampling, the methodology, the techniques, and procedures that were applied to conduct the research, data collection techniques and tools, data analysis, reliability and validity and ethical considerations. The study used interpretive approach to conduct the research in keeping with qualitative method. However, both qualitative and quantitative strategies were applied. The qualitative strategy was chosen to match the philosophical assumptions underlying qualitative, interpretive research and directed at objectives and research questions. Quantitative techniques were used to strengthen the statistical aspects of the research. Semi-structured questionnaire as interview guide was the primary data collection method. Documentary evidence was used to complement the data collection methods. The Statistical Package for the Social Sciences (SPPSS) was used for quantitative data management. The ethical issues related to this research have been addressed within the chapter. The data analysis presentation, and interpretation for the study are discussed in the following chapter four, which presents the results of the study.

CHAPTER FOUR

DATA ANALYSIS, PRESENTATION, AND INTERPRETATION

4.1 Introduction

The overall purpose of data processing and analysis was to summarize the completed thoughts in such a way that they produce responses to the study's research questions. This chapter presents the data analysis, presentation, and interpretation of the study. The study based on the embedded design in a mixed method research approach, where qualitative method was dominant and where quantitative method provided the supportive role, (Creswell, Plano Clark, et al 2003). The data collected was processed in response to research questions of the study. The main data collection instrument used was semi-structured questionnaire which was used as interview guide (Annex 2). Both qualitative and quantitative data were collected as perceived in creative mixing of qualitative and quantitative data collection methods (Johnson and Turner, (2003).

4.1.1 Data Presentation

After the data was tabulated, which means summarizing of data and putting it in the form of structured tables. Quantitative data was presented in the form of tables and charts, which gave a summarized picture of data. Qualitative analysis consisted of scrutinizing, categorizing and merging evidence to address the research questions using written words, phrases, or symbols to give the results meaning. This meant systematic rigorous considerations of the data to identify themes and concepts. Qualitative data was grouped into meaningful patterns and themes that are observed to help in the summarizing and organization of the data. The final matrix presented an interpretation of the combined qualitative and quantitative data.

4.1.2 Data Analysis

The data collected and data analysis were processed starting with demographic investigation, the background information of the interviewees and in response to the research questions posed in chapter one of this study. The aim of the study was to investigate access to and use of land related agricultural information by farmers in Kiambu County.

The study explored the sequence of questions posed to farmers focusing their main lines of farming activities. The main lines of inquiry were: how farmers seek and access information; information sources; adequacy of information access and delivery for effective use; how various categories of information-giving agents accord it; how the respondents would prefer it delivered; what the recipients use it for; information gaps that remain in information access and delivery; challenges and consequences encountered; and possible methods of improvement of the system including the use of information technology

Data was analyzed both qualitatively and quantitatively. Creswell (2009) considers the use of both quantitative and qualitative methods together for ease of data analysis. The researcher first verified the validity of the data she collected with semi-structured questionnaire as interview guide to determine whether there were any inconsistencies in the data collected. This involved transcribing interviews and cleaning them (editing) to ensure accuracy, consistency, and uniformity. The data was organized in a limited number of categories that related to the objectives of the study. The data was sorted out, organized, and entered in the computer for analysis. This is in line with Newman (2006) and Russell (1996), who assert that, after all the data have been collected a quantitative researcher arranges measures of variables, which are in the form of numbers, into a machine-readable form for statistical analysis. Quantitative

data obtained from the semi-structured interview was directly entered into Statistical Package for the Social Sciences (SPSS) and analyzed. Quantitative data was in the form of numbers which represented value of variables. On the other hand, qualitative data obtained from the same semi-structured interview were analyzed in themes (information needs, information access, information use, information sources, mode of information delivery and challenges encountered).

4.2 Data Interpretation

Though it may not have been possible to present every result of the analysis, the final presentation included the most important findings in line with the objectives of the study. Quantitative data was presented through the use tables with percentages, bar charts, and frequency counts to illustrate the outcome. Qualitative data was presented descriptively.

4.2.1 Background information of the respondents

This section presents the data on demographic profile of the farmers, men and women who were the respondents. The demographic factors helped to put the findings into perspective. These includes age, gender of respondents, marital status, and educational level. The author used responses to questions posed to the farmers in the first section of the interview to gather demographic data.

4.2.2 Age and Gender of the Respondents

The study examined the gender balance of those who participated in the study. The age and gender profile of the sample was selected beginning from the 18–25-year group, with 7-year gaps to reflect incremental engagement of respondents with age in farming as well as farming experience. The groups shown in detail in Table 3, reflect, for example, that representation in the sample peaked at ages 50+.

Table 3: Age and Gender of Respondents (n=150)

Age of respondent	Gender		Total
	Male	Female	Percentage
18-25	5	**2**	4.6
26-33	22	8	20
34-41	18	15	22
42-49	17	11	18.6
50+	34	18	34.6
Total	96	54	100

Table from data analysis

Out of a total of 150 respondents interviewed, there were 96 (64%) men and 54 (36 %) women. Those interviewed were from the ages 18 years upwards. Six respondents (5 men and 2 woman) were aged 18-25 years, 30 (22 men and 8 women) were aged group 26-33, while 33 (18 men and 15 women) were aged 34-41, 28 (17men and 11 women) were within the ages 42-49 and 52 (34 men and 18 women) respondents were ages 50 and over. The noticeably young in the age bracket 18-25 years form a small group in numbers of the sample. The group 50 years and over dominated the sample

4.2.3 Marital status

The respondents were classified as married, single, or widowed. The marital status of respondents is shown in Table 4.

Table 4: Marital Status of Respondents (n=150)

Marital Status	Frequency	Percentage
Married	121	80.6
Single	10	6.6
Widowed	19	12.6
Total	150	100

Table from data analysis

Among the 150 interviewed 121 (80.6%) were married 10 (6.6%) were single and 19 (12.6%) were widowed. Among the females, those who were divorced, preferred to be identified as single and those who were separated, especially the men preferred to be classified with the married group.

4.2.4 Educational Level Versus Gender

The analysis of the level of education of men versus women is presented in Table 5.

Table 5: Education vs Gender in the Sampled Population (n=96 and n=54)

Education Level	Frequency	Percentage	Frequency	percentage
	Male (n=)		Female (n=)	
Secondary complete	43	28	24	16
Secondary	12	8	5	3.3
Primary complete	5	3.3	3	2
Primary incomplete	8	5.3	7	4.6
None	3	2	5	3.3
Certificate	15	10	10	6.6
Diploma	4	2.6	0	0
University	6	4	0	0
Total	96	63.9	54	35.8

Table from data analysis

The difference between men and women, (of those in the sample that had completed secondary school education) is men 43 (28%) and women 24 (16%). Those who had not completed secondary school were men 12 (8%), and women 5 (3.3%); those who had completed primary school were men 5 (3.3%), women 3 (2%). The difference of those who had not completed primary school is minimal between men 8 (5.3%) and women 7 (4.6%). Those with no education are women 5 (3.3%) and men 3 (2%). No woman had attained diploma or university education among those interviewed.

During the interview, some farmers pointed out that if they had better education, they would be better informed than they were. Some women felt that they would seek for information themselves instead of relying on their husbands or their male counterpart

if they had better education. One woman interviewee said that if she were educated, her husband would respect her decisions especially concerning the use of land, particularly on making decisions on which crops to cultivate. The woman said

"*I would talk to the government myself if I was educated enough, to advise us on how to make better use of our small piece of land".* She continued and said, *"I know cash crops need a bigger piece of land and not a small one like ours".*

She said that her husband's choice was cash crops which brought money once a year, yet school needs could not wait for a year. She preferred growing vegetables and traditional crops like sweet potatoes which fetched good money throughout the year as well as keeping dairy cow for income and household needs, especially milk. She spoke

"*My husband says he speaks from knowledge because he attended high school and is able to gather information". That he can gather information from educated people, from meetings and reading".* Men on the other hand felt that they needed more than just education, they needed that which would help them improve their farming methods especially skills in all aspects of farming and in the use of technology.

4.2.5 Land Ownership, Size, and Farming

Table 6 shows land ownership and size as reported by the respondents.

Table 6: Land Ownership and Size (n=150)

Size of land acres	Frequency	Percentage
0.1-0.9	16	10.6
1.0-1.9	16	10.6
2.0-2.9	43	28.6
3.0-3.9	33	22.0
4.0-4.9	14	9.3
5+	28	18.6
Total	150	100

Table from data analysis

16 (10.6%) of the farmers owned between 0.1-0.9 acres, and 16 (10.6%) owned between 1.0 -1.9 acres. However, land ownership seemed unequal and uneven. The highest number of farmers 43 (28.6%) owned between 2.0 and 2.9 acres, while the smallest number of farmers 14 (9.3%) owned between 4.0 and 4.9 acres. The 28 (18.6%) farmers who owned 5 plus acres were mostly cash crop farmers as shown also in Figure 2 bellow.

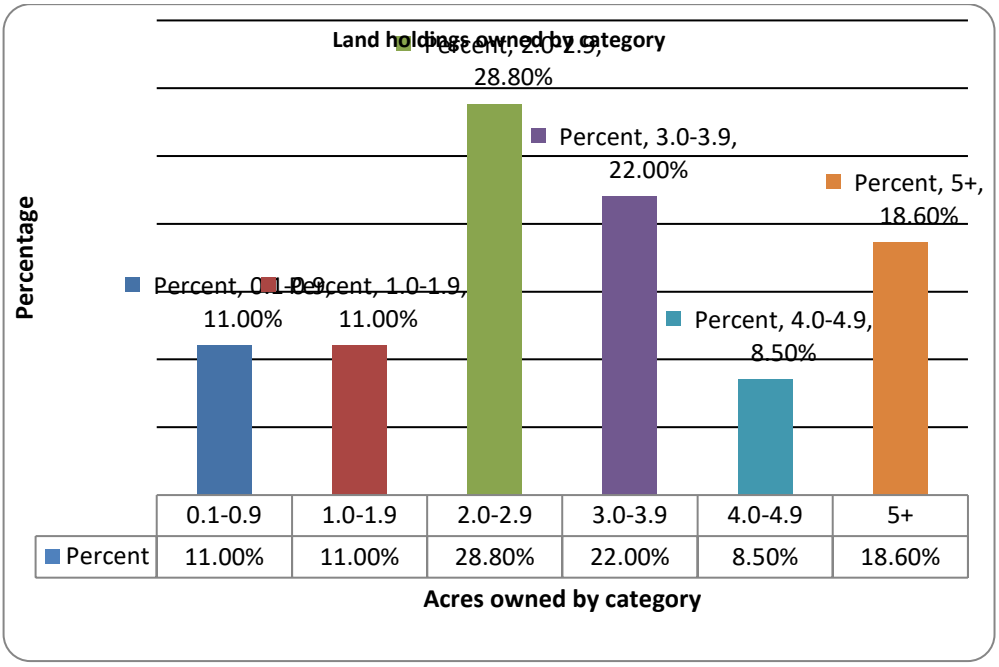


Figure 2: Land Ownership Size and Farming
Figure from data analysis

Most farmers owned less than three acres of land and which they used wholly and intensively, mainly for mixed farming of non-cash crops like maize and legumes, others are used for cash crops like tea, coffee, and pyrethrum. Owing to the small size of farms, farmers were reserved on seeking information opportunities to improve their land, their production and hence their livelihood. The findings also suggest that since the small land brought in less income, farmers were compelled to seek for other income generating activities outside their farms to supplement their incomes.

4.2.6 Main Farming Activities

The study found that the main farming activities of the area surveyed are in dairy farming, followed by coffee and tea, respectively. Table 7 shows the main farming activities reported by the respondents and the percentage each segment represented in the sample. The researchers took care to avoid multiple responses.

Table 7: Main Farming Activities (n=150)

Main farming activities	Frequency	Percent response rate
Dairy	80	53.3
Coffee	43	28.6
Tea	25	16.6
Pyrethrum	1	0.7
Others	1	0.7
Total	150	100

Table from data analysis

Over 50% farmers are engaged in dairy farming followed distantly by coffee farming 43(28.6%) and Tea 25 (16.6%) pyrethrum 1(0.7%) other 1 (0.7). Other than the three main farming categories, 'Other farming' was dominated by 'Food crop' farming, horticulture, chicken rearing and livestock. The sampled area is intensive in dairy farming. Most farmers kept at least a cow for milk for livelihood.

4.2.7 Occupation other than Farming

The general observation from research findings was that most women farmers were mostly engaged in farming as their main activity while majority of men had other incoming generating occupation in addition to farming. It was also noted that some occupations were more predominant among the farmers in Kiambu in relation to others.

Women, more than men specialized in farming while most men were involved in other and more varied occupations, in addition to farming. There were those who

were teachers, businesspeople, civil servants, mechanics, carpenters, masons, and shopkeepers. For those women who were involved in other non-farming activities, some were involved in trading in agricultural produce and in small businesses like hair dressing. When asked why they needed other jobs, majority said that their land was small and could not sustain them even when they used the land intensively.

Majority reported that incomes from farming alone could not sustain their families and hence other means of earning income was inevitable. They also cited low agricultural productivity due to climate change and lack of planning. They also cited delay in income from the sale of cash crops, that payments were always delayed, hence need to have another source of income while awaiting payment, and expensive credit facilities and poor infrastructure mainly roads. Other participants identified landlessness, and the fact that they hired land for use and the owner could request to have their land back any time meant that their income was not secure, and they had no information on legal and land use rights. The most notable occupations outside farming were ‘Businessperson’ (9.3%) male and (23.1%) female; ‘Teacher’ (10.3%) male and (7.7% female). Apart from ‘Driver’ and ‘Mechanic’ works, all other non-farm occupations registered less than 3% of the respondents’ other occupation.

4.2.8 Social and Cultural Aspects

The study revealed that in Kiambu County, cultural practices dictate that a man is the head of the family and the owner of everything including his wife and sometimes wives, (though 99% of those interviewed were in monogamous family. The man also owns the land and everything in it including livestock. Hence the women roles have been to support the husband. Owing to cultural practices, women hardly own land. It is only in the recent times that women have become involved in income generating activities. Previously this was unacceptable without the husband’s consent, except

where she is the head of the family as a single person, divorced or widowed. However, whether married or single, women do most of the physical work on the land and are involved in all agricultural activities, like planting weeding, harvesting, milking, and attending to other farm related activities.

The study shows that access to information is important in improving political and cultural life of the farmers and especially women farmers who are culturally not allowed to own land. Access to information could contributes to a better understanding of cultural implications, to social and economic development and poverty alleviation. From the results of this study, the demographic aspects of farmers in relation to information access and use show that there is need for provision of relevant information and services to both men and women farmers in the County.

4.3 Farmers' Information Needs

The study has developed six categories of information analysis. These are: land tenure; physical planning; agricultural activities; environmental aspects; access to credit; and legal aspects. Data is presented, analyzed, and interpreted using these categories. This helps in comprehending the 'intensity of information needs, access and use.

It must be noted that most farmers were involved in many agricultural activities. There were those who grew cash crops like tea, coffee and pyrethrum and large-scale dairy farming, in addition to practicing small scale farming of food crops. There were the small-scale farmers who were involved in cultivation of small pieces of land, planting subsistence crops like maize, beans, vegetables and kept livestock and poultry for milk and food. The concerns of all these farmers were first, ownership of land and on their use of relatively small parcels of land. How they could use their land

efficiently especially those who had small pieces of land. This influenced their need to access and use information to overcome problems they face in their farming activities. These problems are associated with land tenure or land ownership, physical planning, agricultural activities, and other problems related to new agricultural technologies, environment aspects, access to credit facilities, and legal aspects of land ownership.

4.3.1 Information Required on Land Tenure

The farmers' information needs on land tenure varied but the survey required respondents to pick their top information requirement in the sub-categories, to avoid multiple responses. The overall response on information needs on land tenure are as presented in Table 8 hereafter.

Table 8: Information Needs on Land Tenure (n=150)

Required information	Frequency	Percent
Information on government trust land	5	3.3
Information on title deeds	6	4.0
Information on lease holding	2	1.3
Information on land inheritance rights	12	8.0
Information on sharing of land	6	4.0
Information on land surveying/demarcations	3	2.0
Land purchase procedure	3	2.0
Land ownership	3	2.0
None	110	73.3
Total	150	100

Table from data analysis

There were eight categories of specific needs, led by the need for information on land inheritance rights, followed by equal demands for Information on sharing of land, and Information on title deeds. For those seeking information, some 26.7 percent of valid responses, the needs were specific. Some eight themes or sub-categories emerged: 1) information on government trust land; 2) information on land ownership, and title deeds; 3) information on lease holding; 4) Information on land inheritance rights; 5)

information on land surveying/demarcations; 6) information on land sharing; 7) on land purchase; and 8) land ownership. Out of the 150 responses a large number, 110 (73.3%), needed no information on land tenure per se. Most of the needed information on inheritance rights, sharing of land and title deeds was embedded in traditions and culture. It was widely observed that most farmers own the land they occupy, however small, and they had already indicated the size of land they hold. Where information was needed is in land sharing, pertaining to inheritance rights and on title deeds. Women especially raised this concern. They said they were willing to invest in land if they were assured of ownership. During the interview with farmers, it was clear that the survey region has strong traditional concerning land ownership where sons inherit land from their fathers and women inherit no land. Even in polygamous families, land tenure selectively allocates inheritance and ownership rights to the sons of each wife and not to the daughters.

Information needs on land tenure are thus largely pre-empted by tradition. As one respondent said

"I will leave my land to my daughter; she will need all the information so that no one will get it (the land) from her and I hope the government will help her, but God first".

The strength of traditional land inheritance rights, however inequitable (in gender terms, for example) guarantees a certain degree of traditionally acquired information among the respondents on land tenure. A majority 110 (73.3%) percent of respondents did not need information on land tenure. They stated that the ownership of land is well known. That men own land and that the owners are known even in the next generations since the land is passed on to male child by inheritance. When information is sought, it is specific, residual, and confirmative. The leading need is a

residual of information on inheritance rights 12 (8.0 %), the sharing of land and on title deeds 6 (4.0 %). To a lesser degree, information is needed on government trust land and on land surveying and demarcations.

4.3.2 Physical Planning Information Needs

The study shows that owing to land inheritance, land in rural Kiambu County has been sub- divided many times over and again, and therefore the land is intensively used leaving little in fallow land. The farmers need for information on planning was therefore important to facilitate better use of their limited land for economic gain and better livelihood. The survey required respondents to pick their top information requirement among the sub-categories, to avoid multiple responses.

Table 9 summarizes information required on physical planning.

Table 9: Physical Planning Information Needs (n=150)

Category label	Frequency	Percent of Responses
Piped water	3	2
None	65	43
Markets	3	1.9
Soil erosion	9	6
Construction of green houses	6	4
Water rates	3	2
Keeping fish	9	6
Planning	22	14.6
Road networks	1	0.7
Transfer	6	4
Better breeds	2	1.3
Technology	1	0.7
Information on physical planning	2	1.3
How to construct bore holes	1	0.7
Better irrigation skills	4	2.7
How to build livestock sheds	3	2
Better livestock breeding	1	0.7
Better bee keeping skills	1	0.7
Skills on pig rearing	1	0.7
Proper crop rotation	4	2.7
How to determine what to plant by soil type	3	2
Total	150	100

Table from data analysis

On information needs on physical planning, there were some 150 valid responses. Some 65 needed no information on physical planning. Unlike in land tenure, more than half of the sample looked for information of this category. However, the leading information need among those seeking information on physical planning was on planning in general 23. Of the remainder, some 20 specific sub-themes emerged on the needs for information on: 1) Piped water; 2) Markets; 3) Soil Erosion; 4) Construction of greenhouses among others as shown in Table 10. These had a mixture of information on diversification of economic activity, land planning and on structures of the land use indicating information needs of individual, the respondents. This included information needs on how to control soil erosion, construction of green houses, how to prepare ponds for fish keeping, and sheds for pig rearing, bee keeping, and proper crop rotation and irrigation. The leading need is that on land planning itself, how best the farmers should plan their land for effective and efficient use.

Figure 3 below shows in pie-chart form the main physical planning information needs. It confirms the importance of land planning in the category as well as the fish keeping and soil erosion sub-categories.

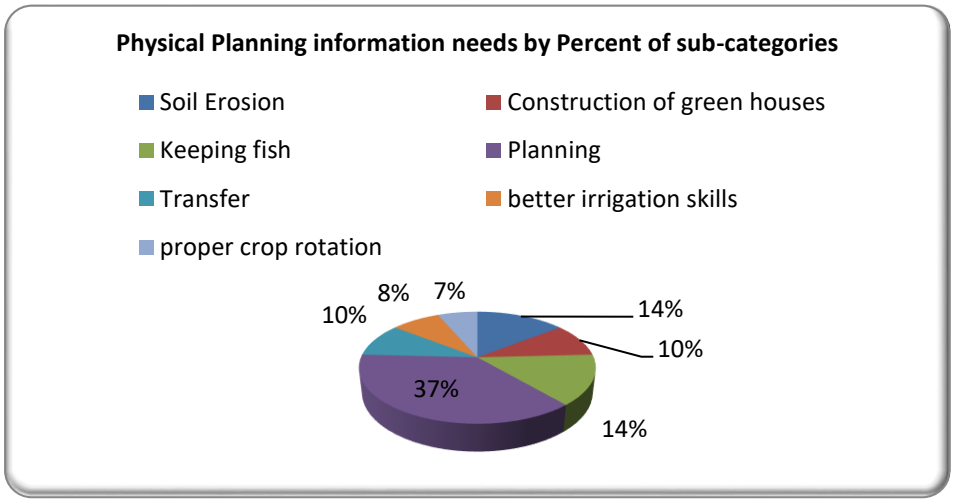


Figure 3: Key Information Needs on Physical Planning
Figure from data analysis

From the enquiry the researcher felt that the farmers were willing to share information on land planning and to work together to make better use of their limited land which is intensively used. They felt that information on planning would be beneficial to them economically, leading to better livelihood

4.3.3 Farmers' Information Needs on Agricultural Activities

The study established that farming community comprises subsistence farming and cash crop farming. During interviews, several different types of information needs emerged on agricultural activities.

These information needs are comprehensive and varied, but while all aimed at enhancing the efficiency of land use, the survey required respondents to pick their top information requirement in the sub-categories, to avoid multiple responses

Figure 4 below shows the main information needs.

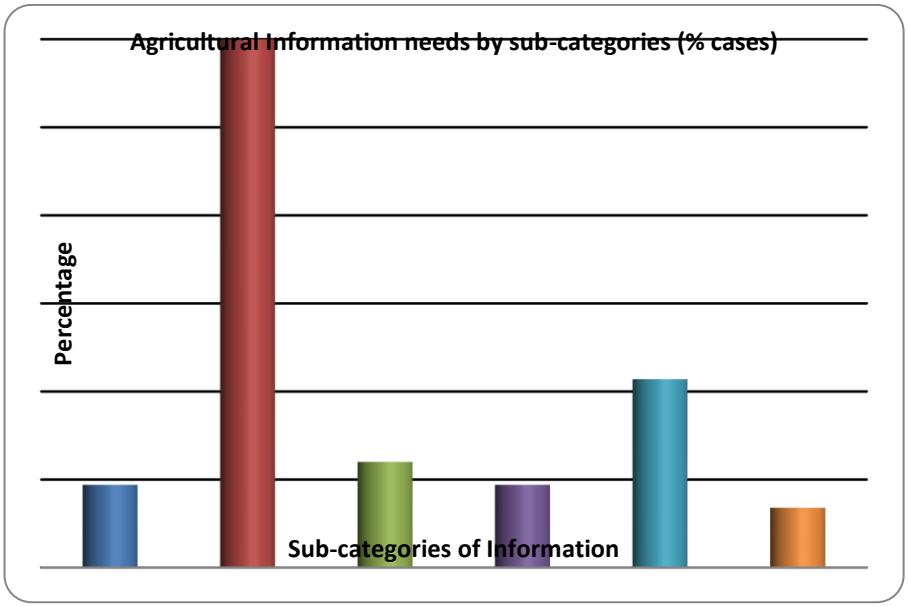


Figure 4: Main Information Needs on Agricultural Information
Figure from data analysis

The sub-categories of information needs that emerged includes.1) information on certified seeds 2) new farming technologies 3) horticulture farming 4) proper planting

5) proper breeding 6) beekeeping 6) 7) proper /nutrition on animal feeds 8) pest control 9) market and pricing of agricultural products 10) fish farming 11) soil composition 12) how to increase farm production 13) proper irrigation methods 14) soil erosion management 15) and cheap affordable farming methods 18. However, the survey required respondents to pick their top information requirement in the sub-categories, which narrowed responses to the six in Fig. 4.

The most important need for information by far was “New farming technologies”, cited by over a quarter of the respondents, 45 (27.1%) of respondents. The next in rank was information on certified seeds 16 (9.6 %) respondents, horticultural farming 9 (5.4%), proper use of fertilizer 8 (4.8%), Proper planting 7 (4.2) proper breeding 7(4.0%). Information on green housing farming 6 (3.6%), proper irrigation methods 6(3.6%), pest control 5 (3.0%) among others.

It is clear the most pressing need for information is on new agricultural technologies in different aspects of agriculture. Some needed information on seed varieties, certified seeds and how to manage the varieties throughout the growing period. Smaller percentages needed information on horticultural farming, on proper planting methods, proper breeding, proper irrigation methods and pest control. Several categories in this section were introduced by farmers themselves during interviews.

4.3.4 Information Needs on Environmental Aspects

On environment information needs, the respondent’s information needs were identified as information on seasonal variations, climate changes, water catchment, global warming. Others like tree planting and manure preparation were introduced during the interview. The survey required respondents to pick their top information

requirement in the sub-categories, to avoid multiple responses, and five (5) needs sub-categories emerged.

Information needs on environmental aspects are shown in figure 5.

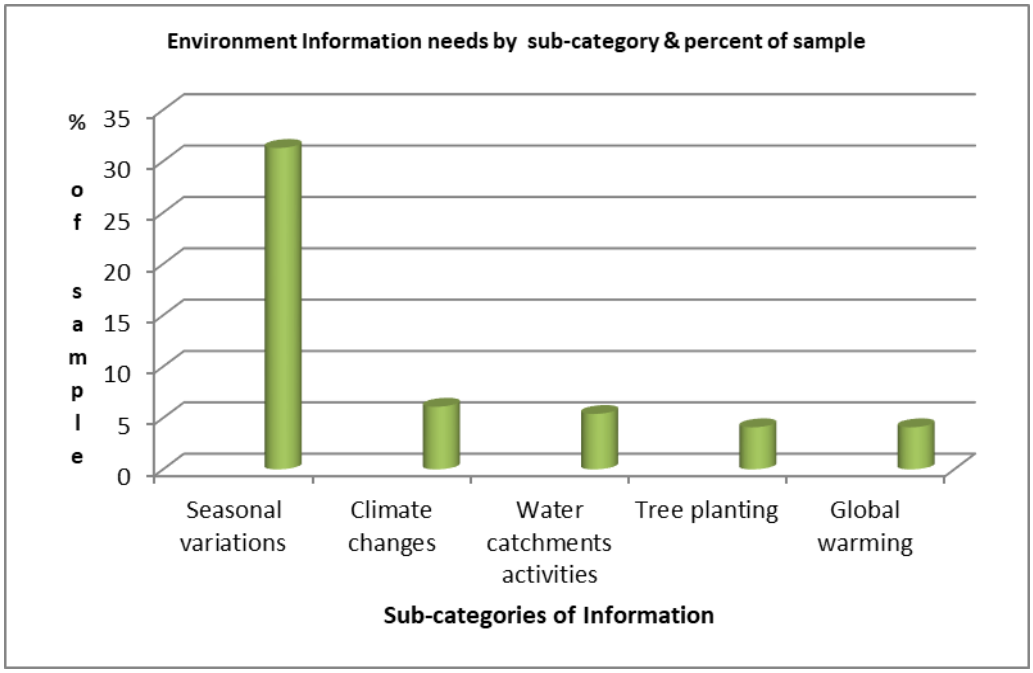


Figure 5: Main Information Needs on Environment
Table from data analysis

The most important information need is on seasonal climate changes 46 (31.3 %) and the effect of climate change on farming 9 (5.8%). The farmers were convinced that late planting was the main reason for low farm production. This was because they lacked information on the expected weather conditions and seasonal changes. Farmers needed to know about water catchment 8 (5.2%); tree planting 6 (3.9%) including which trees are better suited to which area; proper planting methods 5(3.2%); manure preparation 5 (3.2%); and Global warming 6 (3.9%). When asked about global warming the farmers said they have heard of it and did not know how it would affect them but were interested in getting informed on this aspect of environment. Despite environmental information being considered useful by some farmers 52 (33.5%) were not keen on seeking information in this category especially

the subsistence farmers who still largely depended on traditional ways of monitoring the weather patterns. Information on seasonal changes emerges as the most important information need. This is not surprising owing to deforestation that has taken place in the County especially during the last twenty years and which has impacted the weather pattern in the area. The need for information on water catchment is also because of dry weather conditions, which has affected the farming in general and especially food production leading poverty and hunger.

4.3.5 Information Required on Access to Credit

Access to information on credit facilities was one of the most important overall need cited by the respondents. To avoid multiple responses however, the survey required respondents to pick their top information requirement among the sub-categories. The farmers felt that financial support would empower them economically and hence assist them acquire what they would not otherwise be able to, with their limited resources. Figure 6 shows the most important credit related information needs.

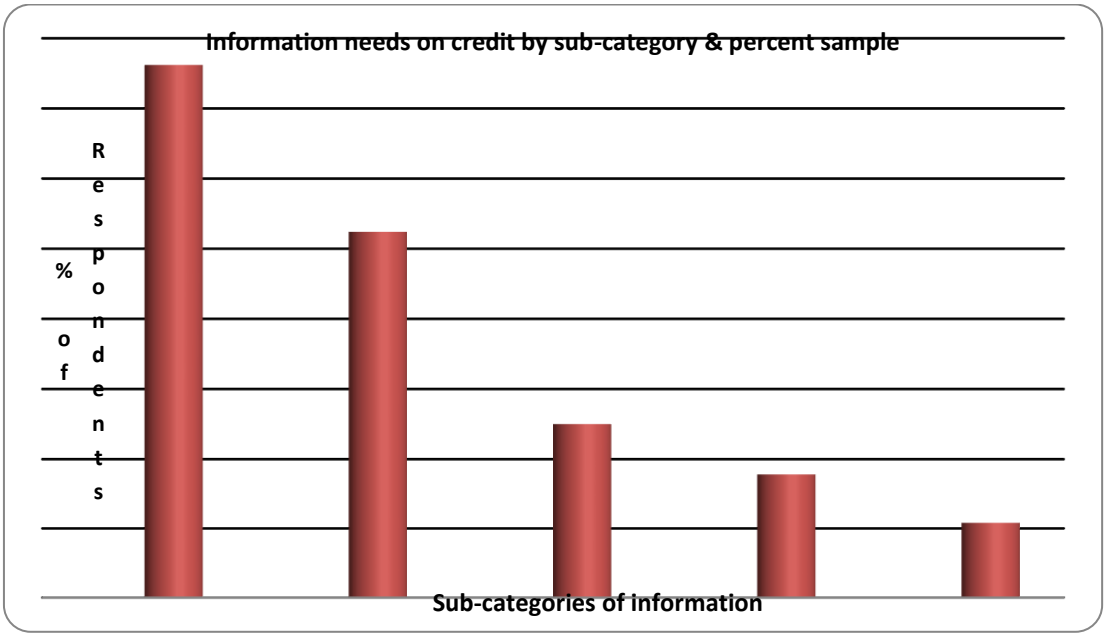


Figure 6: Information Required on Access to Credit
Figure from data analysis

Access to information on credit, the researcher identified 11 indicators signifying information needs. However, the most cited were the availability of loans 64 (38.1%); information on actual interest rates charged by financial institutions 44 (26.2%); and information on institutions that offered the lowest interest rates 15 (8.9%); information on other credit related services offered by financial institutions 9 (5.4%); and information on availability of government funds for farmers 5 (3.0%); which included not only loans in money form but loans in kind like fertilizers and seeds. The farmers were interested in information on the existing and kinds of credit programs that can be of benefit to them especially from financial institutions that were close to them. They indicated that they would be interested in information on varieties of loans available. Some farmers said they knew where to get loans but were not happy with the requirements set by some institutions. For example, some institutions only consider giving loans to trained and experienced farmers, others wanted to give only to registered groups and not to individuals because they believed that registered groups were more organized and easier to monitor their loan repayment.

Information requirement for this category was highly appreciated as only a small percentage of valid respondents 21 (12.5) signified they did not need information in this category showing a relatively high intensity of information needs compared to, say, land tenure or agricultural aspects information needs. The information needs on credit were directed at financial market, services, and conditions thereof. Even ‘Available government loans’ or ‘Availability of Youth Development Funds’ ranked relatively low. There is need for information on the availability of loans as indicated by the high percentage of information need in this category but the need to get information on interest rate and even on lowest interest rate charged, is a pointer that farmers are to some extent knowledgeable of their financial information needs. They

also wanted to have information on services offered by financial institutions which meant that they were aware that financial institutions had other complimentary services farmers might benefit from. The lowest information need is on funds from the government. This is an indication that the farmers have information on government facilities but like one farmer said the government should "reduce the many requirements that have to be met before one can access credit"

4.3.6 Information Needs on Legal Aspects

This category on information needs on legal matters in relation to access to and use of land related information was of great importance to farmers in Kiambu County. Disputes over land ownership, between registered owners of land and other people claiming an interest in the registered land are prevalent in Kiambu County owing to corruption. Table 10 below shows the main categories of required legal information.

Table 10: Main Information Requirement on Legal Aspects (n=150)

Required Information		Percentage
Availability of lawyers	22	14.6
Services offered by lawyers	12	8.0
Availability of insurance policy for	7	4.6
Availability of government lawyers	4	2.8
Legal local institutions	2	1.3
No idea	101	67.3
Farmers legal rights education	2	1.3
Total	150	100

Table from data analysis

The study revealed that in Kiambu County, most disputes over land involves family members over family land, especially because most land is acquired through inheritance. Besides matters related to land registration, many other disputes revolve around land transfer, and succession or inheritance. The farmers therefore are interested in information that can help them solve legal disputes on land issues. The need for information on availability of lawyers 22 (14.6%) is the most important in

this category, followed by service offered by lawyers 12 (8.0%). There were quite a number of those who did not seem interested in legal information 101 (67.3%) and were indifferent to the questions asked. Some did not understand what legal information entailed, while others, especially the less educated thought that legal information was somehow complicated.

The main information requirements on legal aspects are indicated in figure 7.

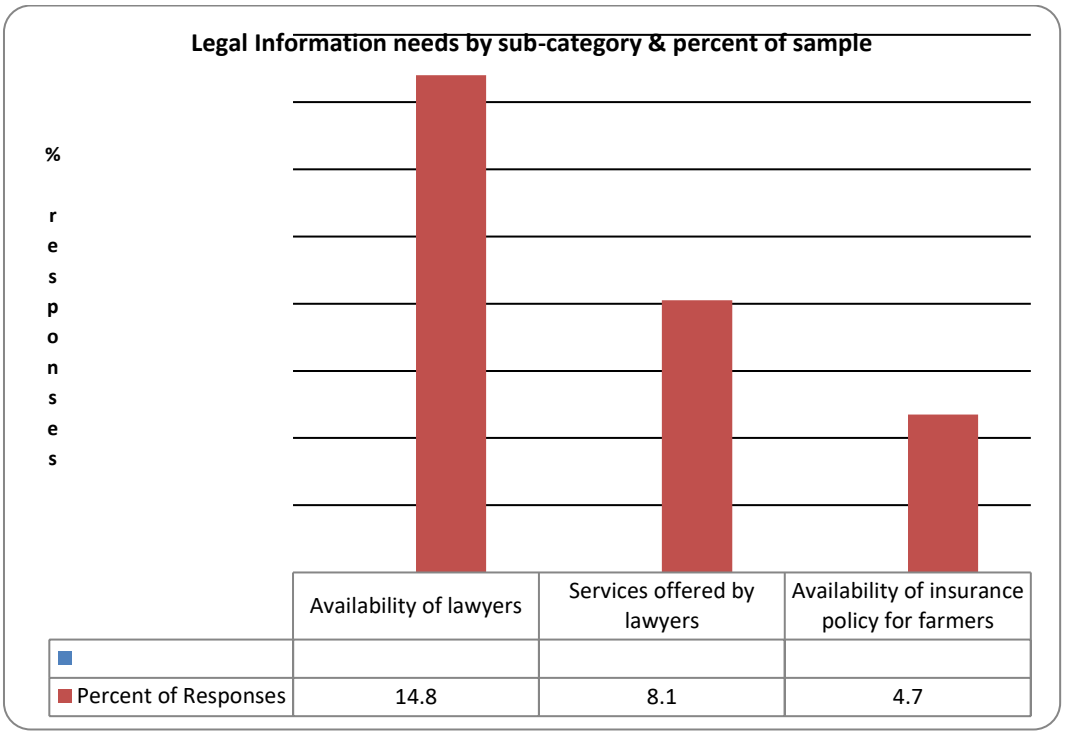


Figure 7: Main Categories of Legal Information Required
Figure from data analysis

From discussions with the respondents, it seemed as if several people did not understand the legal effect of registration. For example, many people were not aware that by not being registered as owners of a piece of land, they had ceased to be owners of the land or ceased to hold any interest in the land in the eyes of law. Farmers were aware of corrupt individuals and family members who knowing, registered family land as their own instead of registering on behalf of members as a trustee when a family member died. Women especially widows and their children have lost their land

through corrupt practices of members of their families. Farmers told stories of death threats related to land issues.

4.3.7 Overall 'Intensity' of Information Needs by Defined Categories

The study developed, interpreted, and considered overall intensity of information needs showing the hierarchy of information needs starting with the most important category as access to credit, followed by environmental aspects, agricultural activities, physical planning, legal aspects, and land tenure. The intensity of information needs is a ranking of the categories (and indication of the key sub-category) by the percentage of respondents requiring the information. Information on "Availability of loans" (a sub-category in Access to Credit) elicited the highest percentage of respondents requiring the information -38.1 percent. The second –ranked intensity was information on "Seasonal Changes" (a sub-category in Environment- 29.7 percent). The strength of information needs in each category is shown in figure 8.

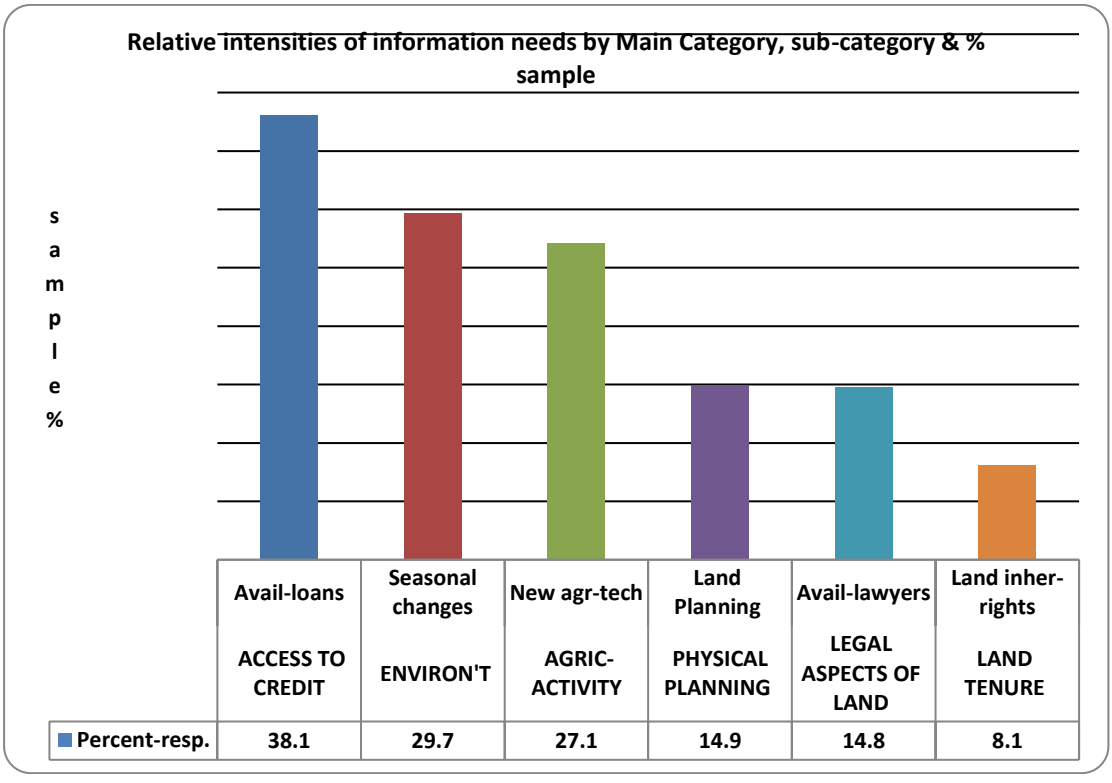


Figure 8: Intensity of Information Needs in Six Categories
Figure from data analysis

The most important information intensity was on access to credit and specifically availability of loans 38.1%. The two next ranked showed almost equal intensity. For example, information needs on the Environment, specifically seasonal changes 29.7% of respondents needing that information; and Agricultural activity, specifically new agricultural farming techniques, which showed 27.1%. Other important information needs are physical planning- planning 14.9%; legal aspects- availability of lawyers 14.8%; and land tenure- land inheritance rights 8.1%.

4.4 Information Sources

The main sources of information used by the farmers for different categories of information i.e., Land tenure, Physical planning, Agriculture activity -including farming and livestock, Environment, Access to credit, and Legal Aspects, vary as the following sections show. The sources are the Government, Cooperatives, NGOs, Churches, and people themselves, relatives, neighbors, friends, and colleagues.

4.4.1 Land Tenure Information Sources

The study sought to find out the sources of information on land tenure matters. The findings are as shown in table 11.

Table 11: Sources of Information on Land Tenure

Category label	(n=)	% of Resp.
Lawyers	2	1.3
Banks	2	1.3
From other people	6	4.0
Printed media	2	1.3
Salesmen	6	4.0
Audio media	3	2.0
No information access	69	46.0
Various cooperatives	13	8.7
Private entrepreneurs	2	1.3
Government	25	16.7
Administrative offices	2	1.3
Churches	9	6.0
NGO’s	9	6.0
Total responses	150	100

Table from data analysis

The study reveals that despite a relatively small percentage of respondents, the farmers that do seek information do not get enough information they need overall. However, information sources on land tenure show that 69 (46.0%) of the farmers said that the information on land tenure was not readily available and that for the information they received, the government was leading as the main source with 25 (16.7%); followed by various cooperatives 13 (8.7%); then churches 9 (6.0%); NGOs 9 (6.0%); individuals who share information with the farmers 6 (4.0%) and then salesmen 6 (4.0 %). The media, the banks and lawyers are less significant in this category. The leading sources of information on land tenure is shown clearly in Figure 10.

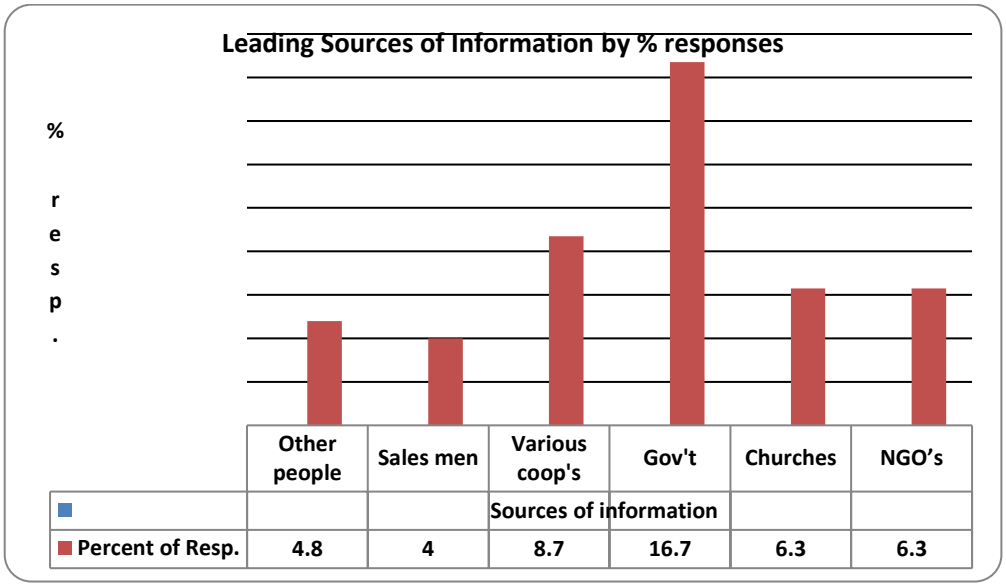


Figure 9: Leading Sources of Information on Land Tenure
Figure from data analysis

The fact that the government is the main source of information on land tenure is informed by the subcategories of information sort i.e., mainly 1. information on government trust land; 2) information on title deeds; 3) information on lease holding; 4) Information on land inheritance rights; 5) information on land surveying/demarcations; 6) information on land sharing; 7) on land purchase; and 8)

on land ownership, and title deeds. The nature of the information requested above is such that only the government has the monopoly of such information. The other information providers were the Cooperatives, the Churches, and the NGOs.

4.4.2 Information Sources on Physical Planning

The study sought to find out the sources of information on physical planning matters. The findings are shown in table 12 below.

Table 12: Sources of Information on Physical Planning (n=150)

Sources	freq.	% resp.
No information access	52	34.6
Cooperatives	32	21.3
Government	22	14.6
Salesmen	14	9.3
NGO	12	8.0
Other people	9	6.0
Churches	4	2.6
Own experience	2	1.3
Own personal Research	1	0.6
Lawyers	1	0.6
Capacity building programs	1	0.6
Total	150	100%

Table from data analysis

The respondents reported that they lacked information on physical planning in general but specifically acquired some information on physical planning from various cooperatives especially information on building sheds for livestock breeding, and information on access to markets. The information they got from the government was mainly on government plans like the road network, land transfer and, how to dig trenches to control soil erosion. The Churches and individuals (colleagues, friends, and relatives) shared information mainly on how to construct or improve building structures around the farms, borehole, among others. General lack of information is represented 49 (34.5 %). Under the 13 specific categories the leading source of

information was various cooperatives 30 (21.1%), followed by the government 20 (14.1%) then salesmen (9.2%) and NGO 11 (7.8%) and other groups and individuals 8 (5.6%).

Many small and big farmers in Kiambu County are members of cooperatives especially those in dairy farming, tea, coffee, and pyrethrum. The cooperatives have programmes and demonstrations where farmers learn several things aimed at improving their products including new innovations. Members of Cooperatives are provided with information that help to improve the quality of products, seed, dairy, or physical planning. The government agents provide information on many aspects especially on regulations and standards and therefore it is no wonder that it also provides information on issues related to physical planning as well.

4.4.3 Sources of Information on Agricultural Activities

The study sought to find out the sources of information on agricultural activities shown in Table 13.

Table 13: Main Sources of Information Agricultural Activities (n=150)

Sources	Frequency(n=	% Resp. rate
Cooperatives	68	45.3
Salesmen	19	12.6
NGO	19	12.6
Government	13	8.6
No information access	12	8.0
Churches	9	6.0
Other people	5	3.3
Print media	3	2
Audio media	2	1.3
Total	150	100

Table from data analysis

The responses from respondents indicate that out of the fourteen categories of specific sources of information on agricultural activities, most of the information came from various cooperatives especially information on agricultural loans, on farm inputs, information on certified seeds, new farming technologies, proper nutrition, on animal feeds, and proper breeding. Salesmen from different companies were sources of information on pest control. The NGOs and the Churches provided some information on general farming education while the government, was the main source of information on soil erosion management and sometimes information on the use of fertilizers.

Under the 14 specific categories the leading source of information was various cooperatives as indicated by farmers 69 (41.8%), salesmen 22 (13.3%), NGOs, 22 (13.3%) the government 16, (9.7%) and the churches 11 (6.7%). Information on agricultural activities is generally available as compared to other categories of information for example general lack of information was 15 (9.0%) as compared to general lack of information on land tenure 53.3% and physical planning (37.4%).

The results further indicate that in their search for information on agricultural activities, the respondents were well catered for by their cooperatives and salesmen, NGOs and to a lesser extent the government. This is because agricultural activities are varied and will attract traders and business enterprises. There are those agents that supply information on issues like fertilizer, insecticides, and animal husbandly. These agents take the information to farmers themselves with the aim of promoting their products.

4.4.4 Information sources on environment

The study sought to find out the sources of information on environment. The findings are as shown in Table 14.

Table 14: Sources of Information on Environmental Issues (n=150)

Sources	(n=)	Percentage response rate
Government	43	28.7
No information access	41	27.3
Various cooperatives	25	16.6
Audio media	13	8.6
NGO	9	6.0
Churches	8	5.3
Banks	1	0.7
From other people	2	1.3
By experience	2	1.3
Recurrent seasons	2	1.3
Printed media	1	0.7
Salesmen	2	1.3
Own personal research	1	0.7
Total	150	100

Table from data analysis

As is the case with land tenure, the government is the main source of information on the environment, especially on issues like climate change, global warming, and tree planting. Cooperatives societies and audio media as sources of information were second and third followed by the NGOs and the Churches. The farmers however expressed their views that sources on environmental issues were not easily available within the County.

The analysis as table 15 shows, most of the information on environment came from the government 43 (28.9%), from various cooperatives 21 (14.1%), the audio media especially the radio and the television 14 (9.4%) the NGO 10 (6.7%) and churches 8 (5.4). However, from the analysis the indications at 42 (28.2%) respondents, show that information sources on environment were not easily identified and hence not readily available.

The results show that most sources of information are those whose agents take information to farmers rather than farmers going to the sources. The farmers indicated that the extension workers brought the information to them. The NGOs and churches also brought in information close to the farmers. Information from cooperatives is passed to them at meetings, seminars, or individually to farmers when they go to correct seeds, animal feeds and pesticides.

4.4.5 Access to credit information sources

The study sought to find out the sources of information on credit facilities as presented in Table 15.

Table 15: Sources of Information on Access To Credit (n=150)

Source	(n=)	Percentage response
Cooperative	80	53.3
Banks	20	13.3
Government offices	18	12.0
Churches	10	6.6
NGO's	10	6.6
No information access	7	4.6
Salesmen	3	2.0
Other people	2	1.3
Total	150	100

Table from data analysis

In analyzing the sources of information on credit, the study found that cooperatives were the main providers of information as indicated by the number of farmers 80 (53.3%), followed by the banks 20 (13.3%), the government 18 (12.0 %), then churches 10 (6.6 %) and NGO 10 (6.6 %) each, respectively. Information from other sources was at 2 (1.3 %). Access to information on credit was shown as the most accessible category of information since only 7 (4.6%) did not get access to information on credit facilities, compared to those not getting information on land tenure 58 (46.0%); physical planning 49 (34.5%); agricultural activities 15 (8.5%);

environment 42 (28.2%). Information sharing among the farmers and from print and audio media was less significant.

The study has shown therefore that various cooperatives and specifically not the banks were by far the main sources of information on credit facilities, followed by the banks, the government then Churches and NGOs. One farmer said,

> *"Before we used to get information from the banks". Banks used to give us pamphlets when we visited them. Sometimes banks discussed with us details on what was required from us by the banks and not so much about us. Now we have our organizations (cooperatives and other groups "Chama"), that come to us. Now we are not short of information on access to loans, we worry about payments. We do not want to give our land as collateral".*

In summary, cooperatives were the main providers of information on credit facilities. The farmers felt that the NGOs and Churches were good at passing on information on access to credit from other institutions like banks and international organizations. The NGO's and Churches were mainly concerned with information on the use of finances rather than the credit facilities. They believed though access to information from capacity building groups, Salesmen, printed and audio media was limited, the information they gave was specific to them, on how to access credit, on how to use it; and inform farmers of the consequences if the farmers defaulted.

4.4.6 Legal aspects information sources

The study sought to find out the sources of information on legal aspects. The findings are as shown in Table 16.

Table 16: Sources of Information Legal Aspects (n=150)

Sources	(n=)	% resp. rate
No information access	86	57.3
Government	36	24.0
Cooperative	11	7.3
Lawyer	5	3.3
NGO	5	3.3
Other people	3	2.0
Own experience	2	1.3
Churches	2	1.3
Total	150	100

Table from data analysis

The study revealed that sources of information on legal matters was not easily accessible as indicated by the number who could not access it 86 (57.3%). However, the study revealed that farmers sources of information on legal information from eight categories of information sources was mainly the government 36 (24 %), and various cooperatives 11 (7.3%). Others were the NGOs, 5 (3.3) lawyers 5 (3.3) then churches and other people.

Farmers need legal information only when they have disputes or transactions to perform. So, when disputes arise on land related issues, the easiest place to go to is to the law enforcing body which is the government. In Kiambu County, the research learnt when interviewing farmers, family members have been deprived of their land, especially women, widows, and their children. Some are alleged to have been thrown out of their homes or killed by their family members through corrupt practices within and without the government.

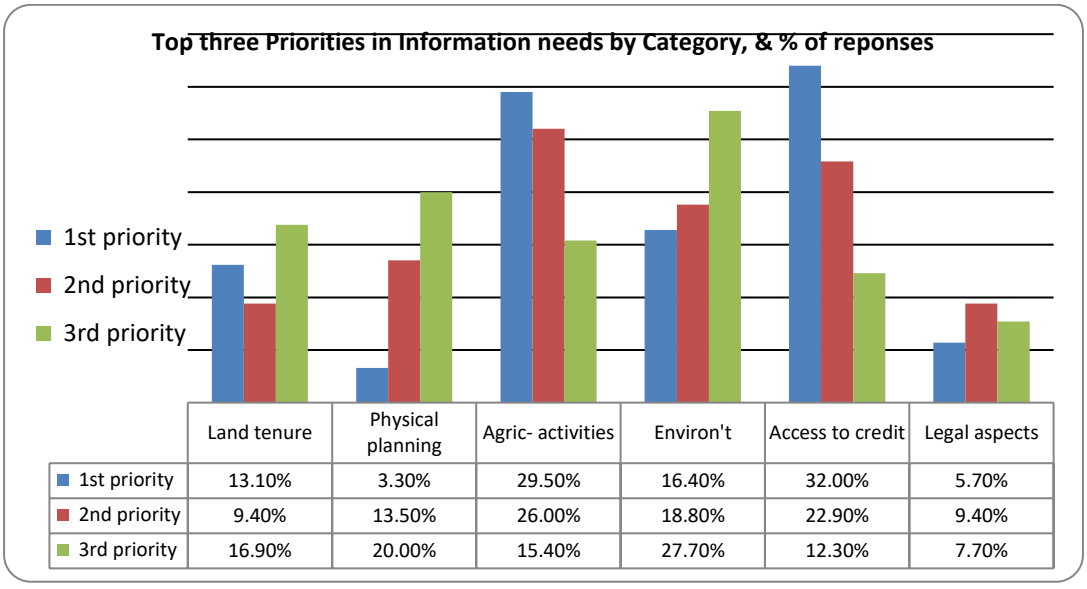
In a segment with little information access to the farmers, (to the tune of 67.3 per cent) the main source of legal information for farmers is the government. This is information on availability of lawyers, services offered by lawyers, farmers legal rights education, local legal institutions, and availability of government lawyers.

Rural people are skeptical of private lawyers. They have faith in the government. The other sources of information on legal information (though indirectly) are various cooperatives, the NGOs, and the Churches though not significant.

In summary the Churches, NGO and Coops are identified as meeting the information needs that are closer to the practical and applied activities like agricultural activities, environment, and access to credit and not information that require processing like information needs on legal aspects, land tenure and physical planning. Agricultural activities, environment and access to credit remains the most important categories of accessed information whether information is provided by the cooperative, the government, or the churches among other sources.

4.4.7 Information Preference by Identified Categories

The study sought to find out the preferred category of sourced information among the six categories. The responses displayed varying and interesting priorities as shown in Figure 10.



	Land tenure	Physical planning	Agric- activities	Environ't	Access to credit	Legal aspects
1st priority	13.10%	3.30%	29.50%	16.40%	32.00%	5.70%
2nd priority	9.40%	13.50%	26.00%	18.80%	22.90%	9.40%
3rd priority	16.90%	20.00%	15.40%	27.70%	12.30%	7.70%

Figure 10: Priority of Information Sought among the Categories

The leading information priorities are on access to credit (32%) and agricultural activities (29.5%). The top second priorities are also in the same categories but reversed to favor information on agricultural activities (26%) over access to credit (22.9%). The highest 3rd priority is information on the environment, followed by information on physical planning. For the information sought from cooperatives, Churches and NGOs, the top information priorities by respondent percentages were again on access to credit (58.1%) and agricultural activities (27.9%).

This data shows the most popular information sought was information on access to credit, followed closely by agricultural activities. This is mainly because such information is closely related and connected with what the farmers do on daily bases. Indeed, during the interview, the farmers added some categories on agricultural activities that the researcher had not included in the interview schedule. Within this category of agricultural activities, planning was the most popular and the study established that planning was popular given that the farmers had small pieces of land and they needed better planning methods that would result in maximum yields and economic gain. The next preferred category was information on access to credit, environmental aspects and land tenure, respectively.

From the analysis, the farmers are shown to have a lower preference on legal aspects, physical planning, and land tenure. Physical planning was not that important to them. From the interviews the author could detect that discussions on information related to land tenure and legal matters were sensitive. There were farmers who felt that land tenure issues should not be discussed with strangers. Others especially women were afraid of discussing the topic simply because matters of land in Kiambu county is a prerogative of men who are the inheritors and not women. There were men who did not want their wives to answer any questions on land. For example, one man found

me interviewing his wife, a bright woman from a “Kahuhu Clan”, She has attempted to give a historical aspect of how Kahuhu clan land had been subdivided. She was reminded by her husband, *“Mundu wa kuma nanja ekumenya atia?”* meaning “What does a newcomer (woman married into the clan) know about land here”. The woman happened to have come from “Gituamba” another range and married in Githiga area. But the idea was to discourage and stop her from expressing her views on land matters. Legal aspects category was equally a sensitive issue. It was the least embraced. The farmers did not believe that legal information can be made accessible easily. To most farmers, legal information was found almost at the highest government level almost next to courts. Hence accessibility of legal information means first demystifying it, i.e., that legal information is like any other information and can be accessible or made accessible.

4.5 How Farmers Used Available Information

The study presents and analyses how the farmers used the available information to satisfy their information needs, using the six categories presented which are land tenure, physical planning, agricultural activities, environment, access to credit, and legal aspects.

4.5.1 Use of Available Information on Land Tenure

On land tenure, despite little demand for information, the little information the farmers managed to get, led them to information sources on and to government agencies that helped them settle disputes on land issues especially on inheritance rights, sharing of land and presentation of title deeds when they requested information or services on the same. Land related issues have been embedded in traditions and culture in Kiambu County and this has led to land deprivation, social unrest, and poverty. Information passed from the government has assisted some farmers in land

demarcation, sorting problems on land disputes over inheritance rights issues. Issues such as women inheritance right have been settled through meetings with family, clan, and the chiefs and through advice given at *Barazas* on peace keeping among family and the community. However, information is not easily available and hence the government efforts have been supplemented by Cooperatives, NGOs, the Churches and Farmers sharing information.

4.5.2 Information Use on Physical Planning of Land

The findings established that the farmers have been able to make use of the information they have managed to acquire to improve their farms by introducing other farm products. The information in this category is mainly supplied and acquired from cooperatives. Some farmers on learning about fish growing took the initiative to ask government agents to help them build fishponds and they are now fish farming and earning income. One farmer told the researcher,

> *"I did not know that fish can be grown here, now we are eating fish in Gikuyu land, unbelievable!"*

Some farmers had been helped in planning, especially physical planning, basically where to put structures, identifying where boreholes can be dug and how. Several farmers had lost their lives through suffocation, trying to dig and construct boreholes without any guidelines on how to do so, and now using information some have acquired the skills in borehole construction. There are those who have improved their livestock sheds by keeping them and their animals clean. One woman told the writer that the cooperatives have educated them, especially in hygiene. She said that the cooperatives do not accept contaminated milk.

> *"When you take your milk, it is inspected and if it is not clean you take it back with you and this is money lost* "

The farmers reported having made profit because the little information they have acquired have contributed to the improvement of their products and in better and profitable use of their small pieces of land.

4.5.3 Farmers Use of Information on Agricultural Activities

In agricultural activities the farmers have made use of information in a wide range of activities since information seeking on agricultural activities has not been as problematic as in the other categories. The farmers have used the little information they get to enhance efficiency of their land use. How to increase farm production for example by practicing zero grazing and proper breeding, identifying different types of seeds appropriate to the climate in the area, including high yield crops, practicing good farming methods and use of technology; learning new farming skills; discovering new markets for their produce and market pricing of agricultural products. Besides, the farmers have learned new things like fish farming; proper nutrition on animal feeds; pest control and more specifically management of cash crops, livestock and crop management and planning. Overall, the information they have been able to get has made them more informed especially on making profit from their farming activities.

4.5.4 Use of Information on Environmental Aspects

The study found that on environment aspects, the farmers valued information on seasonal changes, specifically because it informed them, for example when to plant and which crops to plant. Also, in managing soil erosion, and proper food storage. Information has helped the farmers in tree planting guiding them on which trees to plant on which area and when. Some farmers talked about the Greenbelt movement that have helped them understand the value of trees. They have also learnt from the acquired information about manure preparation. Some of those interviewed said they

have also understood the government policy of forest conservation and how water catchment area impacts the environment.

4.5.5 Use of Available Information on Credit Facilities

The study found out that several farmers especially those with bigger pieces of land had made use of the available information to get loans and were using the money from the cooperatives and banks to finance some of their projects like construction of boreholes and increasing their dairy animals or planting additional crops. Credit information is more intensively acquired from cooperatives than from banks. However, in some cases the loans they received from the cooperatives were in kind. For example, dairy farmers can get animal feeds and pesticides and pay at the end of the month from their milk which they deliver daily to the cooperative. The cash crop farmers, especially` those growing tea, coffee and pyrethrum used the money to buy equipment, transport facilities to help them get produce to the markets. However, for the small farmers, the loans they got were extremely limited since they could not service big loans. They were interested in getting more information especially on financial institutions that support them to access bigger loans which they can service for longer periods, from what the banks and cooperatives offer. Also, other services offered by the same financial institutions like training, and skills development on financial management.

4.5.6 Farmers Use of Available Legal Information

The study found that in their use of information on legal aspect, the farmers were overly cautious especially because most information they sought was on land related matters, information on dispute settlements, over land ownership, information between registered owners of land and other people, and land inheritance rights. Farmers have used information to register their land and in land transfer. Several

women and especially widows and their children have used information on legal matters to try and recover their land that had been taken from them by the family of their deceased husbands. Some farmers have sought information from talking to their friends and other people and sometimes the information they receive is not reliable causing many problems. Several farmers have lost their land through corrupt practices not to mention that some have even lost their lives even after the use of “reliable information” from lawyers to recover stolen land. Information has also been used in search for reliable lawyers and details about their specialization, their services and availability. Some women interviewed reported that the acquisition of legal information has empowered them and given them freedom and power to make informed decisions on their acquisition and use of their land even if the success rate is low.

In summary, the study established that the farmers used the little information they gathered to improve their livelihood in many ways, and this depended on the category of information sort. Information has helped farmers obtain land titles, plan their land, acquire equipment, access markets, and make profit, understand seasonal variations, access credit. In the case of widows and their children, legal information has assisted in settling disputes on land issues. Hence the use of information however little, in all the categories have contributed to enhancing the welfare of the farmers and in improvement of their livelihoods.

4.6 Channels Used for Information Presentation

The study present channels used in information presentation. Figure 11 shows the main information channels.

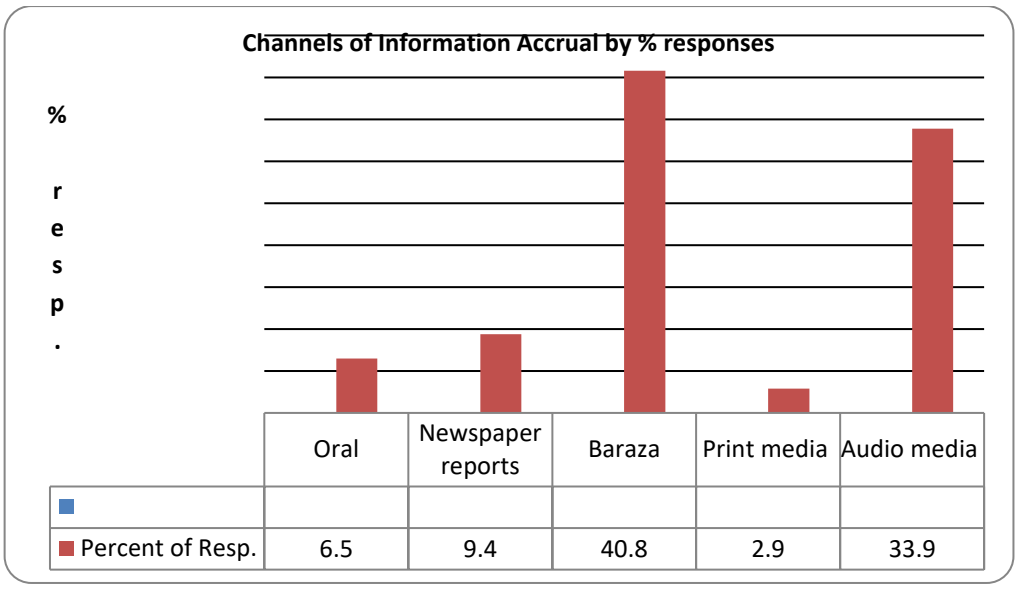


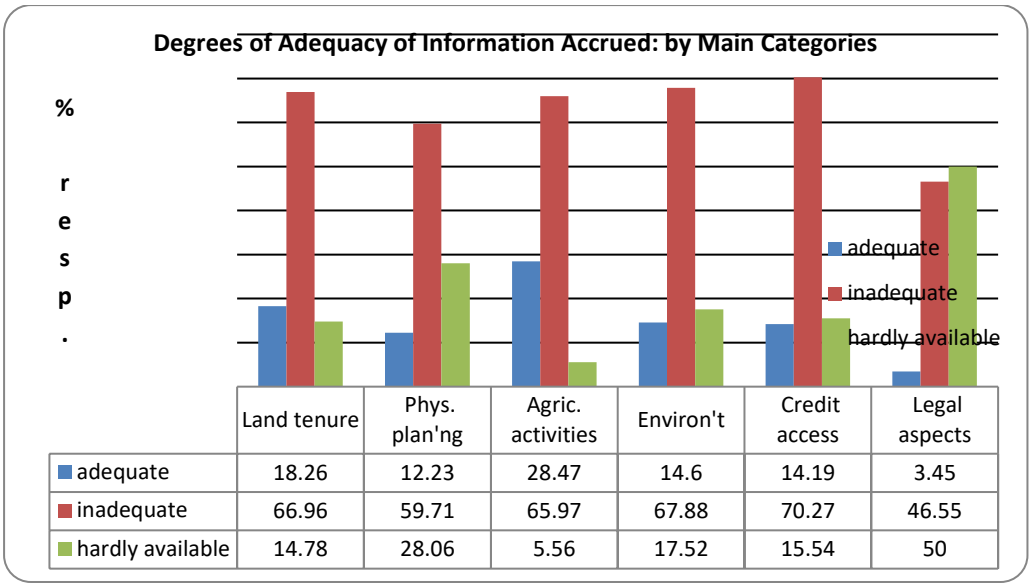
Figure 11: Channels Used for Information Gathering and Distribution

Among these channels, by far the most important channel is the *baraza* 113, (40.8) followed by audio media, specifically communication by the radio 94 (33.9% and Newspaper reports 26 (9.4%).

Through discussions with the farmers however, it was apparent that majority of men attended meetings and only a few women attended, whether organized by the government agencies including *barazas*, and those organized by NGOs. Women had excuse that they did not have time to attend as they had several household chores to attend to. Sometimes permission was required from their husbands for the women to attend meetings and b*arazas*, and it depended on whether it was granted or not. Hence, most women preferred receiving information by word of mouth. Besides the men oversaw radios and all the other ‘‘gadgets” at home so that sometimes the women hardly used the radio when the men were at home. However, several women said that they often listened to the radio often during the day while doing their household chores since men left the radios at home given that they spent most of the day away from home.

4.7 Adequacy of Accessed Information

The study presents results on adequacy of information accessed on Land tenure, Physical planning, Agricultural activities (including farming and livestock), Environment, Access to credit, and Legal Aspects. Adequacy of information here means satisfactoriness. Most respondents thought that the information they got in most categories was inadequate as is clearly shown in figure 12.



	Land tenure	Phys. plan'ng	Agric. activities	Environ't	Credit access	Legal aspects
adequate	18.26	12.23	28.47	14.6	14.19	3.45
inadequate	66.96	59.71	65.97	67.88	70.27	46.55
hardly available	14.78	28.06	5.56	17.52	15.54	50

Figure 12: Adequacy of Information Accessed
Figure from data analysis

On land tenure out of the 150 respondents, only 21 (18.3%) responded that the information was adequate, 77 (66.7%) responded inadequate, 17 (14.8%) responded hardly adequate. On physical planning only 17 (12.2%) said information was adequate, 83 (59.7%), not adequate and 39 (28.1%) hardly available. On agricultural activities, 41 (28.5%) said information was adequate, 95 (66.0%) said it was inadequate and 8 (5.6%) said it was hardly available. On environment 20 (14.6%) adequate 93 (67.9%) reported inadequate 24 (17.5%) hardly available. On access to credit 21 (14.2%) said it was adequate, 104 (70.3%) said it was inadequate and 23 (15.5%) said information was hardly available on legal aspects. Legal aspects 4

(3.5%) said it was adequate 55 (46.6%) said it was inadequate 57 (50.0%) said information was hardly available.

The study assessed the overall adequacy of information accessed by the respondents. Information access is largely inadequate in every category. Importantly the highest degrees of inadequacy mirror the priorities of information needs for example credit access, environment, and agricultural activities. In an environment of generally low adequacy, the study considered *relative* adequacies across the categories. The information on agricultural activity had relative adequacy than say, environment or access to credit. Information on legal aspects led in the section 'hardly available' followed distantly by information on physical planning. Information on credit access lead in inadequacy of information simply because this is the information, farmers mostly needed and therefore most farmers did not get enough of it. On environment, the information is not easily available and on land tenure only those farmers who were not satisfied with land distribution for example women searched for information.

4.8 Preferred Mode of Information Delivery

The study sought to find out the modes of information delivery that the respondents preferred. A number of those interviewed and especially women preferred "Word of Mouth mode" (communications, with neighbours, friends, and relatives) as shown in Figure 13.

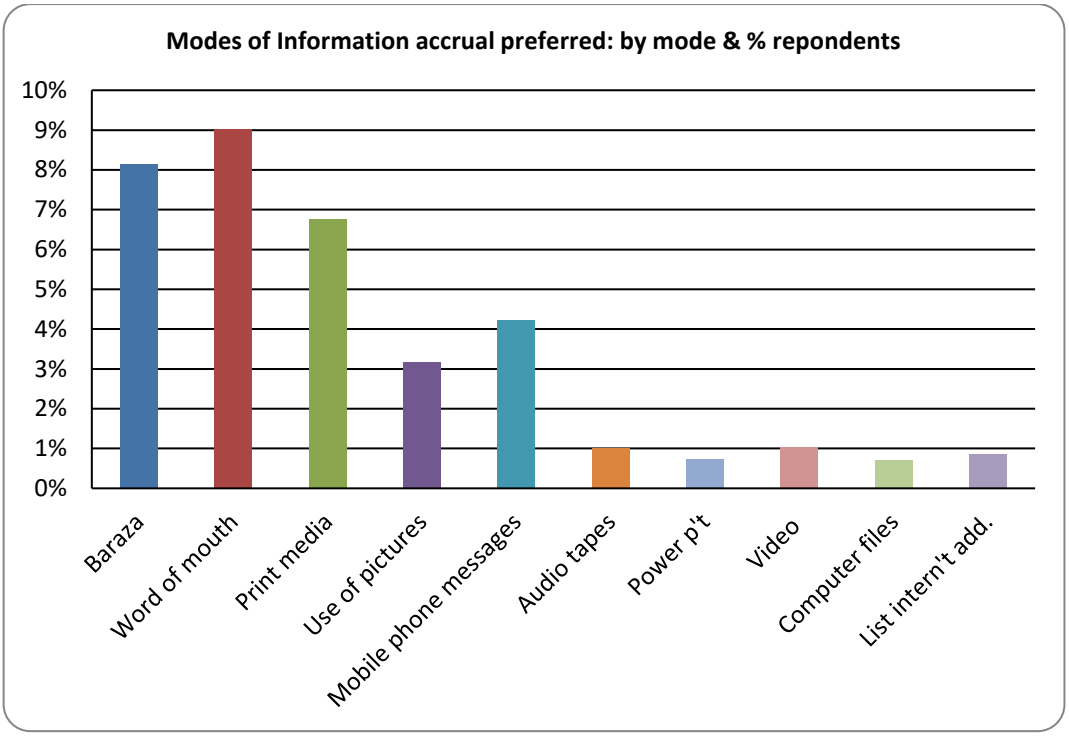


Figure 13: Average % Preferred Mode of Information Delivery
Figure from data analysis

However, b*arazas* was thought as the mode better suited for formal information delivery especially information from government officials. Print media was popular with educated men, and communication using mobile phone was catching up as an important media for all farmers.

Though majority preferred "Word of mouth" communication, it was sometimes found to be not reliable because the information that was delivered was sometimes exaggerated and or distorted. For example, in one of the annual *barazas*, the Chief had been asked by the head of a farmers' cooperative to announce the visit of a Kenya Power Company official who was to assess the rural power distribution, through Government Rural Electrification Project. The farmers had been asked to attend a meeting to meet the power official the following week. However, the information that was passed around by word of mouth to those who did not attend the baraza, was that only those who can afford to pay for electricity were requested to attend the meeting.

This disinformation was common and one man who attended the meeting when asked what the message of the meeting was, he said that the meeting was for the “rich farmers only” which was not the case.

Chief’s baraza was the next popular mode of communication. Unfortunately, only a few women farmers attended such meetings as they were very much involved in many activities, including drawing of water, as “child minders” and carrying on other household chores. Even though not attended by most women and considering all the factors, *barazas* remained the most preferred mode of communication.

4.9 Challenges on Accessing Information

The study showed that there were general challenges that cut across all the categories discussed which included illiteracy and, low level of education among the young people and women which inhibited access to information. Other factors include cultural practices and land ownership, lack of and ignorance of existing information sources, proximity to sources of information, cost of accessing information, transport costs, and corruption. The specific challenges on each of the information needs are discussed hereafter.

4.9.1 Challenges on Accessing Information on Land Tenure

The study established that the main challenges on accessing information related to land ownership were ignorance, owing to cultural practices and illiteracy. For example, some landowners did not think they needed any information on land issues especially on ownership until problems arose and they had to frantically look for it only to find out that the information was not readily available, or where available not sufficient, relevant, accurate or timely. Cultural practices denied women access to information concerning land issues, even though women were the main users of land.

This is because most of them did not own land. Some landowners' hide information especially from their families owing to cultural problems, associated with inheritance rights, and conflicts associated with land ownership. Other challenges include cost of accessing information, internal fees charged and transport costs to land offices.

Consequently, these challenges faced in accessing information hindered farming development. The respondents reported that in some cases, where there were land disputes between families, some farmers were reluctant to develop the land as they fear spending resources to develop the land only for the land to be taken from them later. This resulted in farmers not using land tenure to seek for credit to develop their land. Besides land with dispute, could not be used as collateral. Land that could be producing much more for the family and bringing in income, produced less than what the family required, and the result was poverty. One important realization was that owing to inheritance rights, most of the land had become subdivided and reduced to small pieces of plots that were not economically profitable to cultivate.

4.9.2 Challenges of Accessing Information on Physical Planning

The farmers' main problem was their ignorance of information sources on land and farm physical planning and the fact that information on planning of land was not easily available. As in the case with information on land tenure, most of the information on physical planning is available only in government offices in urban areas. Costs of travelling to information sources in urban areas from the rural areas in Kiambu is costly and time consuming. Lack of information on planning meant poor use of land, hence low production, and poor quality of farm products.

4.9.3 Challenge of Accessing Information on Agricultural Activities

The main challenges of accessing information on agricultural activities were lack of skills that are needed to access to and use existing information, lack of infrastructures such as communication infrastructure that would facilitate access to “new farming technologies”, and cost of accessing information. Cultural practices hindered especially women from going to search for information and educational levels of farmers and shortage of information sources were related. The study also noted indifference by farmers caused by lack of understanding for example, farmers could not forego activities they considered paramount, such as planting or digging to go searching for information. Although farmers needed information, some of them could not comprehend the benefits of information.

4.9.4 Challenges of Accessing Information on Environmental Aspects

The study established that most farmers could not articulate their environmental information needs and were not sure of the information they needed although they were keen on being informed of seasonal changes. Another challenge was that environmental issues were not easily identified, and hence not readily accessible particularly to the illiterate and semi-illiterate on matters environment. In some cases, the information they were able to get was neither timely nor reliable, so farmers were not sure when to plant which crop. Cash crop farmers like tea and coffee growers cited lacking information on changes in weather patterns. Information on weather patterns is useful in making decisions on when to prune crops. This impacted on crop production resulting in low quantity of produce and therefore to losses.

4.9.5 Challenges of Access to Information on Access to Credit

The main challenge in this category was unavailability of enough information on credit facilities. These were challenges associated with financial institutions. Farmers

found that some bank-based information was complicated, and sometimes presented in a format that was not user-friendly. They also felt that the main banks provided information that was directed at benefiting the banks other than the farmers. Information, for example on interest rate charged by these banks was not presented in simple form that farmers would understand. Some farmers were therefore hesitant in applying for loans especially the small-scale farmers who felt that they might not be able to service their loans. This had an impact on not only crop production but on farmers' income for without credit farmers could not produce enough and surplus for sale.

4.9.6 Challenges of Accessing Information on Legal Aspects

The study revealed that most farmers were not as keen as expected on seeking information on legal matters related to land and farming, because of ignorance, and law literacy level. The legal language of some documents was a challenge to those rural farmers of modest education not to mention the illiterate farmers in the county. Information on legal matters was provided by government offices and as hence, reaching to these sources of information was a challenge, considering time and cost. Besides, government bureaucracy in access to such information is slow and tiresome and this leads to corruption, where corrupt legal officers demanded money for services provided and this made legal information inaccessibility. Information on availability of lawyers was not readily available. Besides, private lawyers were not accessible to farmers because of the prohibitive charges they quoted.

4.10 Possible Solutions to Closing Gaps on Access to and Use of Information

The study reveals that to close the gaps on access to and use of information, there is need to raise the level of literacy. The study found that farmers with high literacy

level performed better, because they could gain much more from audio and visual communications, and from meetings and *barazas*.

For improving information usage by especially the less educated farmers, information providers should repackage information fit for rural farmers and community at large.

That information needs to be brought close to the farmers. Proximity to information sources was found as key to accessing information. Information should be brought close to the people (especially women), so that they can spend little time looking for it.

Communication infrastructure including electricity should be improved to facilitate efficient and economical use of information technology including use of mobile phones, radio and television, information channels the farmers were using as revealed by the study.

The study revealed that the farmers who owned bigger pieces of lands were more interested in searching for information than those who did not have or had small pieces of land. Therefore, information on right to own land by men and woman should be effectively communicated by both National and County governments. In addition to providing the farmers with information about land and farming activities, they should be facilitated to acquire ownership of their land so that they can use it effectively especially for credit access.

The study revealed that women more than men were involved in agricultural activities, but they were more illiterate, and could not leave their homes, (their center of activity) to look for information. Hence women needed information to be brought closer to them. An information resource centres equipped with modern information

technology, should be built close to the farmers within the county where farmers would access the information they need.

4.11 Possible Uses of ICT in Access to and Use of Land Related Information

The study established that farmers to some extent used radio communication to pass information to farmers, although most farmers, found oral communication as the most effective means of delivering information. The study also established that farmers made use of mobile phones, radio, television, and internet as communication tools. The use of ICT devices to some extent played a role in enhancing the capacity of the farming community. These devices are important especially in information and knowledge sharing and could be used to share information on title deeds, planning, modern agricultural technology, climate change, access to credit and on legal aspects and others. ICT can assist in all aspects of land information practices and by default in effective and efficient land use. However, the high cost of ICT devices, erratic power supply and poor connectivity in the rural areas including skill development will require a combined effort of national and county governments, the farmers and information providers. Use of ICT is the future for sustainable land management and use in Kenya and Kiambu County in particular

4.12 Chapter Summary

This chapter presented and discussed data analysis and presentation and interpretation of the study. The aim of the study was to investigate, access to and use of land related agricultural information in Kiambu county and suggest possible solutions.

The qualitative data was presented and analyzed using qualitative techniques on identified categories while quantitative data was analyzed using descriptive statistics to summarize the findings in terms of frequencies, percentages, and intensities. The

chapter discussions followed the main lines of inquiry which are how farmers seek; access and use information; information sources; adequacy of information access and delivery for effective use; how the respondents would prefer it delivered; what the recipients use it for; information gaps that remain in information access and delivery; challenges and consequences encountered; and possible methods of improvement of the system including the use of information technology. The findings will be expounded in chapter five

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CHAPTER FIVE

SUMMARY OF FINDINGS

5.1 Introduction

This chapter presents a summary of the findings. The study investigated access to and use of land related agricultural information by farmers in Kiambu County in Kenya. The study makes use of Niedzwiezka's new proposed behavior model which incorporates aspects of information needs, information seeking and information use. The findings revealed that the farmers' information needs were information on land ownership or land tenure; information on planning of their land; on agricultural issues; on environmental aspects; information on access to credit; and on legal matters. The study also found out that there were dynamics that influenced the accessibility and use of information by farmers in Kiambu County like farmers not being able to articulate their information needs, distance to information sources, cost, education level, gender and age and land size

Following is the summary of the findings organized around the research questions of the study. The summary begins with the demographic aspects which has a significant impact on access to and use of information on land in Kiambu County

5.2 The Demographic Factors

The study has shown that demographic factors, age, gender, and marital status, have significant impact on access to and use of information on land. The results of the study reveal that great number of farmers were over fifty years of age, and these were the main owners of land. They were more educated than the young people and therefore interested in gathering information more than the young people. This most active group, hardly owned land, and what they owned was land they had inherited or were waiting to inherit. This impacted negatively on access to and use of land related

information. Lack of access to information, means less productivity, leading to poverty, especially among the youth.

The study disclosed that the owners of land were men, (64.7%), however women 53 (35.3%) were the main users of the land. Women were however simultaneously involved in several other activities, and it was difficult for them to go seeking information, especially far from their homes, which were the centres of their activities. They needed information to be brought closer to their homes.

5.2.1 Education and Gender

The study has revealed that one of the factors that hinder information accessibility and use is the low level of education and illiteracy. Farmers with high literacy levels, for example, can gather and understand the content of printed material as well as audio and visual communications, and gain much more from meetings such as *barazas* and are therefore able to apply that information and knowledge. Further, gender disparity in education and farming activities places women as the disadvantaged, less educated or illiterate and hence do not access information as easily as men do.

5.3 What Kinds of Information do the Agricultural Community Require?

5.3.1 Information Required on Land Tenure

The farmers' leading need for information on land ownership or land tenure was on inheritance rights (8.0 %) and in obtaining title deeds (4.0 %). Women farmers especially needed information on how to obtain title deeds and information on information on inheritance rights. There were farmers who needed information on sharing of land, information on land surveying and demarcation. Others needed information on land purchase procedures. There were some who sought information on lease holding.

5.3.2 Information Required on Physical Planning

The study found that the leading information need out of the 20 identified information needs was on planning in general (14.9 %). The information sought by individual farmers was a mixture of information on diversification of economic activity, land planning and on physical structures such as the building of sheds for livestock breeding. The study reveals that information sought was inadequate but the information available has produced some results in profit earned and in improvement of farmland.

5.3.3 Information Required on Agricultural Activities

The study established that information on agricultural activities was popular, with the most sought-after sub-category of information being “new farming technologies” (27.1%). Other requirements were on certified seeds, horticultural farming, suitable use of fertilizer, proper planning, and pest control.

5.3.4 Information Required on Environmental Aspects

The study established that the farmers needed information on seasonal changes 46 (31.3%) stood out clearly as the most important. Other identified needs were climate change 9 (5.8%) information on water catchment problems, tree planting and global warming

5.3.5 Required Information on Access to Credit

The study disclosed that access to information on credit facilities was the most sought-after information by farmers, specifically the availability of loans 64 (38.1%) and on those institutions that provide loans to farmers, including the government. Further, information on interest rates charged, and information on the services offered by financial institutions.

5.3.6 Information Required on Legal Aspects

The study revealed that the most important need for information on legal aspects was the availability of lawyers 22 (14.8 %), and their area of specialization. There were farmers who were not keen of seeking legal advice because of mistrust and costs.

5.4 How do Agricultural Farmers Seek Information on Land Related Matters?

5.4.1 Information Sources on Land Tenure

The study established that the farmers' main sources of information on land tenure were the government 21 (16.7 %) the custodian of information on land and land ownership, and cooperatives 11 (8.7 %). Farmers also sought information from various cooperatives, the churches, and NGOs. There were also individuals who shared information with the farmers, including salesmen. Farmers also used the media as a source of information. Information was not easily available because it was mainly found in the urban areas.

5.4.2 Information Sources on Physical Planning

The study established that farmers' main source of information on physical planning was various cooperatives 30 (21.1%) and government 20 (14.1%). They also got information from salesmen, NGOs, and individuals. The information they received from the government was mainly on government initiatives and plans such as the new road network, land transfer, and how to dig trenches to control soil erosion. Salesmen, NGOs, churches, and individuals (colleagues' friends and relatives) shared information mainly on how to construct or improve building structures around the farms, boreholes, among others.

5.4.3 Sources of Information on Agricultural Activities

The study found that the main sources of information on agricultural activities 69 (41.8%) were various cooperatives, then salesmen 22 (13.3%), NGOs 22 (13.3%) and government 16 (9.7%). The Churches and other organizations were other sources of information. There were also agents who took information to farmers on such items as fertilizers, insecticides, and animal husbandry with the aim of promoting their products.

5.4.4 Information Sources on Environmental Matters

The study established that the government was the main source of information on the environmental matters 43 (28.9%), cooperatives 21 (14.1), radio and television 14 (9.45) and NGOs 10 (6.7%) and churches.

5.4.5 Access to Credit Information Sources

The study disclosed that the leading sources of information on credit were various cooperatives 86 (50.8%) and banks 24 (14.2%) then the government 21 (12.0 %), Churches and NGOs, who were good at passing on information on access to credit from other institutions, from banks and international organizations.

5.4.6 Legal Information Sources

The study established that the government was the main source of legal information 21 (18.6%), then cooperatives 9 (8.0), lawyers, NGOs, and Churches. The study however disclosed that sources of information on legal matters were not easily accessible, and that over 76 (67.3%) of farmers could not access legal information.

The study identified Churches and NGOs as supplying the information needs that are closer to the practical needs of farmers, like agricultural activities and access to credit.

5.5 What are the most Preferred Methods of Getting this Information?

The study revealed that the farmers most preferred method of communicating information in all the categories was the *baraza*, followed by "word of mouth" or oral communication, (communications, with information providers, neighbors, friends, and relatives). However, the farmers used radios and television, and to some extent print media and lately mobile phones to access information. "Word of mouth" however, was found sometimes unreliable, because information was sometimes exaggerated and or distorted. The study found out that *barazas* were the preferred met of information dissemination.

5.6 To What Extent Does the Existing Information meet their Land Related Information Needs?

The above question refers to the use farmers made of the information they managed to get. The study revealed that though the availability of information was limited, the use of information acquired by the farmers, contributed to some extent, to improving the welfare of the farmers leading to improved livelihoods for example access to credit.

5.6.1 Use of Acquired Information on Land Tenure

Information availed on land tenure was mainly used to assist farmers in land demarcation, to register their land, acquire title deeds and in land transfers. The information enabled farmers to solve land disputes especially problems associated with inheritance rights. Owing to cultural stances, women did not own land so that they had to fight for land ownership most of the time. With little information they got, women were enlightened and became aware of issues they had not been aware of before, and this gave them confidence and incentive to aspire to seek more information especially on their land rights.

5.6.2 Use of Acquired Information on Physical Panning

From the findings on physical planning, the study established that farmers used the information to plan their land and improve their farms by introducing other farm products like fish keeping which was a new farm product in the county. They learnt how to identify where and how to dig boreholes, and indeed some acquired skills in borehole construction.

5.6.3 Use of Acquired Information on Agricultural Activities

Information acquired on agricultural activities was used widely by the farmers to enhance efficiency of their land use. For example, in proper grazing and breeding of dairy cattle, practicing good farming methods, management of cash crops, supply of fertilizer, insecticides, animal husbandry and livestock keeping, and discovering new markets for their products and pricing and making profit from their faming activities. The farmers were therefore able to improve on their land and add value to their farm produce. However, the farmers felt that with modern technology they could achieve a great deal more.

5.6.4 Use of Acquired Information on Environment

Acquired information on environmental aspects, mainly on seasonal changes, was especially useful in predicting weather conditions so that farmers could decide when to plant and what crops to plant. Also managing soil erosion, understanding forest conservation and importance of water catchment areas and the impact it has on the environment. The farmers also acquired knowledge on food storage

5.6.5 Use of Acquired Information on Access to Credit

Information acquired on credit facilities have made it possible for farmers to get loans which assisted them in financing projects like construction of boreholes, increasing

their dairy animals and planting additional crops. The cash crop farmers those growing tea, coffee and pyrethrum used the money to buy farm equipment, while other farmers (subsistence farmers), improved their crops by using variety of seeds recommended by the cooperatives. Some cooperatives gave loan in kind which meant that farmers received animal feeds, pesticides, among others instead of money.

5.6.6 Use of Acquired Information on Legal Aspects

The study established that legal information helped in registration of land titles, land transfer, and recovery. Farmers were able to gather information that helped them identify lawyers who assisted them in several legal matters. Women and their children were the most deprived of their rights to land and land use, owing to cultural stance that disinherited them of their land and properties. Lawyers helped them in land recovery and in other legal relate matters. Women reported having been empowered and given freedom to make informed decision.

The study found out that for all the categories identified the information accessed was not adequate although agricultural aspects, and land tenure categories were more active and engaged than the other categories.

5.7 What are the Challenges Faced by the Kiambu Farmers in Closing the Existing Information Gaps?

This study presents the summary of the challenges faced by farmers in closing the existing information gaps using three identified themes: Information needs and information seeking; information sources; and information uses.

5.7.1 Information Needs and Information Seeking Challenges

A major challenge is identification of a diversity of information needs. The study revealed that farmers, while aware of information gaps, could not articulate their

information needs or the needs were not easily identified. This challenge is acute particularly among the illiterate and semi-illiterate. Farmers need direction on their information needs, on the appropriate information they require to improve their land. Identification of information needs is essential in the design of information systems and the provision of effective information services as noted by Odini, and Otike, (1997).and Ignorance and cultural practices deny especially women access to information especially on land tenure and inheritance rights. Although addressed in the 2010 Constitution most farmers are still not conversant with the issues.

Farmers do not have modern and up-to-date information and knowledge on how to improve their products in terms of quality and quantity. The study revealed that farmers' main challenge was continued use of outdated farming tools because they were not well informed. Indeed, need for information on "New technologies" emerged as important need that necessitated access to up to date information.

5.7.2 Information Sources Challenges

The problem of ignorance of information sources especially on land planning, environment and legal aspects was a challenge. Proximity to information sources remains a challenge and is as key to accessing information. The study found that any information the farmers required was not close to them and they had to travel substantial distances to access it because it was especially housed in urban areas. Having information far from users was a challenge resulting in the challenges of cost of accessing information.

Cost of accessing information was a challenge noted in all categories. This is about transport costs to and from sources of information and sometimes to the internal fees requested by officials to acquire the needed information for example at the

government lands offices. This led to another challenge of government bureaucracy which slowed access to information, and which lead to corruption.

Other challenges are related to information providers. The study established that the government was the main source of information on land tenure, on environmental aspects and legal information and that the cooperatives were main source of information on physical planning and information on credit aspects. These sources of information were not adequate. Besides there were sometimes duplication of efforts by information providers and some information was not directly directed at the needs of the farmers. More information was required from other institutions for comparative purposes and to give farmers varieties to choose from.

5.7.3 Information Uses Challenges.

One of the challenges is lack incentives or motivation for use of information because of lack of knowledge especially by the less educated farmers. The fact that information is not adequate, timely or up to date especially in keeping with modern technology.

Communication infrastructures are still a challenge in most rural areas of Kiambu county owing to power supply and poor connectivity coupled with the need for skill development, skills that are needed to access to and use existing land related agricultural information, especially on the internet.

Hence the use of ICT is still largely inaccessible to most of the farmers. This is a challenge because a lot of information is now available on the internet. Modern technology is known to open possibilities for increasing the supply of information at lower cost, increase efficiency in acquisition and processing of information and improve timeliness.

Another challenge is associated with the way the information is packaged. Some bank-based information, and legal language is complicated, and sometimes presented in a format that is not user-friendly.

The use of English language is a challenge to those rural farmers of modest education and the illiterate farmers. Information repackaging is important especially in the Gikuyu language for the benefit of farmers in the county.

The study established that oral communication and specifically farmers' preference of "Barazas", though they also used radio, television, mobile phones and print media communication calls for improved literacy level and better communication.

5.8 What Suggestions can be Offered to Improve the Access to and Use of Land Related Agricultural Information in Kiambu County?

There is need to have more and reliable information providers else the persistence of absence of information sources will create a bigger gap in information provision. More appropriate sources and systems should be introduced to widen the sources of information and mitigate persistence of existing challenges in information use since the study established that information sources and providers were few and not adequate or efficient. An example is on availability of credit facilities. More information is required from several financial institutions to give farmers varieties to choose from.

The mode of information provision and the medium of information provision need to be improved and updated.

The national and the county government should introduce various mechanism to improve farmers' information provision and knowledge even through public private partnership and joint activities with other stakeholders.

Some information required on land use and especially on environmental aspects and effects on agriculture require information that is location specific and therefore monitoring and evaluation is key.

Improved and advances in information technology to improve the dissemination of information for the benefit of farmers by improved adaptation of new cost-effective technologies.

The study proposes establishment of a model information Centre in Kiambu County which can be used to establish more of the same in the same county and other counties as well. This model is discussed later in chapter six.

5.9 Discussion of Findings

This chapter discusses the findings from the study and links the findings to the objectives and research questions, which guided the study. It also relates the findings to previous literature discussed and theoretical framework, Niedzwiedskas's (2003) framework. The aim of the study was to investigate access to and use of land related agricultural information in Kiambu County and suggest possible solutions.

The findings are discussed under the following topics: farmers' information needs and the extent to which their information needs are met; farmers' information sources, how agricultural farmers access information; order of information preference and priority of information sourced from main information providers; use of available information by farmers; channels used for information presentation; adequacy of

information acquired; challenges encountered in information access and delivery; and utilization of information technology (ICTs

The study was mainly qualitative complimented by quantitative techniques in embedded mixed method and was informed by Niedzwiezka's (2003) theoretical framework, "New Model of Information Behaviour which suppose that that everyone can seeks information regardless of his or her position, so that farmers as individuals could seek information they need. Also, that anyone can seek information by relying on others a situation that is live with farmers. They are obliged to seek help of others, in information seeking because of the nature of their work.

5.9.1 Farmers Information Needs

According to Wilson (!996) and Derwin (1996) information seeking is an interplay of thoughts, feeling and action. An earlier study done by Ochola (1998), on the information seeking and communication behavior of academics, states that high levels of "uncertainty caused increased information-seeking behavior and that, as uncertainty levels declined, information seeking decreased." Some rural farmers, unlike the academics, were not afflicted by uncertainty only, but they were not sure of the information they needed, and could not appropriately articulate their needs, as this study has revealed. Besides, the subsistence farmers, unlike the academicians, could not see the benefits of information on its own, as they were more inclined to the practical rather than theoretical side. Derwin (1996) Sense-Making theory that is based on the concept that humans generally seek information when they encounter an obstacle, or gap, of some kind that they see as a block in their life path. To bridge that gap, the individual seeks or revises information, methods, and new approaches that they find helpful.

The study revealed that the farmers information needs in Kiambu County were on land ownership or land tenure; planning on use of land; better farming methods and specifically “new farming technologies”; seasonal variations and the effect of climate change; access to credit; and information on lawyers and their specialized legal services. The study established that information access and use was limited, owing to lack of awareness, distance from information sources and hence cost of accessing information.

Thuo and Njoroge (2018), discuss information needs and seeking behavior of young small-scale dairy farmers in Murang’a County which is another county in Kenya. The study discusses dairy farming and the challenges they encounter are different mainly lack of funds, lack of exposure, inadequate time, lack of confidence and illiteracy. This compares well with Siyao, (2012)**,** who discuss problems of accessing agricultural information for small scale sugar growers in Kilombero, District in Tanzania. The two studies specialize in a single farming activity and the studies are done in Tanzania. None of these studies consider factors like distance to information sources. Ugah (2007) talks of some conventional agricultural information needs and cites several aspects such as “economic, social, environmental, occupational, technical and managerial capabilities; lack of awareness; inaccessibility; information explosion; bibliographic obstacles; declining budgets and rising costs; costs for users; staff attitude toward users; and crime”. Odini (1995) also identifies some of the conventional information needs in Kenya such as lack of suitable information systems, language barriers, illiteracy, and lack of skills.

In his study on users of information Odini (1995) found out that information systems were designed without taking note of the needs of the user. Therefore, there is no overall understanding of the information needs of different groups of information

users like farmers and teachers. This study found that such groups could include the farmers who were the respondents in this study. He notes that the information user community can be classified: farmers and rural communities (the concern of this study); students, teachers, and technicians; professionals in various fields; and policy makers, planners, and administrators.

This study findings are discussed below in full, by identified categories of information needs but demographic aspects describes the farmers' characteristics. The categories are: Land Tenure, Physical Planning, Agricultural Activities, Environmental Aspects, Access to Credit and the Legal Aspects. However, the discussion starts by discussing demographic factors and other aspects that influence access to and use of land related agricultural information in Kiambu County.

5.9.2 Demographic Aspects

The study established that demographic factors, age, gender of respondents, marital status, and educational level had significant impact on access to and use of land related information within the identified categories.

5.9.2.1 Age

The study has shown that over a third of the 150 respondents (34 men and 18 women), were over 50 years old as shown in Table 3. This indicates that most farmers were aged over fifty years. Although the study does not show directly how age affects access to and use of information, there are early studies that have shown that demographic factors, age gender, marital status and educational level impact information seeking and use. Such studies include Odini (1995), Kaane (1997) and Sarah Odini (1999). However, Thuo & Njoroge (2018), cite lack of confidence and funds for young farmers as inhibiting them from seeking information. Although there

is not enough information on land tenure as noted Kanogo (1987), and the available information on the same is not proper or appropriate information, and that there is misinformation and concealment of information about land issues, as noted in Ndungu report (2004). The study indicated that the group 50 years and over dominated the sample which suggests most of them were the owners of land. This means that young people do not own land and that if they owned land, it was most likely that they had inherited it. This means that they were more likely less interested in information on land and though they were within the most economically active group, they had no initiative to seek information, and this impacted negatively on their access to and use of information. Besides, some of them might not be looking for innovative ideas of improving the land beyond what their parents had continued to do for years, eventually impacting negatively on agricultural development in the county. This issue on how age affects access to and use of agricultural information and farming calls for further research.

5.9.2.2 Gender

Concerning gender, the study indicated in Table 3 that most of the respondents were men 96 and women 54 out of the 150 respondents. This means that men were the landowners. Many studies including Sarah Odini (2009), reveals that although men were the landowners, they were less involved in actual farming activities, and that most women did not own land but were the main users of the land. The study discuses information on women in Vihiga County and has concern on women right to information even as it is concerned with women having occupied with too many activities. This study is on Kiambu County and has concern on women as having less time to access information They are however involved in several other domestic chores such as childcare and household chores. It was difficult for them to look for

information far from their homesteads, due to too much commitment at home, where they carry out most of their activities. Such women farmers therefore needed information to be brought closer to their homes. A study done by Sarah Odini (2009) in Vihiga confirms that “rural women spent most of their time performing domestic chores, which were not productive”. This means that the women were involved in less economic activities because they were not well informed.

5.9.2.3 Age and Education

The study found out that some farmers in Kiambu County did not know the scope of information they required to maximize on the use and profitability of their land, while others could not articulate their information needs accurately especially**.** The study established that the level of education (illiteracy, and those with lower education) had a part in determining the type and scope of information the farmers needed

The study disclosed that the men and women farmers aged 45-54 (29.9%) were the most educated and the most active of the respondents in the group. The men were able to access information more easily than women because they were the most educated and attended barazas and other meetings more frequently. However, they did not use the information as much as was expected, since they were not as intensely involved in farming activities as women were. Most men were also involved in other income generating activities rather than farming.

It is to be observed that below the 45–54-year-old group, the groups 25-34 and 35-44 years displayed lower levels of secondary education; they were outperformed even by the group of 55 years and over. This indicates that the young people with low education levels, and relatively low levels of ownership of land, were less motivated, and had little or no reason to search for information. Lack of motivation may be a

contributing factor to these young people getting involved in the abuse of alcohol and drugs that has resulted in so many deaths in Kiambu County, as well as being involved in such anti-social groups such as Mungiki.

Women had the highest number of illiterates (9.45%) compared to men (3.1%). It was therefore not possible for them to easily acquire the information they required from government information officers nor from other information providers such as NGOs, churches, among others. Studies done by Jiyane and Ochola (2004) on information availability and exploitation by rural women, they consider that women would use information more efficiently if information is provided to them. However, a study by Wagacha (2014), who discusses research information, reasons that information should be taken to the people, and in this case to the farmers because the farmers might not know of the existence and availability of information they need. Srikantaiah (1993) noted that developing countries are unaware of the information that exists, especially at low income, and poor levels of education. He says that, in these countries, the precise nature of information needs and the format in which it is sought varies, and much is influenced by the seeker's level of literacy. Okwu and Umoru (2009), speaking in relation to Nigeria experience and Odini (1995) and Kaane (1997) from Kenya have the same conventional views that illiteracy hindered information seeking and use. This study found out that irrespective of education level and gender bias, proximity to information was especially important hence bringing information closer to the farmers. ICT and especially mobile phones could be particularly helpful in extending services to the rural populations, by using communication that is not restricted by distance, volume, medium and time. Since the main users of land are women, if the information is brought closer to them, they

would be better informed and would make use of information to improve their livelihood

5.10 Size of Land

This study found out that the size of land had implications on information seeking and use. That farmers who had small pieces of land were not as interested in seeking information as those farmers who had bigger pieces of land. Further, those with small pieces of land were forced to seek other means of earning supplementary income, since income from farming alone could not sustain them. Consequently, the study established that there was a need for information by all the farmers to help them maximize their use of land for income generation and poverty alleviation. In a report by Mike Mwaniki (Daily Nation, Tuesday April 22, 2014), referring to Kiambu County, he reported that the "Real Estate Boom" was forcing farmers out of their small pieces of land. This meant that farming land was being sold out to pave way for real estate development. This implies that those with even smaller pieces of land were less interested in looking for information and would in the stop farming altogether. Hence more than at any other time, information was needed to increase the value of agricultural activity on land, by finding ways of bringing information close to the farmers, information that will help them generate income and improve their livelihoods.

5.11 Cultural Practices

The study established that Kiambu County is renowned for strong traditional control of land tenure. Cultural practices in the county deter the use of land effectively in that, as discussed earlier, women do not own land, despite their being fully involved in agricultural development, cultivation, and food production. Men inherit land from their fathers, while land is selectively allocated, through inheritance rights, to the sons

of each wife where there are polygamous families, but not to the daughters. Hence the need for information has tended to focus on and around land sharing, inheritance rights and the issuance and validity of title deeds. A study by Kameri-Mbote (2002) on East Africa found out that men own 76% of agricultural land and women 8% while joint ownership stood at 11%. This meant that women who worked on farms and depended on farming for their livelihood, did not own any land, and did not have incentives to search for information, expecting that men would bring information to them. Women need information and knowledge brought closer to them so that they are made aware that even though they do not own land, they can use information to improve their small pieces of land efficiently. A study done by Night Roselyn (2016), maintains that Land tenure system should be gender inclusive for women to participate fully in economic development since land is a factor of production in agriculturally based economy for a community. This means that women should not only be satisfied with accessing information to improve on their small pieces of land but should consider acquiring equal ownership to land. This study goes further and consider that women should be provided with information on inheritance rights.

5.12 Occupations other than Farming

The study revealed that farmers could not wholly depend on farming for their livelihood. Farming did not contribute enough income for livelihoods compared to other activities. As a resu2t, both men and women were involved in other income generating activities other than farming. Farming, as far as men were concerned, seemed to take up less than half of their occupational time. The study showed the top two other occupations of farmers are to be ‘Businessperson’ (9.3% male and 23.1% female) and ‘Teacher’ (10.3% male and 7.7% female). On average, more men ventured into non-farming activities than women. Some men were involved in

teaching, since they were the most educated, others worked as drivers and mechanics, while women pursued business, to complement their household chores. This could be the cause of reduced information-seeking on land use. Yet, without information, not much improvement can be expected from the farming industry, hence, not much agricultural development.

5.13 Farmers' Information Needs by Identified Categories

The study findings showed information gaps in all the identified categories as discussed below. The major information gaps identified in this study related to land ownership; planning on use of land; better farming methods and specifically "new farming technologies"; seasonal variations and the effect of climate change; access to credit; and information on lawyers and their specialized legal services. Rankings of information needs showed variations across the categories. For example, information on land ownership and title deeds was a major information need for farmers, under land tenure category. Planning on use of land was the major gap under the physical planning category. Better farming methods and specifically "new farming technologies" topped the needs under agricultural activity. Seasonal variations and the effect of climate change on farming, led the needs under environment aspects category. Availability of loans led, under access to credit, and information on lawyers and their specialized legal services was ranked top under need for information on legal aspects. Elly and Silayo (2013); Koskei (2008) and Lwoga, Stiwell and Ngulube (2011**)** discuss information needs, access and uses by farmers even in Kenya and Tanzania but none details the category of farmers information needs cited in this study. Although the nature of the information needed was dependent on the information needs of the farmers, sometimes the agents who provided information to far mers misunderstood the farmers' needs.

The main information providers are NGOs, Churches, Cooperative, as well as government agents, extension workers, and salesmen who sometimes supply all manner of information not specifically directed to the needs of farmers but for advertisement. As already reported, the study revealed that many farmers were not aware of their information needs. Kiplang'ati and Ochola (2005) observe that there is lack of appreciation of, not only information in general, but relevant and timely information. Lack of information nationally has been highlighted by Agriculture Principal Secretary, Sicily Kariuki, speaking during the launch of the e-extension services at Embu Kari headquarters. She said that "lack of proper information was a major hindrance to efforts to enhance food security" (reported by a Correspondent in the article "Farmers to access data on the go", Daily Nation, Wednesday April 16, 2014). Newspaper article did not consider land issue in relation to information on agricultural issues.

5.13.1 Need for Information on Land Tenure

The study revealed that most farmers especially women and children of deceased persons, needed to have information about acquisition of title deeds. Land in Kiambu county was decided in the 1950s to ensure that ownership was credibly established, most farmers did not know their right to own title deeds. According to Kieyah (2014) titles offer the best way of securing land rights for the sustainability of future generation, and it is a prerequisite of land investment. Further research is needed on real estate development in Kiambu County.

Further this study established that the size of land had implications on information seeking and use. Many landowners did not have large pieces of land. Just above 50% of the farmers owned less than 3.9 acres, and only 18.6% owned over 5 acres. Owing to inheritance rights, land in Kiambu County continues to be subdivided among male

family members, and not the women. Doss et al (2013) points at gender inequalities in ownership and control of land in Africa. Ali et al (2014), asserts that secure agricultural land rights for women increase land related investment and hence promote economic development. Both writers do not however underscore the importance of access to land related agricultural information. Kenya government passed a law in 1981 that allowed both genders to inherit land from their families, many farmers are not aware of its existence. This calls for better information dissemination for improved information use for better livelihood. However, the new constitution passed in 2010 and which was highly popularized, gave a lot of power to women include right to own and to inherit land. The study found out those who owned small pieces of land, such as subsistence farmers, were less interested in information on land or farming activities, as compared to those farmers who had larger tracts, and who had surplus crops, milk, or cash crops for economic gain. The owners of big relatively big farms needed information on markets for their produce and better and new farming methods. They were more focused in farming while as those owning small pieces of land were interested in other income generating activities other than farming.

Several farmers have turned their land into commercial real estates for financial and economic gain since income from farming alone could not sustain them. More than at any other time, information is needed to save agricultural land. Subsistence farmers, who form part of the less educated group, need information and more so education to help them maximize their use of land for income generation, agricultural development, and poverty alleviation.

5.13.2 Physical Planning

The study established that there was information gap on land planning. This is indicated by the fact that the primary information needs among those seeking information was on planning. The results also indicated that farmers needed a variety of information, including information on the diversification of economic activity, land planning and on the erection of structures on their land. This category disclosed the personalized information needs of farmers. Though not enough it was established that farmers obtained some useful information on physical planning from cooperatives. From the specific sub-themes that emerged, as noted earlier, they got information on piped water and better irrigation skills, how to construct boreholes, soil erosion, the construction of greenhouses, fish farming, road networks, the transfer of land, technology, how to build livestock sheds, better livestock breeding, better bee-keeping skills, pig rearing skills, proper crop rotation and planning in general), information was specific to the individual, it is clear that individual farmers were interested in improving their land to attain better returns and hence agricultural development. Although Lwoga et al (2011), do not discuss specifically the aspect of land use planning but they point out that the information needs vary, from one rural area to another. That the kind of information needed depends on the uniqueness of the community. This study revealed unique categories of information needs some which can address an individual farmer for example a farmer in Kiambu County need to plan on fish farming to improve his livelihood leading to many farmers wanting to gain knowledge on fish farming and in building improved livestock sheds. Besides, they have gained knowledge in digging boreholes, whereas previously, there had been many incidents in which lives were lost through suffocation, as attempts were made to

dig and construct boreholes ad hoc, and without any guidelines or information on how to do so.

5.13.3 Agricultural Activity Information Needs

The need for information on the use of land for agricultural activities was the most appealing to the farmers, as compared to such categories as land tenure, mainly because it impacted more directly on the efficiency of land productivity and the improvement of the farmers' welfare.

The study established that the need for information on better farming methods and specifically "new farming technologies", was the most popular need among the numerous categories of information needs that emerged on agricultural activities. Ogada, Germano and Muchai (2014) consider farm technology as important in relation to improvement in farm yields, economy, and livelihood. Ngongo (2016) considers the importance of adopting modern agricultural technologies. These studies do not consider the importance of accessing land related information to agriculture. However, the use of ICT in the provision of information to farmers has gained prominence, as reported in the Daily Nation, Wednesday, April 16, 2014 (Business News page 36). The Nation Correspondent in the article "Farmers to access data on the go" reported that the Ministry of Agriculture has launched a website that will enable farmers countrywide to access information on proper crop and animal husbandry in a bid to boost agricultural production and by enhancing extension services. "The site will offer data on when to plant, the right seeds and fertilizer to use. It will have videos to guide growers on best farming practices and answer questions through text messages." However, the cost to adopt technology by farmers and limited skills can also be a challenge. Mobile technology is now a modern tool that is being used by all farmers irrespective of education level. This is making the

farmers to aspire for knowledge and information concerning in depth aspect of farming, modern and efficient farming methods that will provide better economic and financial gain from farming. Further research should address the use of ICT in farming activities

5.13.4 Environmental Aspects

The study established that the most important information gap that needed to be filled on environmental aspects among others was on seasonal variations and the effect of climate change on farming. The farmers were of the view that low farm production was at least partly due to lack of information on weather conditions and the effects of seasonal variations. Farmers need to know the proper planting methods conducive to their respective environments. A study done by Maina, Newsham, and Okoti (June 2013), pronounces that "the agricultural sector in Kenya is complex with many varied agro-ecological zones, many players and actors with differing interests, roles, responsibilities and spheres of influence" all impacted upon by climate change. They talk of climate at a high level while farmers need information at micro level which this study has revealed. In his study on pineapple farmers in Nigeria**.** Iwuchukwu and Udoye (2014), points out that pineapple farmers need information that underscore forecast on rain and any information on climate change that would be helpful to the farmers.

5.13.5 Access to Credit

The study found that there was information gap on access to loan details, especially information on interest rate charged by financial institutions. Among eleven indicators signifying information needs in relation to access to credit, farmers considered "information on the availability of loans and the interest rate charged", as the most

sought-after information in this category. Abdullah and Manan (2011), contends that farmers are discriminated against in accessing credit from banks.

Access to credit is especially important as it enabled them to improve their farming, their yields, and their financial and economic livelihood. This to some extent concurs with a study done by Waceke (2013) which established that interest rate and credit rationing were found to greatly influence farmers' choice of credit source, although, in her study, the farmers ranked credit rationing as number one. Nevertheless, financial institutions ought to balance between interest rate and credit rationing, while developing products aimed at small farmers, especially smallholder dairy farmers, who stand out as a big group in Githunguri area of Kiambu county.

The study established that to raise the level of credit access of smallholder farmers, and therefore attract more farmers, financial institutions need to educate the farmers and repackage their loan products to suit the needs of the farmers. A suitable product is one that takes into consideration both the credit attributes as well as the farmers' characteristics, as they all jointly affect the farmers' choice of credit source. In a study done in Ghana by Anang et al (2015) on factors influencing smallholder farmers access to credit, the authors do consider the importance of information but of being aware of lending institution and improved technology adaptation among other factors. A study on the capital on land and land tenure effects on agricultural sustainability case study of Limuru, Kiambu by Mbugua (2012, again discusses "availability of money" as one solution to agricultural productivity and sustainability. Mbugua (2012) disregarded the role of information details in access to credit.

5.13.6 Need for Information on Legal Aspects

The study established that the most important need for information on the legal aspects was availability of lawyers, and the type of legal services they offered.

The study revealed that owing to ignorance, most farmers were not as keen as expected on seeking legal advice. Most of them, especially the small subsistence farmers (men and women) own land passed to them through inheritance and were ignorant of their rights. They were not as keen as expected in seeking legal advice. Several of them took for granted that the land belonged to them automatically and did not understand the legal aspect of land registration. For example, many of these farmers were not aware that, by not being registered as owners, they had ceased to be owners of the land or to hold any interest in the land in the eyes of law. Some were not aware that corrupt individuals as well as family members had knowingly registered family land as their own, instead of registering it on behalf of the rightful owners, as trustees etc. Women, especially widows and their children, had lost their land through the corrupt practices of members of their families. Some farmers and in particular the big farmers, thought that most lawyers were corrupt. They stated a preference for legal information issued directly from and through the government.

Women especially had little or no say on land-related decision-making processes, and though the available legislations barely protected them until the 2010 Constitution, they remain unaware of the provisions in the current Constitution, that could help them.

There are currently several studies done on the legal aspects of land such as Odhiambo and Nyangito (2002), on land law and implications for agricultural development in Kenya, and (Okoth Ogendo 1976) on the Constitution and land.

However, until 2009, Kenya had no clear or comprehensive land laws and policies when a national land policy (2009) was formulated and finally passed as an Act of Parliament in replacing the previous colonial laws. Law information is however complicated and need to be repackaged in a simple language for the benefit of farmers.

5.14 Information Sources

Using the six categories cited at the beginning, that were the base for all enquiries, the study established that information sources were Government, Cooperatives, NGOs, banks Churches, and the individuals who share information with the farmers. However, the farmers' main sources of information were the government and the Cooperatives. It should be noted that information sources by category exhibited their own peculiarities in relation to information providers, as

5.14.1 Sources of Information on Land Tenure

The study established that the government was the main source of information on land tenure. The nature of the information sought as indicated by the sub categories i.e. 1) information on government trust land; 2) information on title deeds; 3) information on lease holding; 4) information on land inheritance rights; 5) information on land surveying/demarcations; 6) information on land sharing; 7) on land purchase; and 8) on land ownership, and title deeds is indicative that the government had the monopoly of such information as seen in (Okoth Ogendo (1976), GoK (2002), GoK (2004) and the Ndung'u report (2004). A lot of information is housed at different government departments and commissions. Some information is difficult to trace for example from National Land Policy Formulation and other Committee formed by government to sort out underlying issues in the country.

5.14.2 Information Sources on Physical Planning

The study established that there was hardly any central or established information sources in general on physical planning, and that the farmers' main source of information on this aspect was various cooperatives. This is information the farmers required to build sheds for livestock breeding, and information on where to create markets. However, the farmers had information provided to them by government agencies on government plans GoK (1996), and information on road network, land transfer and how to dig trenches to control soil erosion. Additionally, churches and individuals (colleagues, friends, and relatives) shared information mainly on how to construct or improve building structures around the farms, borehole, among others.

5.14.3 Sources of Information on Agricultural Activities

The study established that provision of information was not centralized but provided by different information providers. In their network paper no 107, Rees (2000) established that the major sources of knowledge for smallholder farmers about Kiambu District (now Kiambu County), were local neighbours, family, markets, and community-based organizations and noted that though government extension workers were important sources of information their quality and frequency were wanting. The situation has been found comparable with situation in Tanzania and Lwoga et al., (2011) and Nigeria Adomi et al., (2003). In this study the findings are that extension workers were not the major sources of information as compared to the previous studies mentioned above

The study also noted that NGOs, Churches, *barazas* and agricultural companies were other information sources. Most farmers considered that the most pressing information requirement which was not being adequately addressed was, among

others, information on where to get certified seeds, the most appropriate varieties of seed for a given location.

The study found that out of the identified fourteen specific sources of information on agricultural activities, most of the information came from various cooperatives. This included information on agricultural loans, farm inputs, certified seeds, new farming technologies, proper nutrition, animal feeds and proper breeding. Salesmen also acted as sources of information on pest control. The NGOs and churches provided some information on general farming education, while the government was the source of information on soil erosion management, and sometimes information on the use of fertilizers.

The role of cooperatives as providers of information has been confirmed by a research paper presented at the faculty of Veterinary Medicine Biennial Conference, Kabete Campus, university of Nairobi (August 1998) by Wambugu et. Al., which was a result of a survey conducted to determine the sources and delivery of technical information, to smallholder dairy farmers in Kiambu District. It was revealed that for Kiambu District, which has a well-established smallholder dairy industry, the most effective dairy information delivery channel especially for poor farmers, were meetings organized by cooperatives and neighbor to neighbor discussions.

5.14.4 Information Sources on Environment

The study established that the government is the main source of information on the environmental aspects, mainly on issues like climate change, global warming and tree planting etc. Other sources of information on environment were cooperatives societies, audio media (radio and television) and sometimes NGOs and the Churches.

The farmers however expressed that sources on environmental issues were not easily available within the county.

5.14.5 Access to Credit Information Sources

The study established that various cooperatives were by far the main sources of information on credit facilities, and that smallholder farmers preferred cooperatives to big banks because the information supplied by the cooperatives addressed the farmers' basic needs for example they provided "loans in kind" rather than money. Nyairo and Njuguna (2015), point out that formal conditions (as provided by banks), affect credit supply to small- scale farmers. It is confirmed by Wachekeh (2013), that farmers need a credit product that will not only address their farming needs, but that also address their livelihood, including health and education needs. This was clearly shown by the fact that most small, and even big farmers held credit from Githunguri Cooperative Sacco, which also gives credit on food stuffs and other non-farming products.

The banks gave information on their institution, and the government-on-government information sources, however the study established that the NGOs and the churches were good at passing on information on access to credit from other institutions, including banks and international organizations. The study also revealed that the farmers used to get information from the banks through pamphlets, as a marketing tool for the banks. The bank officials would also discuss bank requirements for credit facilities if the farmers requested information at the bank. However, the farmers felt that the information from the banks was more for the benefit of the banks, rather than the farmers. The study revealed that, among the subcategories of information sought, (information on availability of credit, information on the existing and kind of credit programmes and information on financial institutions that were close to farmers,

information on interest rates charged, information on services offered by financial institutions, and information on the available government funds to farmers), the most sought-after information was on the availability of credit facilities.

5.14.6 Source of Information on Legal Aspects

The study established that, the main source of legal information was the government, although the available information on land related legal matters was not easily accessible. The study established that 67 % of farmers could not access legal information owing to several issues. Firstly, the government had no clear or comprehensive land laws and policies until the national land policy of 2009. Secondly the laws that relate to land administration, such as the Consolidated Land Act, (CAP 283), the Law of Succession, Women Property Rights, and the Registered Land Acts, and many more are, under revision. Other issues emerged that hindered access to and use of such information. One was the legal language of such documents, such that the few educated farmers, those rural people of modest education not to mention the illiterate farmers in the county, could not comprehend the content. This information needs to be repackaged and availed to the farmers in simplified form. Even such studies done on legal aspects of land by Odhiambo and Nyangito (2002), on land law and implications for agricultural development in Kenya, and (Okoth Ogendo,1976) on the Constitution and land, need repackaging.

In conclusion, the study established that the main sources of information on land tenure, environment and legal aspect was the government, whereas various cooperatives were the main sources of information on physical planning, agricultural activities, and credit facilities

5.15 The Order of Preference by Category of Sourced Information

This study established that among the categories identified, (Land tenure, Physical planning, Agricultural activities, Environment, Access to credit, Legal aspect), the farmers preferred information on agricultural activities, and the main prevalence in this category was planning. The second prevalence was access to credit, and the main preferences were information on financing and interest rate charged. This was followed by physical planning, with planning as the main sub-category, then environmental aspects with bias on seasonal changes. Land tenure and legal aspects were the less preferred. Agricultural activities had many subcategories, some of which were added at the interview stage by the farmers.

5.16 Priorities of Information Sourced from Main Providers

The study established that the main information sought by the great number of farmers from information providers was access to credit, followed by information on agricultural activities, then environment and physical planning, respectively. There were not as many farmers who sought information on land tenure and legal aspects of land issues as compared to the other categories in Kiambu County. This is because of the sensitive nature of the subject categories, like land ownership, and the fact that some farmers think owning land is enough. They are not aware of existing information gaps until problems arise. However, because the county was the first in Kenya to have experienced land adjudication and land ownership, the situation is not lost. Kieyah (2014) points out, titling of land offers the best way of securing land right, and it is a prerequisite of land investment.

The study revealed that legal information aspects was the least embraced category. This was because of ignorance of information sources, mystery associated with legal matters etc. Consequently, accessibility of legal information meant first demystifying

it and having it categorized as any other information, repackaged, and made accessible.

5.17 Uses of Available Information by Farmers

The study established that the farmers used the information depending on the category of the information sought. Adetimehin et al (2018), contend that utilization of agricultural information and knowledge lead to improved production. Adio et al (2016), talks of utilization of agricultural information sources. This study proposes merging the two to have a center that provides information

5.17.1 Use of Information on Land Tenure

The study established first that the information the farmers got was inadequate in all the categories. However, the information they managed to get on land tenure, most of it from the government, had helped the farmers to settle disputes on land issues especially on inheritance rights, sharing of land, land demarcation and presentation of title deeds. The new Constitution has paved the way, especially for women who for a long time had been disinherited of their share of land. Though most farmers did not know the constitutional interpretation of their rights, once they appeared in court, the law supported them. Hence widows and girl children have benefited from information on inheritance rights. Land related issues had been entrenched in traditions and culture in Kiambu County where the male child inherits the land, and the girl child does not. She is expected to move from the land and marry elsewhere. If the girl does not marry, she is a taboo and many women have been forced out of their father's land by their relatives, especially their brothers. Widows are also thrown out of their land especially those who are illiterate and not well informed.

Despite little demand for information on land tenure, the issue is so important and sensitive that any issue related to land tenure is taken seriously by the government. The government encourages family meetings, trying to solve the problem before it gets to courts, using family members, the clan, and the chiefs and through advice given at *barazas* on peace keeping among family and the community. The government efforts have been supplemented by Cooperatives, NGOs, the Churches and Farmers sharing information.

5.17.2 Information Use on Physical Planning

The study revealed that farmers, as individuals or in groups, have used the information they have received on planning for fish farming for example, particularly from various cooperatives, to solicit government assistance in building fishponds, and are now earning an income through keeping fish. This is important because fish farming is a new phenomenon in central Kenya, and this means a new diet for the community. The farmers have used information to help them identify where boreholes can be dug and how. Before they were informed, several farmers had lost their lives through suffocation, trying to dig and construct boreholes without any guidelines on how to do so, and now using information, some have acquired proper skills in borehole construction. Some farmers have been helped in planning, especially physical planning, basically where to put structures, and how to maintain them, for example livestock sheds, and some reported having made a profit because of the information they had acquired, which has contributed to the improvement of their products.

5.17.3 Farmers Use of Information on Agricultural Activities

On agricultural activities the study established that the farmers have used the information they have been able to get to enhance efficiency of their land use. They

have been able to increase farm production through proper animal bleeding and using their small pieces of land efficiently by practicing zero glazing for example. They have learnt how to identify different types of seeds appropriate to the climate in the area, leading to high yields. They have learned new skills like fish farming; proper nutrition for the animals; pest control and more specifically management of livestock, cash crops and other crop, and planning. They have been able to make use of technology in learning new farming skills, as well as in pricing and marketing their produce. Overall, the information they have been able to get has rendered them more informed, especially on making profit from their farming activities.

5.17.4 Information Use on Environmental Matters

The study has established that the farmers used the little information related to environment in managing seasonal changes. Using the information, they managed to get, they were able to assess, for example, when to plant and what crops to plant depending on the season. Some were better informed on managing soil erosion, and proper food storage. The farmers have used the information and knowledge on the value of trees, and tree planting especially, for example which trees to plant on which area and when. The farmers have been informed of institutions like the Greenbelt Movement where they can obtain more information especially on tree growing. They have also learnt from the acquired information about manure preparation. Some of those interviewed said they have also understood the government policy of forest conservation and how water catchment area impacts the environment

5.17.5 Use of Available Information on Access To Credit

The study established that through use of information on credit the farmers, especially those with bigger pieces of land, had obtained loans from cooperatives and banks to finance some of their projects like construction of boreholes and increasing their dairy

animals or planting additional crops etc. In some cases, the loans they received from the cooperatives were in kind. For example, dairy farmers got animal feeds and pesticides on credit, which they paid for at the end of the month from their milk dues. The cash crop farmers, those growing tea, coffee and pyrethrum used the money to buy farm implements and pay for transport facilities to help them get their produce to the markets. The small farmers used the information to learn more about services offered by the same financial institutions as training, and skills development and loan management.

5.17.6 Farmers' Use of Information on Legal Aspects

The study found out that farmers, especially women, widows, and their children, who sought legal information and were able to access legal assistance, had benefited. Some used information to try and recover their land that had been taken from them by the family of their deceased husbands. The study also established that the information had empowered women and given them freedom and power to make informed decisions on their acquisition and use of their land even if the success rate is low. Farmers have used information to register their land, and in land transfer. Information has also been used in search of reliable lawyers and details about their specialization, their services and availability, since several farmers had lost their land through corrupt practices even among lawyers, not to mention that some farmers had even lost their lives through corrupt lawyers.

In conclusion the study has established that the use of information however little, in all the categories had contributed to enhancing the welfare of the farmers, improvement of their livelihoods, learning new things, understanding government policies, accessing markets, acquiring farming implements, and in acquiring skills. In their use of information on legal aspect, the farmers were overly cautious especially

because most information they sought was on serious land related matters like information on disputes over land ownership, information between registered owners of land and other people, and land inheritance rights.

5.18 Channels Used for Information Presentation

The study found out that several the information communication channels used by farmers were not highly effective and were not adequate.

The “Word of Mouth” or oral communication (with neighbors’ friends and relatives,) was found to be popular among farmers, but this mode of communication was not reliable. A good percentage of the information therein exchanged was not completely accurate

Barazas were the most popular, followed by audio/visual media (TV and Radio). Barazas are organized meetings that government administration uses especially the chiefs, to pass information to the community. NGOs and other groups can only call a baraza through the Chief of the area. The study however pointed out that few women attended the meetings (and yet they were the main users of land), because they lacked time as they had several activities to attend to, such as drawing of water, as “child minders”, cooking and other household chores. Some women had to have the permission from their husbands to attend Barazas

Mobile phone was used by farmers to some extent in some measure to communicate and pass information among themselves. They also used them to book appointments with cooperatives and other information providers, to arrange for face-to-face meetings. However, most farmers, especially the less educated and the illiterate could not relate mobile phone activity with agricultural information. This concurs with Shannon and Weaver (1949) who contend that information and uncertainty are closely

related, and that lack of information makes a situation unpredictable or risky. If mobile phones can provide information, they can reduce uncertainty and hence should be encouraged

Radio was popular especially among women farmers. The study revealed that several women listened to the radio often during the day while doing their household chores. The radio has been in existence for an exceptionally long time. It is cheaper for the rural people to own and maintain. This means of communication was very appreciated by the farmers, especially women because it brought information closer to them meaning that they could carry on their activities while listening to the radio and did not have to spend time searching for information. Besides the farmers only needed to listen, and not to spend time reading and trying to comprehend. The disadvantages were that the radio programs that interested farmers were not regularly aired and farmers on the other hand did not know when they were aired. But farmers gained a lot on farming activities from the radio communication.

The study revealed that the T. Vs, print media (newspapers, magazines) and paper reports, newsletter, manuals reading were less appealing to the farming community because first the television was an expensive item they most farmers could not afford to have, then the print media (newspapers, magazines) and paper reports, newsletter, manuals were insignificant to most farmers given that they were hardly available and attracted the literate. Furthermore, almost all the communication channels except oral communication were hindered by poor infrastructure and lack of resources

5.19 Adequacy of Information Access and Delivery for Effective Use

The study established that the extent to which information met farmers' information needs depended on the category and nature of information required. For example, on

agricultural activities, the study established that information needs on agricultural activities was relatively adequate. The study also found out that the farmers accessed extraordinarily little information on environment and on land tenure. Information on credit was the most sought-after information, but it was not adequate because they did not have enough of it.

5.20 Challenges of Information Access and Delivery for Effective Use

The study presents the challenges encountered by the farmers. These were information, proximity to information sources and hence cost of accessing, poor communication infrastructure, and cultural practices. Obliviousness to existing information sources coupled with the fact that the poor subsistence farmers were not aware of the importance of information as something that would improve on their livelihood. Level of literacy and sometimes the language barrier (most officers use the official Kenyan languages, English, and Swahili) and not the local language, to communicate. For women especially, there was lack of time to access information. There are other specific challenges encountered in relation to identified categories of information needs.

On land tenure, the study established that the main challenges were mainly the cost of accessing information, travelling to the sources of information, and sometimes having to pay government officers (through corruption) to access information especially information on title deeds. Proximity to information sources and poor communication infrastructure meant travelling to urban areas from the rural areas was discouraging farmers from accessing information. Cultural practices inhibited women from accessing information

Owing to lack of information, as discussed there were land disputes related to land ownership within families, and faulty/fraudulent title deeds to land stemming from inheritance rights, which hindered agricultural development. Lack of information and therefore lack of knowledge meant that owing to inheritance rights, the land in Kiambu County had become subdivided and reduced to small pieces of plots that are not profitable for farming. The same plots are increasingly being converted to commercial use therefore hampering agricultural development.

On physical planning, the study revealed that the main challenges the farmers faced were ignorance on the availability of information sources exacerbated by distance to information source centers. Government was the only source of information and this was not adequate. Without proper information, there was poor planning or lack of planning, and this contributed to poor use of land such that land use was not maximized which led to low production, and poor quality of products and the result was poverty.

As concerns agricultural activities the study established that the main challenges were absence of information on modern technology and poor communication infrastructure. However, this was being addressed slowly using mobile communication. Cash crop farmers of tea, coffee and pyrethrum did not have as much problem in accessing information as subsistence farmers hence had no big problem with marketing of their products, most were members of farmers' cooperatives. Subsistence farmers still used old farming methods especially in the use of poor farming implements which means low production. Therefore, aside from the farmers need for information technology, for agricultural development to succeed, the county government should exploit all forms of farming technology.

On environment, the study established that lack of reliable information on weather conditions, owing to changes in climate, impacted on planting and harvesting seasons, for all types of crops and in planning. For cash crop, tea and coffee and pyrethrum, inadequate information on changes in weather patterns meant that they were not sure when to prune their crops. Conway (2009) noted that climate change, floods and droughts has negative impact on food security and agricultural production.

Lack of and insufficient information on environmental aspects has influenced disease control, which impacted on crop production resulting in low quantity of produce and to losses. Maina, Newsham, and Okoti (2013), see the underlying challenges as, among other things, high poverty levels, low capacities to adapt and dynamic cultural practices. They state that the country "lacks localized data and (possibly) the critical technical manpower to implement projects that deal effectively with the impacts of climate change". However, GoK (2013) is a government report that spell out government policy on climate change. However, it does not address the specific concerns of the farmers like seasonal changes, and it is not made available to the farmers.

The study found that the main challenge on access to credit was the fact that financial institutions, excluding the big banks did not provide sufficient information that the farmers needed on credit facilities. The banks on the other hand provided information, most of which was about marketing themselves, rather than how the farmers can benefit from banks. Several writings on access to credit including Mbugua (2013), while discussing factors determining access to credit do not consider information as a factor on access to credit facilities, rather they concentrate on inadequate access to financial services. So that farmers miss out such important information as information

on interest rates because it is not highlighted yet the banks charged exceedingly high interest rates that are not affordable to most farmers, particularly small-scale farmers.

Wacekhe (2013) points out that credit rationing was a problem for farmers in Kiambu County. The study showed that the services of cooperatives were more appealing because they provided money as credit and offered credit in kind, by supplying fertilizers, animal feed etc. Farmers should be exposed to more information on sources of credit for promoting agricultural development, income generation and food supply and hence avert poverty.

On challenges related to legal aspects information access, the study established that there was heavy reliance on government information sources in Kiambu County. As mentioned earlier, most government information institutions are to be found in the urban areas. The government bureaucracy is slow and tiresome, and this leads to corruption. Access to information from private lawyers was not encouraging either, owing to the prohibitive charges they demanded of farmers. Aside from that some lawyers were found to have provided false information on land matters that has caused farmers their land, owing to corruption. There were also cost involved in travelling to seek for information, which most farmers could not afford. Further, many of them could not afford the time to travel far from their homes or from the canter of activities, especially women who were involved not only in farming but in running the home. Information on legal matters should be centralized and repackaged to be useful to the farmers.

Concerning information technology, **t**he study established that farmers to some extent used mobile phones, radio, television, and internet as communication tools. The use of ICT devices to some extent played a role in enhancing the capacity of the farming

community. However, it was revealed that high cost of ICT devices, erratic power supply and poor connectivity (in some rural areas) of Kiambu County were a challenge to information access and use.

5.21 Suggestions that can be Offered to Improve Access and Use of Land Related Agricultural Information in Kiambu County

There is need to have more and reliable information providers else the persistence of absence of information sources will create a bigger gap in information provision. More appropriate sources and systems should be introduced to widen the sources of information and mitigate persistence of existing challenges in information use since the study established that information sources and providers were few and not adequate or efficient. An example is on availability of credit facilities. More information is required from several financial institutions to give farmers varieties to choose from.

The mode of information provision and the medium of information provision need to be improved and updated. The national and the county government should introduce various mechanism to improve farmers' information provision and knowledge even through public private partnership and joint activities with other stakeholders.

Some information required on land use and especially on environmental aspects and effects on agriculture require information that is location specific since some areas for example Ndeiya in Kiambu county experience low levels of rainfall while Githunguri in the same county receives very heavy rainfalls annually.

Improved and advances in information technology to improve the dissemination of information for the benefit of farmers

The study proposes establishment of a model information centre in Kiambu .be used to establish more of the same in the same county and other counties as well. This model is discussed later in this chapter

Government should put measures to have frequent rural information needs assessment before providing information services to rural farmers.

5.22 Chapter Summary

This chapter discussed the findings of the study based on the objectives, research questions and assumptions of the study. The discussions were also allied to studies on the topic and in the literature review.

The key findings on access to and use of information on land by farmers were that the most sought information, by the great number of farmers was access to credit, specifically loans, and information on modern technology in agricultural activities category, and that the main sources of information were the government and various cooperatives. The study findings established that oral, *barazas* and radio communication were the most popular channels used for information communication and that radio and television provided useful information together with the modern mobile phone technology. That there was need for the improvement of electricity infrastructure to facilitate the use of ICT. Mtega, (2018), advance the use of radio as important in dissemination of agricultural information and Nazari, Bin and Hassan (2011), discuss the use of television as proving farmers with agricultural knowledge. The following and final chapter six provides the conclusions and recommendations of the study.

CHAPTER SIX

CONCLUSION AND RECOMMENDATIONS

6.1 Conclusions

The conclusions of this study are drawn from the findings of the study.

On the information the farmers required, the findings revealed that farmers needed information on:

- Land ownership, land tenure and specifically acquisition of title deeds for their farms
- Information on farm planning, how they can plan for better yield, financial gain, and improved livelihood.
- `Information on modern farming technology
- Information on climate change specifically seasonal variations
- Information on credit facilities, and specifically availability of loans
- And information on lawyers that can help them especially with land cases.

The study concluded that the farmers' information needs were based on intensity and hierarchy of information needs. Hence the study concluded that the farmers aspired to acquire and use specifically information on availability of loans, seasonal changes, new farming techniques, on planning, availability of lawyers, and land inheritance in that order.

1. On sources of information, the study concluded that main sources were the government and cooperatives. However, banks, various NGOs, and churches and agricultural. extension workers also provided information. That the government was the main source of information on land issues, and environment, and legal aspects. Farmers' cooperatives were the main

providers of information on agriculture, physical planning, and access to credit.

The study conclusion was that more research should be carried on identifying other sources of information, other than the government and cooperative. The stake holders should be involved in the provision of information, but the use of ICT would provide more and diverse and relevant information in addition to what the farmers need.

3. On the use of the information the farmers succeeded to acquire, the study conclusion was that however little the information was, in all the categories, it had contributed to some extent, to enhancing the welfare of the farmers, improvement of their livelihoods, accessing credit even in kind from the cooperatives, seasonal changes, learning new things and acquiring skills like fish keeping and on legal aspect, the farmers had sought help on land disputes over land ownership and land inheritance rights.

   The conclusion was that access to information is critical in providing, and advancing knowledge to farmers and hence improving the livelihood their

4. The farmers' preference on channels of communication that they used was oral communication and barazas which were not satisfactorily effective. Radio, television provide important information and mobile technology is quickly advancing and is highly effective. The conclusion is that the use of mobile phone is becoming the most important communication device, providing much needed information.

6.2 Recommendations

Information Access

- On information needs it is recommended that the government, cooperatives, and other information providers should put measures to help farmers acquire the information they need, specifically information on availability of loans, seasonal changes, new farming techniques, on planning, availability of lawyers, and land inheritance in that order.

- **Information Sources**

  On sources of information, it is recommended that the national and county governments take measures to bring information close to the farmers by using modern technologies (ICT), modern communication channels, and including the use of the internet, establishing modern resource information centers, equipped with relevant information, sharable data bases like databases of legal information providers and services offered, qualified and knowledgeable personnel who are able to identify relevant information sources and materials that will benefit farmers in Kiambu county

- **Information use**

  It is recommended that information providers and information workers should ensure that the farmers are trained on how to identify the information they require, how to access information and how to apply the information effectively. Farmers need training on how to access and use of information sources available. This is important for them specially to know what questions to ask and how to ask it. This can be done through training, seminars but most importantly through video, radio, and television programmes.

- **Information repackaging**

  The national government in collaboration with the county government should ensure that the existing information on seasonal changes and the effects of climate change on farming should be simplified and made accessible to farmers. Information on climate change should be broadcasted through radio regularly and nationally, in Kiambu and in all counties in Kenya, to identify and predict any major environmental related changes.

- Similarly, legal information should be presented in a language the farmers understand. Most official documents are in the English language. Use of a national language like Swahili and local language could enhance the farmers' comprehension of the information they acquire.

- **Establishment of modern information center system in the county**

  The study established that information should be brought close to the farmers (especially women), whose activities are around their homes so that they can spend little time looking for it. The farming community could gain immensely if relevant information is brought closer to them especially using modern information technology and establishing resource and information center.

6.3 The Proposed Model Information and Resource Center

Introduction

The aim is to have a resource center that will provide relevant information close to the farmers to facilitate access to information in many forms within one physical space. The objectives of the proposed model which are based on the study findings are: to acquire and house up to date and timely information in various forms on specific area of land related agricultural information which are land tenure, physical planning, agriculture activities, on environment, access to credit, legal aspects and other

relevant information on other fields. To have the material collected, processed, and disseminated for the benefit of the farmers. Others are to promote resource sharing among farmers in Kiambu county constituencies using modern facilities like the internet and mobile phones, and with other counties at large to address shortage of information sources. Mchombu (2004) talks of sharing information by communities but this study is specifically aimed at the farming community. The resource center is also directed at repackaging information for simplicity and in the language the farmers understand, and to encourage the farmers to use modern technologies in acquisition and use of information including the internet access to enable the farmers to access appropriate relevant and timely information that is available on the internet.

The model

Information and Resource Centre:

The center is set up in a thematic model as shown in figure 14. The links are presented below as follows:

A. One –stop center that provides land related agricultural information and other agricultural related information, and which will make use of ICTs to provide, disseminate and package and repackage information services.

B. The structure of the center: This includes the administration, specialist and staff, capacity building.

C. Information activities: The center holdings, housing printed materials; Audio/Visual: Databases; Alerting services; communication and information desk; Information packaging and repackaging for facilitation of information use.

D. Primary Beneficiaries: the farmers; dairy, coffee, tea, pyrethrum, and subsistence farmers

E. Key Stakeholders: Government, Farmer's cooperatives, NGOs, Banks, and researchers including individuals. These are stakeholders who are identified as information providers who have relevant information and interest in land agriculture and farming in Kiambu county

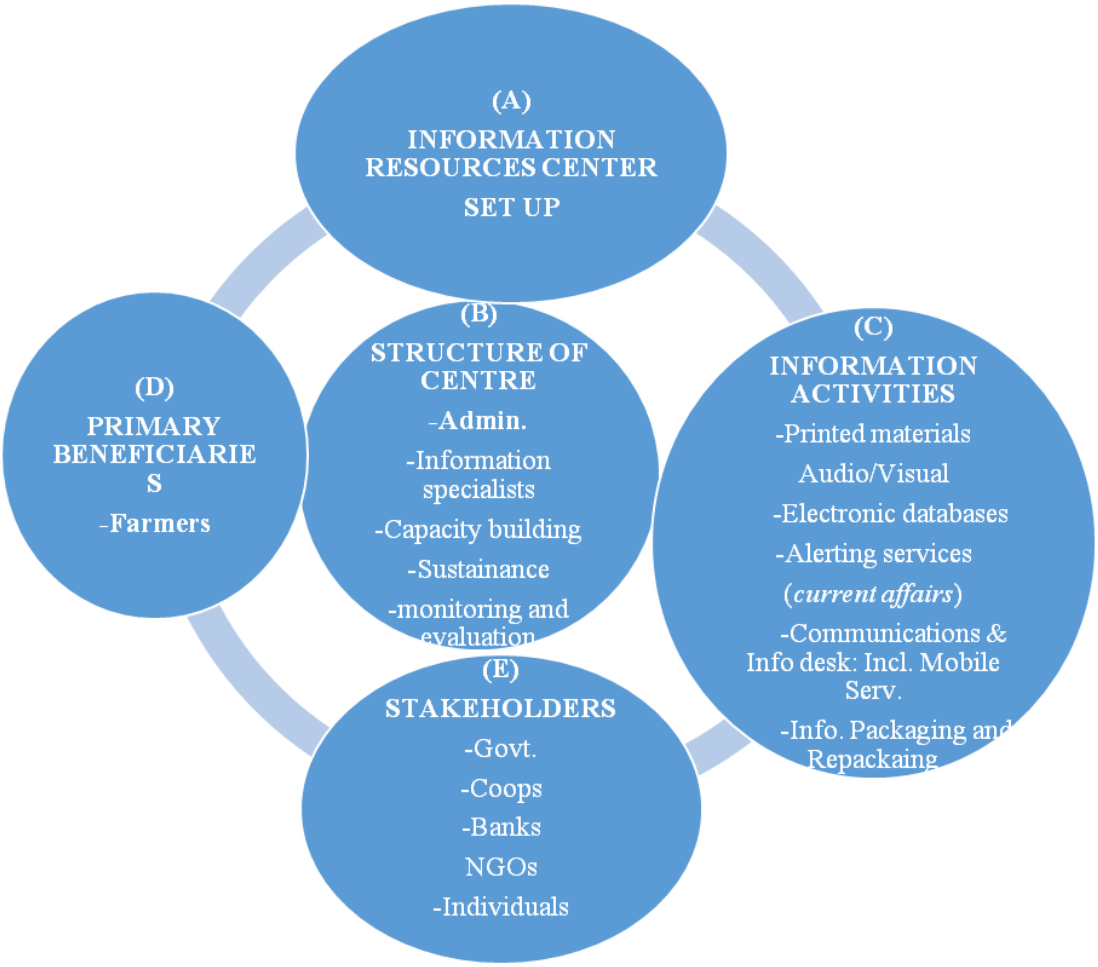

Figure 14: Model Information and Resource Center

The center is aimed at providing relevant information to meet the needs of farmers. The information should be processed in a way that will facilitate its use. Odini (1995) asserts that information providers and experts need to pay attention to the information needs of the various groups and the communication process among each group. The center will need collaborative approach in acquisition of resources first because of

financial reasons as well as need to acquire relevant and timely information. It will have to recruit trained staff as well as build capacity for staff development.

The center will have to acquire first the building then the infrastructure, computers, printers, photocopiers, scanners etc. and be near good road network for ease of access. The center will then build a collection of materials both print, audio and visual and others for the benefit of the farmers and stake holders. The center will provide information to the members using both print media and modern electronic formats since the purpose is to have a center that have channels and information sources suitable for acquisition and dissemination of information.

The center will provide for packaging and repackaging of information. Use of mobile devices for information access and dissemination will be essential. The center will have an information desk for current awareness. This should also serve an information service area for question and answer where the information specialist in charge of providing information, should be cognizant of farmers' literacy level and the questions they might ask which might seem basic but pertinent to their information requirements and subsistence. "Munyua (2000), establishes that rural communities require information among others on supply of inputs, new technologies, early warning systems (drought, pests, diseases, credit, market prices and their competitors).

For information dissemination, the center will make use of different channels. Use of mobile devices for information access and dissemination will be essential. The center staff should provide tailor-made information packages in Swahili and Gikuyu languages. According to Saracevic (1986), information should be disseminated through the appropriate channels that will enhance user access and use of that

information. Underwood (1990) affirms that when designing information services, one should think of operational issues by delineating specific products and the tasks the services will provide. The County government should work with the national government and farmers' cooperatives for the sustainability of the center. However, farmers, who are the main beneficiaries of information should participate in the planning and developing of the center's information services.

6.4 Suggestions for Further Research

The aim of the study was to investigate, access to and use of land related agricultural information by farmers, in Kiambu County. The following research activities are recommended to further augment the present achievements:

a) This study exposed five categories and subcategories of information needs, and how the farmers used the information they accessed within those categories. These are land tenure, physical planning, agriculture activity, environment, access to credit, and legal aspects. Further Research should be advanced on access to and use of land related agricultural information on each of these categories.

b) Further research should be carried on sources of information on the same categories to enhance the availability of information the farmers require using modern technologies (ICT), modern communication channels, including the use of the internet and ways that would facilitate sharing of relevant databases on information required by the farmers within the 47 counties in Kenya.

c) Research should be done on the training of farmers on how to access information using modern technology and consequently the use of ICT.

This study has contributed to uncovering the intensity of information needs on land related agricultural information in Kiambu County within the field of information sciences studies, and therefore contributing to knowledge.

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ANNEX 1: RESEARCH PERMIT

REPUBLIC OF KENYA

NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY & INNOVATION

Ref No: 640423

Date of Issue: 20/May/2021

RESEARCH LICENSE

This is to Certify that Ms. Phyllis Wambui Wagacha of Moi University, has been licensed to conduct research in Kiambu on the topic: ACCESS TO AND USE OF LAND RELATED AGRICULTURAL INFORMATION BY FARMERS IN KIAMBU COUNTY for the period ending : 20/May/2022.

License No: NACOSTI/P/21/10022

640423

Applicant Identification Number

Director General

NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY & INNOVATION

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ANNEX 2: REQUEST LETTER FOR RESEARCH PERMIT

MOI UNIVERSITY
SCHOOL INFORMATION SCIENCES
NAIROBI CAMPUS

Tel: (053) 43153
Fax: (053) 43153

P.O Box 63056-00200
NAIROBI
KENYA

MU/NRB/IS/SA/14

24th May 2021

National Commission for Science, Technology and Innovation
Upper Kabete.
NAIROBI

Dear Sir/Madam,

RE: REQUEST FOR RESEARCH PERMIT
WAGACHA PHYLLIS WAMBUI – IS/DPhil/011/09

This is to confirm that the above named is a Postgraduate student of Moi University, School of Information Sciences. Mrs. Wagacha Phyllis Wambui is pursuing a PHD in Library and Information Sciences at Moi University.

The student successfully defended her proposal and proceeded for her research data collection in 2011. The research Title is– **"Access to and use of land related Agricultural information by Farmers in Kiambu County".** Unfortunately, she misplaced the research permit.

The purpose of this letter is to request for a replacement/renewal of the Research Permit so that she can attach it to the final thesis which is a requirement.

The University shall highly appreciate any assistance accorded to her.

Yours faithfully,

DR. JARED OBUYA
COORDINATOR, COMMUNICATION STUDIES

ANNEX 3: INTRODUCTION LETTER FOR INTERVIEW GUIDE

P. Wambui Wagacha
Moi University,
School of Information Science,
P.O. Box 3900-30100

Eldoret

Uasin Gishu County,

Kenya.

Dear Sir/Madam,

REF: DATA COLLECTION MISSION FOR A DOCTORATE DISSERTATION IN LIBRARY AND INFORMATION SCIENCES.

As a partial fulfilment of the requirements for a Doctor of Information Sciences, at Moi University, I, the undersigned, wish to request you to answer the questions in the interview guide here attached. The purpose is to assess availability or lack of it and use of information on land related issues in Kiambu County and thereafter make recommendations for better information systems and services.

Any information you provide will be treated with utmost confidentiality and used only in the realization of the objective outlined above.

Yours faithfully

P. Wambui. Wagacha

ANNEX 4: INTERVIEW SCHEDULE

ACCESS TO AND USE OF LAND RELATED INFORMATION FOR AGRICULTURAL DEVELOPMENT IN KIAMBU COUNTY

NAME OF INTERVIEWER----------

DATE----------

ENUMERATION AREA ----------

COUNTY----------

LOCATION----------

NEAREST TOWN----------

RESPONDENT'S PROFILE

Q.1. GENDER Male -------- Female-------

Q.2. Age of respondent----------

Q.3. Education (Highest Level) ----------

Q.4. Occupation other than farmer----------

Q.5. Are you a Dairy, Coffee, Tea or Pyrethrum farmer? If your farming activities include all or some of these please categorize them in order of importance

- Dairy----------
- Coffee----------
- Tea----------
- Pyrethrum ----------

Q.6. Do you undertake any other farming activities besides the above?

(For example, Livestock, Chicken growing, Fish keeping, Foodstuff-maize, vegetables etc.)

Please explain----------

Q.7. What is the approximate size of your land (Acres)? ----------

Q.8. Do you own the land? ----------

If you do not own the land, please explain----------

SECTION I: GENERAL INFORMATION ON LAND INFORMATION ACCESS & USE

Q.10.What information do you require on the following to use your land efficiently?

a. Land tenure----------

b. Physical planning----------

c. Agriculture activity, including farming----------

d. Environment----------

e. Access to credit----------

f. Legal Aspects----------

g. Do not know----------

h. Please Rank your preference marking your most important as no. 1 to the least important

1 ----------2) ----------3) ----------4) ----------5) ----------6

SECTION II: INFORMATION SEEKING EXPERIENCE WITH INFORMATION PROVIDERS

Q.11.A. How do you source information on the following?

a. Land tenure----------

i. From government----------

ii From NGOs; Churches; Cooperative, traders (you may tick more than one) ----------

iii. Other, Specify----------

b. Physical planning----------.

i. From government----------

ii. From NGOs; Churches; Cooperatives; traders (you may tick more than one)----------

iii. Other,specify----------

c. Agriculture activity, including farming----------.

i. From government ----------

ii From NGOs; Churches; Cooperatives; traders (you may tick more than one)----------

iii Other, specify----------

d. Environment----------.

i. From government----------

ii From NGOs; Churches; Cooperatives; traders (you may tick more than one)----------

iii. Other, specify……

e. Access to credit----------

i. From government

ii From NGOs; Churches; Cooperatives; traders (you may tick more than one)----------

iii. Other Specify----------

f. Legal aspects----------

i. From government----------

ii. NGOs; Churches; Cooperatives; farm traders (you may tick more than one) ----------

iii Other,specify----------

7. I have not sought for information ----------

i. Among the above types of information, rank the information you seek most from Government: 1) ----------2) ----------3) ----------4) ----------5) ----------6) --------8. (Please rank your preference marking your most important as no. 1 to the least important)

ii. Among the above types of information, rank the information you seek most from NGOs

Churches; Cooperatives; farm traders: 1) ----------2) ----------3) ----------

4) ----- - ---------5) ----------6) ----------.

iii. From Other organizations /Institutions etc. 1. ----------2----------3----------4----------5----------6----------8.

Please Rank your preference marking your most important as no. 1 to the least important.

Q.11.B. How is the information presented to you? In what form----------

In Paper form e.g. report/ non paper form e.g. Meetings (baraza), Media(radio, T.V., DVD-etc.----------

SECTION III: ADEQUACY OF INFORMATION ACCESS AND DELIVERY FOR EFFECTIVE USE

Q.12. Do you find information sources available to you adequate for your activities on the following?

Land tenure-- Adequate…… Inadequate……Hardly Available……

Physical planning- Adequate------inadequate--------Hardly Available----------

---

Agriculture activity, including agriculture- Adequate------Inadequate---- Hardly Available----------

Environment- Adequate----------Inadequate----------Hardly Available----------

Access to credit- Adequate----------Inadequate----------Hardly Available----------

---

Legal aspects- Adequate---------Inadequate--------Hardly Available----------

---

Please explain----------

SECTION-IV: MODES OF INFORMATION DELIVERY THAT IS PREFERERED BY THE FARMERS

Q.13. How would you prefer the information delivered to you on the different sectors, for example?

- *BARAZAS* for information on (Land tenure; Physical planning; Agricultural activity; Environment; Access to credit; Legal aspects) ----------

---

Why? Explain ----------

- WORD OF MOUTH for information on (Land tenure; Physical planning; Agricultural activity; Environment; Access to credit; Legal aspects)----------

---

Why? Explain ----------

- PRINT MATERIALS EG. BOOKS, PAMPHLETS, NEWS CUTTINGS for information on (Land tenure; Physical planning; Agricultural activity; Environment; Access to credit; Legal aspects)---------- ----------

----------Why? Explain ----------

- PICTURES for information on (Land tenure; Physical planning; Agricultural activity; Environment; Access to credit; Legal aspects)----------

---

Why? Explain ----------

• MOBILE PHONE TEXT MESSAGES for information on (Land tenure; Physical planning; Agricultural activity; Environment; Access to credit; Legal aspects)-------- ----------

Why? Explain ----------

•AUDIO TAPE for information on (Land tenure; Physical planning; Agricultural activity; Environment; Access to credit; Legal aspects)----------

----

Why? Explain ----------

• SLIDES for information on (Land tenure; Physical planning; Agricultural activity; Environment; Access to credit; Legal aspects)---------- ----------

----

Why? Explain ----------

• VIDEO CASSETTE for information on (Land tenure; Physical planning; Agricultural activity; Environment; Access to credit; Legal aspects)---------- ----------

Why? Explain ----------

• COMPUTER FILES for information on (Land tenure; Physical planning; Agricultural activity; Environment; Access to credit; Legal aspects)----------

----

Why? Explain ----------

- LIST OF INTERNET ADDRESSES for information on (Land tenure; Physical planning; Agricultural activity; Environment; Access to credit; Legal aspects)----------

---

Why? Explain ----------

SECTION V: GAPS IN INFORMATION ACCESS AND DELIVERY FOR EFFECTIVE USE

Q.14. After you source for information on the following issues and is presented to you, do you still find you need to seek for more information to be effective on the following:

a. Land tenure----------

---

b. Physical planning----------

---

c. Agriculture activity, including farming----------

---

d. In environment----------

---

e. In access to credit----------

---

f. In legal aspects----------

----------Any comments you would like to make----------

SECTION VI: CHALLENGES/CONSEQUENCIES OF INFORMATION ACCESS AND DELIVERY FOR EFFECTIVE USE

Q.15. What are the problems, (challenges /consequences) of the above gaps (lack of information), to your farming, and livelihood?

a. Land tenure----------

---

b. Physical planning----------

---

c. Agriculture activity, including farming----------

---

d. In environment----------

---

e. In access to credit----------

---

f. In legal aspects----------

Any comments you would like to make----------

SECTION VII: POSSIBLE SOLUTIONS TO CLOSING THE ACCESS/USE INFORMATION GAP

Q.16. What things would you like to see changed or possible solutions to closing the gap?

a. Land tenure----------

---

b. Physical planning----------

---

c. Agriculture activity, including farming----------

---

d. In environment----------

---

e. In access to credit----------

---

f. In legal aspects----------

Any comments you would like to make----------

SECTION VIII: POSSIBLE USES OF ICT TO ACCESS AND USE INFORMATION ON LAND

Q.17. What are your views on possible uses of ICT to access and use information on land?

a. Land tenure----------

---

b. Physical planning----------

---

c. Agriculture activity, including farming----------

---

d. In environment----------

---

e. In access to credit----------

---

f. In legal aspects----------

----------Any comments you would like to make----------

SECTION IX: POLICIES ON ACCESS TO/USE OF INFORMATION ON LAND

Q.18. What are your views on government participation in provision of information on access to information on land on the following?

a. Land tenure----------

---

b. Physical planning----------

---

c. Agriculture activity, including farming----------

---

d. In environment----------

---

e. In access to credit----------

---

f. In legal aspects----------

Any comments you would like to make----------

Q19. What are your views on NGOs, cooperatives, Churches, Farm Traders, other organizations, Institutions etc. participation in provision on access to and use of land related information on the following?

a. Land tenure----------

---

b. Physical planning----------

---

c. Agriculture activity, including farming----------

---

d. In environment----------

---

e. In access to credit----------

---

f. In legal aspects----------

----------Any comments you would like to make----------

SECTION X: MODEL FOR ACCESSING AND USING LAND RELATED INFORMATION IN THE COUNTY

Q.20. What recommendations or model of information provision would you propose, to improve access to and use of information on?

a. Land tenure----------

---

b. Physical planning----------

---

c. Agriculture activity, including farming----------

---

d. In environment----------

---

e. In access to credit----------

---

f. In legal aspects----------

---

g. On other land related matters ----------

----------Any comments you would like to make----------
