

**ACCESS AND USE OF DAIRY AGRICULTURAL INFORMATION BY SMALL-
SCALE YOUNG FARMERS IN MURANG'A COUNTY, KENYA**

BY

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E65/OL/CTY/24112/2014

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**A RESEARCH PROJECT SUBMITTED IN PARTIAL/FULFILLMENT OF THE
DEGREE OF MASTER OF LIBRARY AND INFORMATION SCIENCE OF
KENYATTA UNIVERSITY.**

AUGUST, 2018

DECLARATION

Student's Declaration

I confirm that this research project is my original work and has not been presented in any other university/institution for certification. The project has been complemented by referenced works duly acknowledged. Where text, data, graphics, pictures or tables have been borrowed from other works- including the internet, the sources are specifically accredited through referencing in accordance with anti-plagiarism regulations.

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DEDICATION

Dedicated to my mother, Lucy Wambui Thuo, you were always eager to know what I was studying, here it is. And for all the amazing women I've met, and those I haven't, who battle with the dark days, bright days are coming.

ACKNOWLEDGEMENTS

First and foremost I would like acknowledge the Almighty God for giving me life, good health and strengthen throughout my studies and in preparation of my research project. I glorify your name.

I am particularly grateful to my supervisor Dr. Rose Njoroge for her professional guidance and advice in accomplishment of this project. She has been of great help. I also sincerely thank lecturers in the Department of Library and Information Science for their intellectual guidance and support.

My continuing gratitude goes to my family for their love, moral support and motivation to move on during my studies. I have been helped throughout the preparation of this project by friends, colleagues and classmates who have given strong support in often difficult times when I was almost giving up.

To you all, my grateful thanks. May God bless you abundantly.

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ABBREVIATIONS AND ACRONYMS

ATMA	Agricultural Technology Management Agency
CAS	Current Awareness Services
CD	Compact Disc
DIDC	District Information Documentation Centers
DVD	Digital Versatile Disc
GDP	Gross Domestic Product
GPS	Global Positioning Systems
G20	Group of Twenty Countries based in Nigeria
ICT	Information Communications Technology
KDSCP	Kenya Dairy Sector Competitiveness
KIG	Kenyan Information Guide
MCC	Murang'a County Creameries
NACOSTI	National Commission for Science, Technology and Innovation
NGO	Non Governmental Organizations
SARD	South African Agricultural Research Development
SDI	Selective Dissemination of Information
SPSS	Statistical Package for Social Sciences
USAID	United States Agency for International Development

ABSTRACT

Access to agricultural information influences the farming practices adopted by farmers. Information centres are charged with the responsibility of ensuring that there are adequate, relevant and up-to-date information resources for all. Dairy farmers need frequent access to information on nutrition, breed, health status, environment, and among others to cope with modern dairy farming practices. Inefficient access and dissemination of dairy agricultural information can negatively affect the production level of dairy products. This study sought to investigate access and use of dairy agricultural information by small-scale young farmers in Murang'a County, Kenya. The area has experienced low dairy agricultural productions despite its high potential in dairy farming. The study aimed at understanding how farmers get information on dairy farming for improvement in dairy farming production. The study's specific objectives were; to assess the information needs and seeking behavior of young farmers venturing in dairy farming; to find out the various information sources used in accessing dairy agricultural information by young dairy farmers; to find out the technologies employed by young dairy farmers in accessing dairy agricultural information and finally investigate the challenges encountered by small-scale dairy farmers in access and use of dairy agricultural information. The study used descriptive survey research design. A sample size of 152 respondents were selected from a target population of 250 young dairy farmers and 12 extension officers who are located in Kangema, Kiharu, Kigumo and Mathioya constituencies in Murang'a County. Simple random and purposive samplings were used to select 152 small scale dairy farmers and 12 extension officers. Questionnaires, interview guides and observation schedules were used as instruments of data collection. A pilot study was conducted in Maragwa constituency to enhance the reliability and validity of the instruments. Data was analyzed by use of quantitative and qualitative methods. Description and thematic analysis was used for qualitative data analysis while descriptive and inferential numeric analysis was used for quantitative data. Frequency tables, bar graphs, percentages and pie charts were used to present analyzed data. The study established that all the young dairy farmers required dairy agricultural information however; factors such as lack of exposure, lack of confidence, illiteracy, lack of funds and technical difficulties in information access negatively affected their information seeking behavior. The key source of dairy agricultural information used by majority of the farmers was radio, others being other dairy farmers and television. Majority of the farmers never used technologies such as computers, CD/DVD and social media to access dairy agricultural information. Three quarters preferred using other sources over technology. Among the most common challenges faced by farmers were inadequate funds, inadequate extension services, lack of information services, lack of support by the government and poor infrastructure in rural areas. The study concluded that there are gaps in access and use of dairy agricultural information. The researcher therefore recommended that the government should; recruit more extension officers within Murang'a County to ensure improved extension services, set up agricultural resource centers with qualified information providers to assess, select and acquire useful agricultural resources, improve infrastructure and set up cyber cafes within the sub counties and also educate dairy farmers on the use of technologies in accessing agricultural information.

CHAPTER ONE

INTRODUCTION AND BACKGROUND TO THE STUDY

1.1 Introduction

This chapter presents the background of the study pointing out why the researcher intended to conduct the research. It provides an overview of the dairy farming as one of the major type of farming practiced by farmers. The chapter states the problem investigated describing the research gaps that need to be filled. It also outlines the purpose and objectives of the study, research questions, significance of the study, limitations and delimitations, and theoretical and conceptual framework.

1.2 Background to the Study

Information is valuable in every development process. According to Rezvanfar, Moradnezhai & Vahedi (2007), information is required because of its significant contribution to the daily activities of people. In the information era, distribution and utilization of information by information providers to farmers will play a considerable role in the improvement of farming methods and practices. Access to agricultural information by farmers is crucial for advancing food production at the rural community (Yusuf, Masika and Ighodaro (2013). Li and Baoguo (2011) states “agricultural information provision is the central element of advanced agriculture system, as well the fundamental and essential promoter for agriculture development, helping for betterment of the rural farmers”. Lack of information resources in the rural communities is the main factor hindering increased agricultural production and high income by farmers. Improving dissemination of agricultural information at the village level may proficiently fill the information gap, positively enabling farmers to improve production and enhance their livelihood (Yaseen, Xu, Yu and Hassan, 2016). Therefore, information providers through the government need to

come up with efficient methods of satisfying farmer's information needs as rural society need information on diverse areas of rural livelihoods that will boost opportunities and lessen risks.

Application of information and communication technologies in agricultural information dissemination is also very crucial. Under-utilization of ICTs in agricultural information searching is mainly caused by lack of suitable ICT skills and lack of awareness of existence of ICT tools (Tadesse and Bahigwa, 2015). Adebola (2013) in his study points out that "agriculture is viewed as unattractive to youths and they tend to have a negative perception towards it". He therefore suggests that "there need to make the agricultural sector attractive to youths through re-branding, education and making full use of Information and Communications Technology (ICT)". Youth in rural regions are migrating to cities and towns to look for white collar jobs or start businesses not considering there are opportunities in farming. South African Agricultural Research Development (SARD, 2007) reveals the number of rural inhabitants firmly went down in 2001 from 44.9% in 1996 to 42.5% due to financial and dilapidating agricultural opportunities in towns and villages respectively. Contrary to this, Akinnifesi (2013) study concluded by asserting that "the growing demand for food and the expanding market, coupled with endowment of land and labor in Africa, create scope for employment and income generation opportunities for African youth". To motivate young farmers in their daily farming activities, there is a need for provision of appropriate agricultural information and training regarding the required technologies, in order to enable them can carry out tasks proficiently. To achieve this, it is a pre-requisite to therefore understand farmer's information needs and information seeking behavior.

Dairy farming has been one of the major agricultural activities among the people in the rural communities. The dairy industry is a major employer in the world and it is growing further as the demand for milk products is rising with the increasing number of people worldwide. At national

or regional level dairy farming needs a well organized infrastructure and the availability of support services: marketing facilities; breeding, health and extension services; and a reliable supply of inputs. Farmers need knowledge, skills and management capacities (Maas, Bonnier and Rijks 2008).

Despite India being the largest producer of milk, farmers in rural areas also face challenges in access and utilization of information due to inadequate infrastructure, inadequate use of ICTs and implementation of current agricultural practices, illiteracy and inefficient marketing. However, World Bank News, (2012) reported that “new approaches towards the dissemination of agricultural technology such as the Agriculture Technology Management Agency (ATMA) model has contributed to diversification of agricultural production in parts of rural areas”. Chandrasekan, Dipesh, Jitendra, Kamlesh, and Dinesh (2010) and Rao, (2007), reveals that in India, agricultural information which mainly consists of scientific research information is primarily obtained from research institutions and universities, though this information is not disseminated to the rural farmers.

In Africa, dairy agriculture is considered as the source of growth in nearly all developing countries. It contributes significantly to the economy of African countries. Proofing this in Africa is Rwanda's Girinka “One Cow per Poor Family” project that was started by President Paul Kagame in 2006. The program has given out more than 130,000 cows to the rural people with an aim of combating poverty. The program sought to enhance livestock production, increase family incomes and reduce poverty in rural areas. In Nigeria, a Group of Twenty Countries (G20) initiative has been working jointly with the Federal Government of Nigeria to generate research information that is aimed at increasing agricultural productivity (Nigeria Federal Ministry of Agriculture, 2011). In spite of this, there are still barriers to information access and utilization

which include: lack of sufficient agricultural knowledge and information, high illiteracy level, language and poverty among farmers (Sani, 2014).

In Kenya, the main types of agricultural activities include dairy and crop farming. Dairy agriculture employs majority of the population and provides income for rural families. Muriuki et al. (2004) emphasize that “the dairy industry is the single largest agricultural subsector in Kenya, larger even than tea”. It provides 14 % of agricultural GDP and 3.5 % of total GDP (Government of Kenya, 2008). This farming is mostly practiced in rural areas by young small-scale farmers where nearly all of the residents live and rely on farming for their living. It is also practiced by both men and women unlike other types of small scale farming which are mainly practiced by women as shown by Ngongo (2016) and Benard (2014) studies.

In Murang’a County, Central Kenya, majority of the rural young people are practicing dairy farming. Murang’a County has an approximate population of 700,000 with a land area of approximately 1,700 square miles (Kenyan Information Guide, 2015). The County is highly dependent on agriculture. Over half of the land is used by small - to medium-size farm holders for crop cultivation and dairy farming (KIG, 2015). Dairy farming has become popular among the youth in this County following the introduction of “One Youth One Cow” initiative project that was launched by Governor Mwangi wa Iria on 23rd September, 2015. The project is under the partnership of Murang'a County Government and Murang'a County Creameries (MCC). It provides an affordable and a friendly financial plan that enables the youths to venture into dairy farming. Youth in the age of 18-35 years bracket are eligible to benefit from the project. The first phase was done during the launching day. Two hundred and fifty (250) cows were given to beneficiaries drawn from various sub-counties. Since then the program has been giving out more cows to the youth on annual basis.

Information on dairy farming is crucial to growth of young dairy farmers and also a major source of income to the people in both rural and urban regions (Muriuki *et al.*, 2004). These young farmers take decisions in their day-to-day farming activities though this can be greatly supported by accessibility to adequate information to satisfy their needs. Hence, distribution of information to young small-scale farmers in rural areas will be an important contribution for modernizing of agricultural production. To support and sustain the “One Youth One Cow” program in Murang’a County, access and utilization of dairy agricultural information by the young beneficiaries is a major factor in advancing small-scale dairy agricultural production, attracting markets to dairy products and thus leading to better standard of living among the youth in the County.

Murang’a is among the counties in Central Kenya experiencing difficulties in access to social amenities in rural towns. This includes inaccessibility to information and technology due to poor infrastructure. Aina, (2007) acknowledges that “rural farmers face widening information gaps and therefore it is difficult for them to compete in the global market”. In addition to this, unemployment among the youth has been a great problem in this area. The county has three information centres namely: The Kenya National Library Services, Kangema Community Library and Murang’a County Information and Documentation Centre (DIDC). The researcher visit to these centres found out that there are very few information resources on dairy farming. Apart from Kenya National Library Services, the rest are poorly stocked with information resources. This shows that there is negligence in identification of user information needs and also poor connection between the small-scale farmers and information providers such as research institutions, extension officers and libraries.

The study therefore intended to assess access and use of dairy farming information by small scale young farmers in Murang’a County, who are beneficiaries of “One Youth One Cow”

initiative. Appropriate strategies to be used in disseminating dairy farming information to young farmers have been recommended.

1.3 Statement of the Problem

Lack of white collar jobs has faced a high population of young Kenyans. According to Kenya National Bureau of Statistics, over one-third of Kenya's population is between the ages of 18 and 35 years. Most young people go back to their rural homes to start farming. This presents a great opportunity for Kenyan Youth since there are available markets for products in the agricultural sector. Among the types of farming practiced is dairy farming. Youth take up the dairy farming duties when the aged generation retires from the business. They have also identified opportunities in dairy farming projects to take up employment and enterprise activities. The projects have been implemented by the national government and others are coming up in counties to support dairy farming and also increase incomes and improve livelihoods for rural youth and women. Among the known projects are The USAID, Kenya Dairy Sector Competitiveness Program (KDSCP), and Integrated Dairy Farming for Income and Employment for Women and Youth.

Murang'a County has got high potential in dairy farming due to its good environment and weather conditions, fertile land and high rainfall. Despite, there has being very low productions of dairy farming and this suggests that there are challenges facing dairy farmers in this area. Park, (2016) outlines common challenges faced by women and youth in agriculture and food systems as: limited access to productive resources (land, water, inputs, technology) and information, limited access to extension services and credit, lack of voice and participation in rural institutions and decision making, and limited access to decent rural employment opportunities.

With the introduction of One Youth One Cow Initiative in Murang'a County by the County government, youth are now actively participating in dairy farming. It is likely that dairy farming will dominate among the youth in the area. They need to be supported to improve the dairy farming productions in the area. To carry out their dairy farming activities effectively, farmers need information. Access to information services by the farmers in this county may pose a challenge due to the limited number extension workers provided by the government and poor access to the information services. The researcher has noted that small-scale farmers get information and advice from other dairy farmers in the neighborhood and the milk collecting organizations. The young small-scale farmers may not have enough know-how of the new dairy farming system. The dairy farming also requires repackaged information that is relevant, specific and up to date. High illiteracy among the rural people which includes farmers may create difficulties in access to information.

The establishment of National libraries and Documentation centres within counties reveals how the government value information. The information centres, specifically Murang'a National Library, Murang'a County Documentation Centre and agricultural extension officers are expected to play a major role by providing adequate and relevant dairy agricultural information. This has not been happening and as a result, the researcher had a reason to investigate the gaps in access and utilization of dairy agricultural information services in the area of Murang'a County.

1.3.1 Purpose of the Study

The general objective of this study was to investigate access and use of dairy agricultural information by young small scale farmers in support of "One Youth One Cow" initiative in

Murang'a County. The study aimed at understanding how farmers get information on dairy farming for improvement in dairy farming production.

1.3.2 Objectives of the Study

The objectives of the study were:

1. To assess the information needs of young dairy farmers in Murang'a County
2. To establish the information seeking behavior of young farmers venturing into dairy farming in Murang'a County
3. To find out the various information sources used in accessing dairy agricultural information by young dairy farmers in Murang'a County
4. To find out the technologies employed by young dairy farmers in accessing dairy agricultural information in Murang'a County
5. To investigate the challenges encountered by small-scale dairy farmers in access and use of dairy agricultural information

1.3.3 Research Questions

The research was based on the following questions:

1. What are the information needs and seeking behaviors of young dairy agricultural farmers in Murang'a County?
2. What sources of agricultural information are used by dairy farmers to access dairy agricultural information in Murang'a County?
3. What technologies are employed by young farmers in accessing dairy agricultural information in Murang'a County?
4. What challenges do young dairy farmers encounter in accessing agricultural information?

1.4 Significance of the Study

The study intended to investigate access and use of dairy agricultural information by young small scale farmers. The researcher hopes that the research findings may be of importance to:

- a. Young small-scale dairy young farmers in Murang'a County as they require adequate access to current agricultural information in order to be successful in dairy farming thereby leading to improved milk production. Most of the aged dairy farmers who have been living in the area have enough know-how of the dairy farming system but the new young dairy farmers who are the main beneficiaries of dairy farming project require tailored and intense provision of agricultural information. Information about the main aspects of dairy farming such as feeding, breeding, healthcare, reproduction and recording is very vital.
- b. Technicians like extension and animal production officers who act as advisers to small-scale farmers on how to improve on their farming practices based on scientific knowledge.
- c. Development agencies like NGOs, policy makers and other local development organizations involved in dairy agricultural activities may benefit from the study findings by getting to understand farmers' information needs, factors affecting access and utilization of dairy agricultural information and also understand the gaps to be able to take corrective action.

1.5 Limitations and Delimitations of the Study

The study experienced some limitations and delimitations as explained below.

1.5.1 Limitations

This study faced the following limitations:

- a. The respondents who are the beneficiaries of the one youth one cow initiative were not willing to provide information for fear that such information could be used against them. The researcher assured them of the confidentiality of the information provided. Others asked for favors before they could give any information. In return, they were advised that the research was being done to help them improve their dairy farming practices.
- b. Farmers' absence and lack of cooperation during data collection was experienced despite interviewees being prepared before the process. The researcher had to reschedule to meet some in a different day when they were available.
- c. The geographical conditions of the area under study did not allow the researcher to reach farmers in all the areas but this did not affect the thoroughness of the study as the researcher was able to reach most of them through their cooperative creameries offices.
- d. Some farmers are beginners in dairy farming and were not able provide reliable information and hence the researcher paid attention to farmers who had been in the project for one year and above.

1.5.2 Delimitations

The target population of the study did not cover all dairy farmers in the area. The study was confined to young dairy farmers between the ages of 18 and 35 years who are beneficiaries of the one youth one cow initiative project in the year 2015. The findings of the study could not therefore be generalized to the entire dairy farmers in Kenya but the researcher considers the situation could be the same nationwide.

1.6 Assumptions of the Study

The researcher had the following assumptions:

- a. Small-scale dairy farmers have information needs

- b. The respondents would provide true, honest and transparent information necessary for the study
- c. The young small scale farmers are literate and would be able to provide information by the use of the questionnaires

1.7 Theoretical and Conceptual Framework

The study was based on the following theoretical and conceptual framework:

1.7.1 Theoretical Framework

The study was based on Daniel Bell's and Eugene Garfield theory of the Information Society. In 1973, sociologist Daniel Bell came up with the concept of post-industrial society or information age which he later renamed as the concept of information society.

By information society, he focused on the flow of information and information technology. By this, he meant the sudden increase in the distribution of scientific information and its broad accessibility by the public via mass media.

In 1979, Garfield differentiated between an information literate and information conscious society. An information conscious society is one where people take information for granted as a basic part of day by day activities, while an information literate society is one where people know how to use and evaluate information. The concept of information society emerged from the two concepts of information literacy and information consciousness. His concise definition was “information society is a society in which we take for granted the role of information as it pervades and dominates the activities of government, business and everyday life”. He foresaw that access and utilization of information by minority groups like women, elderly and

handicapped will make them powerful in addition to everyone's access and use of a diverse range of valuable or any other considerable information.

The information theory was relevant to this study as it investigated access and use of dairy farming information by small-scale young farmers who are the group of people whose information needs are always forgotten. The theory reveals the importance of information to all groups of people if it is well communicated. It also recognizes the importance of information providers in the society as the people who create, assemble, and disperse information. For this study, information providers i.e. libraries, extension officers and research institutions should play their role of acquiring, storing, repackaging and distributing agricultural information to the small scale dairy farmers. The use of current information technology facilities should be embraced in distribution and access to information. For dairy farmers, access to dairy agricultural information will help them gain knowledge and predict a bright future for the dairy farming industry.

1.7.2 Conceptual Framework

The conceptual framework below shows the relationship among dependent variables, independent variables and intervening variables.

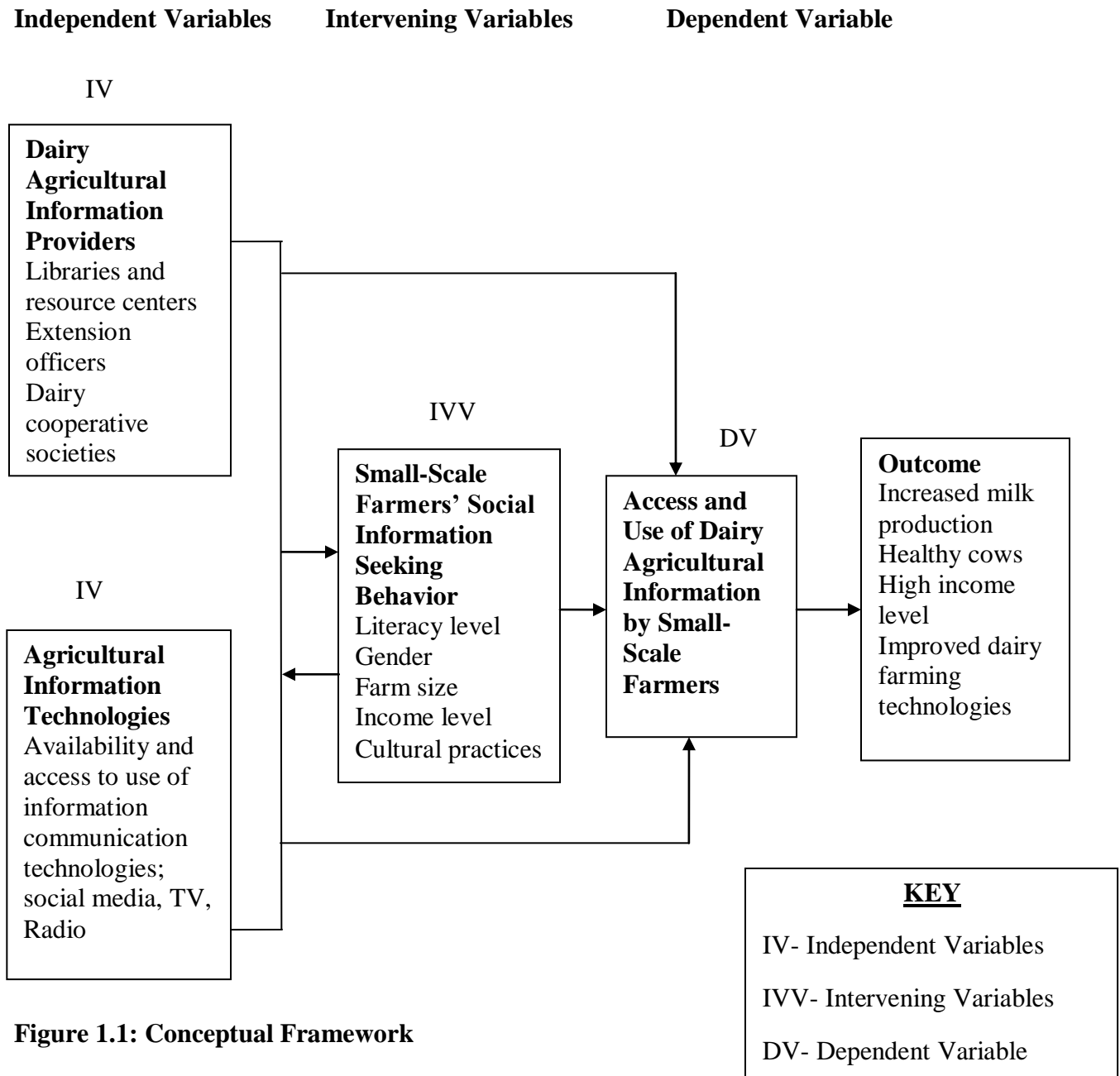


Figure 1.1: Conceptual Framework

Source: Researcher, 2018

The above conceptual framework illustrates the key factors that affect access and use of dairy agricultural information by small scale dairy farmers. Independent variables (dairy agricultural information providers and agricultural information technologies) have a negative or positive effect on the dependent variable (access and use of dairy agricultural information). The intervening variables (Farmers' information seeking behavior) affect both the independent and dependent variables. Positive outcome by farmers can only be realized by promoting the independent and intervening variables. To increase use of dairy farming information by young small scale dairy farmers in Murang'a County the above factors may play a pivotal role and will need to be looked at.

1.8 Operational Definition of Terms

Access of Information - Ability to identify, obtain and make use of dairy agricultural information effectively.

Agricultural Information Sources – Resources that provide knowledge on animal production and crop growing

Agriculture – The practice of farming that includes cultivation of crops and rearing of livestock.

Dairy Agricultural Information – Facts or data on rearing, husbandry and management of dairy cattle.

Dairy Farmer - Person who manages dairy cattle for milk production

Dairy Farming - A division of farming involved in continuous production of milk and processing of dairy products for sale.

Information - Facts or knowledge provided from study or instruction.

Information Technology – Electronic devices or facilities that are used in accessing dairy agricultural information.

Smallholder - Farmer who manages the farming activities on a small plot of land; often involved in mixed farming.

Use of Information – Ability to choose dairy agricultural information sources and apply information in dairy farming practices

Young Small-scale Dairy Farmer - Person who is between the ages of 18 and 35 years at the time of issuance of dairy cows by One Youth One Cow project in the year 2015 and practices dairy farming with less than 10 dairy cows.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

2.1 Introduction

Mathooko and Mathooko (2011) states that literature review is required to be a critical analysis of the selected works to reveal the done and the untouched by revealing the gaps that require filling. This chapter reviewed literature based on the specific objectives of the study. The areas addressed were: dairy farming information needs; information seeking behaviors by small-scale dairy farmers; sources of dairy agricultural information; application of information technologies in accessing and use of dairy agricultural information; and challenges in access and use of dairy farming information by small-scale dairy farmers. The chapter also indicated the research gaps the research sought to address.

2.2 Dairy Farmers Information Needs

Information need is interpreted depending on set of data required by a consumer in making decisions or solving issues affecting them. Information is required by all groups of people in execution of their daily activities and this therefore defines the characteristics of the information according to user needs. Among the group of information users are farmers who need access to agricultural information. Subash, Gupta & Babu (2015) in his study defines information needs as “those needs that arise from the dairy farming activities of farmers on which they feel themselves incompetent and need the assistance from some other sources before taking a decision for action”.

It is important to satisfy farmers’ information needs in countries where economy is mainly dependent on agriculture to enhance national growth (Meitei & Devi, 2009). Matovelo, (2008)

and Idiegbeyan-ose & Theresa, (2009) also admit that information “enables farmers to make informed decisions regarding production and marketing and managing their lives successfully to cope with everyday problems and to realize their opportunities”. Identifying farmers’ information needs assists in coming up with suitable guiding principles and managerial innovations (Babu, Glendenning, Asenso and Govindarajan, 2012).

Dairy farmers are a group of farmers who also need access and use of dairy agricultural information which is specific to their dairy farming needs. The fame of the dairy industrial in Kenya requires that every dairy farmer is able access information to keep informed of the current happenings. Kumar and Chander (2011) study on dairy farmers’ information needs reflected that nearly all of the respondents confirmed that information on reproduction, feeding habits, health, climate conditions and e-governance as the most useful to their farming needs.

Msoffe (2015) research on farmers information needs in selected rural areas of Tanzania concludes that there is very little understanding and concentration on farmers’ information needs. Her results suggested that information providers are ignorant and not informed of farmers’ information needs and consequently distribute information that is not useful to suit farmers’ requirements. It is advised that information managers should carry out an assessment of dairy farmers information need to ensure delivery of specific information according to individual needs. This can be successfully be done by extension officers who have gained enough experience in accessing farmers information need. This is achievable as a study by Ng’ang’a (2013) on access and use of agricultural information by extension officers showed that half of them had an experience of 21 years and above. De Silva and Ratnadiwakara, (2008) emphasizes that the “value of information needs assessment, by engaging directly with users of information, should not be overlooked. A two-way process enables farmers to share lessons and best practices

related to their farm enterprise, thus incorporating their knowledge base as well”. In developing countries, there are very few published research works on farmers’ information requirements (Babu et al., 2012). There is need to evaluate the information needs of dairy farmers and therefore the study sought to fill this gap.

2.3 Information Seeking Behaviors by Small-Scale Dairy Farmers

Singh & Satija, (2007) define information seeking behavior as “a series of attitudes in target oriented resolution process”. Information seeking behavior is a function of the recognition of one’s information needs as perceived by him, which propels him to make use of information services and resources to satisfy such perceived needs (Emmanuel, 2012).

There are different subgroups of farmers. This is defined by the type of farming activities they are carrying out and therefore it’s crucial to understand the specific factors that control their access, selection and utilization of information. This will ensure establishment of better information sharing programs. There are several factors that affect and determine the characteristics that the farmer portrays as they search for information. These includes individual characteristics such as farming experience, education and age; trading characteristics such as size of farm, market orientation, kind of farm enterprise, debt level, and farm ownership; and physical location characteristics such as accessibility to market points and distance to nearest technological infrastructure (Babu et al...2012). Psychological and socioeconomic factors also affect farmers’ hope in life pressuring their information search behavior. Bernard, Dercon, and Taffesse (2011) state that “individual characteristic to information search behavior relate to the formation of aspirations”. Ray, (2006) adds that “the capacity to aspire and gaps in aspiration could influence the search behavior of individuals”.

Information needs of farmers could be achieved by establishing their farm characteristics and delivering through their desired media. Kumar (2010) explains that determining the needs of the users' means knowing their requirement for information. In order to determine their requirements, it is essential to know the following: who the users are, their background (qualification, mastery of language, areas of research and specialization) and the purpose for which they need the information.

Majority of dairy farmers have characteristics against change in their dairy farming activities. Farmers often have a traditional lifestyle and livelihood, which in turn prevents innovation and seeking new methods of doing things (Habbershon as quoted in Eftekhari and Purtaheri, 2010). Most of the young farmers also want to follow and inherit the dairy traditional farming from the aged generation. Information providers need therefore to keep farmers informed of the available information and ensure that they are able to access, assess and use it to make decision. This involves provision of information resources at user level and also conducting seminars and training on how to access these resources. Farmer awareness has a major effect on the farmers' choice of farming venture and their performance in that particular project.

In rural areas information may be available but farmers are not able to access it because of low level of education or in poor financial status to attain the resources. Soyly, (2016) suggests that "professional efficiency and motivation of the farmers can be enabled with the satisfaction of their information needs. With the unique purpose of providing practical solutions for the farmers, their information need and information seeking behavior can be analyzed and addressed". This study therefore sought to understand the negative and positive factors that influence the information seeking behavior of young dairy farmers in accessing and using information.

2.4 Sources of Dairy Agricultural Information

Farming knowledge is passed through formal, social and experiential education pathways. Formal learning resources transfer knowledge through text from expert to learner and the resources include agricultural journals, industry magazines, text or reference books, Internet resources and self-assessment workbooks. Experiential learning is learning by doing where knowledge is acquired through experiences, observations and engagement with the surrounding environment. Social process is learning from the people you interact with. Information is shared among a group of individuals who have a common interest in ideas, practices, beliefs and decision-making perspectives (Hoffman, Lubell and Hillis, 2015).

Utilization of information resources refers to the use of content resources as well as the secondary resources which directly serve for creating, capturing, storing and consuming it (Chaolemen, Huiling, Bin, and Guojun, 2016). Access to sources of dairy agricultural information is vital for young dairy farmers as they are able to gain knowledge and create awareness on modern dairy innovations. Dairy farming is becoming more intensive in developing countries and farmers need information resources to acquire knowledge. Diekmann Loibl, and Batte (2009) remarks that “as agriculture systems become more complex, farmers’ access to a reliable, timely and relevant information source is critical to farmers’ competitiveness. Information must be relevant and meaningful to farmers in addition to being packaged and delivered in a way preferred by them.

Yusuf, Masika and Ighodaro (2013) survey reported that most farmers depend on friends, neighbours, and colleagues for farming information; however, the majority preferred extension officers together with on-the-farm demonstrations. Similarly, Benard, Dulle, and Ngalapa (2014) and Rees et al. (2000) studies revealed that the major sources of information for small-scale

farmers are family members, markets, personal experience, neighbors, community associations and agriculture extension officers”. Isaya, Agunga and Sanga (2016) study also which yielded a high response rate of 96%, found that radio and agricultural extension workers were the primary sources of agricultural information for women farmers. Contrary, both farmers and extension workers expressed dissatisfaction with the quality and frequency of their connections in Rees et al. (2000) study. This may be due to the fact that the number of farmers increases as the number of extension officers decreases as stated by Gakuru, Kristen & Stepman (2009). NGOs were also reported as important sources of information in those areas where they existed. Churches, rural community meetings and agricultural corporations were considerable information sources in some few areas.

Libraries especially public libraries, resource centres and research institutions should acquire and disseminate relevant and up to date information materials for dairy farmer to satisfy farmers their information needs. This involves provision of SDIs (selective dissemination of information) and CAS (current awareness services). Failure to this will result to farmers accessing unreliable sources of information. Warnett (2015) study portrayed that social and experiential sources of agricultural knowledge were among the highest ranked by users. Formal learning resources were ranked low. The study showed that farmers prefer acquiring information from their social peers rather than the formal professional pathways. It therefore recommended that knowledge policies that concentrate on farmers' social learning processes may result in higher application of current, production practices and methods.

From the reviewed literature, one cannot clearly tell where farmers’ specifically dairy farmers acquire specific information on dairy farming practices. The study therefore sought to explore these sources.

2.5 Application of Technologies in Accessing and Use of Dairy Agricultural Information

Tiwari, Chakravarty & Goyal (2014) states that “rapid growth of Information Communication Technology (ICT) and the introduction of ICT-enabled information services provide ways to improve information dissemination to the knowledge intensive agricultural sector and also help to bridge the information gap existing among the group of farmers”. Innovations in information technology have transformed the ways of collection, storage, retrieval, processing and communication of information. In developed countries like India, decision support system has been developed to provide farmers with interactive data driven systems on dairy production aspects. Raalte and Riel (2013) book on the use of social media in the United States shows that 76 % of farmers between the ages of 18 to 35 years use social media to share information, contact customers, and market their business.

In developing countries, use of ICT in access and use of information in agricultural sector has been slowly adopted especially in rural areas. Chukwunonso (2012) explains this has been so due barriers related with access to technology, access to ICT devices, farmer’s IT skills, and farmer’s attitude. Farmers also prefer the simple forms of technologies such as radio and television in accessing information. This is revealed by Mburu (2013) study on factors influencing access of agricultural information by smallholders which showed that 95% of the respondents preferred using radio over other ICT channels. Lwoga (2010) declares that “the advancements in the information and communication technologies (ICTs) provide an opportunity for developing countries to harness and utilize information and knowledge to improve productivity in various sectors including agriculture”.

ICT can facilitate better information flow by connecting rural agricultural communities but this seems impossible in some regions due challenges in implementation of ICT facilities. The flow

of information on agricultural production and marketing to youth has been hampered by under-utilization of ICTs (Njenga, Frida and Opio, 2012). Tiwari, Chakravarty & Goyal (2014) studies on information access asserted that the use ICTs devices is low due to poor infrastructure, lack of awareness about internet, unavailability of ICT tools and lack of motivation to use them. The study recommended that intensive effort should be made in creating and promoting favorable environment that will speed up the full utilization of the potentials of ICTs in information dissemination. Furthermore, a 2015 insight on potential, challenges and limitations on Mobile Applications and the African Farmer explains that Africa possess a number of successful agricultural apps, but often fail due to the various challenges associated with the high costs of app use, network failures, illiteracy among target users, and inability for users to charge their phones.

Information communication technologies have the ability to disseminate information to farmers. A study by Subash, Gupta & Babu (2015) recommends that effective system need to be implemented specifically on employment of information communication technologies to deal with the information needs of dairy farmers. Irungu, Mbugua & Muia (2015) also suggest that in order to attract more youths in farming industry, one of the main strategies is the integration of information communication technologies (ICTs) such as the internet, mobile phones, with traditional devices such as radio, television, and press.

The reviewed literature shows there are barriers to adoption of ICT by farmers. Fewer works have been done on how farmers use these technologies in accessing dairy farming information. The study was conducted to assess the use of technologies among the young dairy farmers and agricultural extension officers.

2.6 Challenges in Access and Use of Dairy Agricultural Information by Small-Scale Dairy Farmers

Lack of information is the main cause of challenges faced by dairy agricultural farmers as they are not knowledgeable on how to evade or resolve them. Aina (2007) states that farmers in rural areas face gaps in access to information and thus are not able to compete in the global market. Accessibility of information by farmers determines the kind of decisions they make (Agbamu, 2006). Access to current and relevant information is very important for dairy farmers. Bala and Sharma (2008) suggest that farmers should have the latest information regarding new farming techniques and innovations. Study by Rehman Ruby and Ismat (2013) showed that the print media are the major sources of agricultural information, followed by fellow farmers and television in the areas investigated. These sources may not provide adequate and current information therefore posing a challenge to dairy farmers in gaining knowledge about the new farming technologies. In addition, Singh and Priya (2011) argue that in the present days, farmers should have access to current information regarding new techniques in all areas of farming on local and international levels.

Other challenges as revealed by Benard, Dulle, and Ngalapa (2014) research on evaluation of information needs of rice farmers in Tanzania are associated with lack of information services, inadequate funds, lack of awareness of the available information sources and inaccessibility to information. The study recommended that there is a need for government and information resource institutions to lay more emphasis on sustainable practices on information accessibility to farmers. In addition, farmers including dairy farmers in Africa lack access to modern processing technology and market information (Matovelo, 2008). Babu *et al.* (2012) study on farmers' information needs and search behaviors in Tamil Nadu found out that unreliable

information and untimely provision of information are among the major barriers facing farmers in accessing information. Farmers' educational levels also influence their access to agricultural information. Mtega and Bernard (2013) study on the state of rural information and communication services in Tanzania also showed that poor/unreliable information infrastructure, high illiteracy levels, low income, lack of electricity, low adoption of ICT and high cost of ICTs have limited the accessibility of information services in rural areas.

Farmers Trends blog (2016) adds that there is limited access to extension services in most parts of the country in Kenya with the extension staff to farmer ratio standing at 1:1,500. This situation has hindered most farmers from keeping pace with changing technological advances. Low accessibility to agricultural information leads to low adoption of improved technologies, which invariably affects farmers' productivity (Ozowa, Lopez and Blair 2005). There is therefore need for recruitment of more extension officers and the involvement of libraries, resource centres and NGO's in provision of information services to farmers.

Information centres and extensions services have a big role to play in alleviation of these challenges facing dairy farmers in access and use of information in order to enhance agriculture and dairy production. The above reviewed literature showed that even though the challenges facing farmers in access and use of agricultural information have been studied, the challenges facing small-scale dairy farmers, especially in Murang'a, Kenya, have not been adequately addressed. The study therefore sought to fill this gap.

2.7 Summary

A review of the related literature evidently shows that there are gaps in access and use of information by farmers. Therefore, there is more that need to be done by information service

providers in information dissemination. There are no current studies in Kenya that has being done to explore the information needs of young dairy farmers. The five a laws of librarianship by S. R. Ranganathan clearly elaborates that information is for use and every user must be able to obtain his/her information. To ensure effective access to information by dairy farmers, their information needs, information seeking behavior, information technologies they use and challenges they face must be expressed and addressed. This study therefore sought to address these areas.

CHAPTER THREE

RESEARCH DESIGN AND METHODOLOGY

3.1 Introduction

This chapter contains information on the research design for this study, location of the study, target population, sample size, sampling techniques, research instruments, pilot study, data collecting techniques, methods of data analysis and logistical and ethical considerations observed during the study.

3.2 Research Design

Orodho (2010) defines a research design as “the arrangement of the conditions for collection and analysis of data in a manner that aims to combine relevance to the research purpose with economy in the procedure”. It comprises decisions regarding what, where, how much, by what means concerning an inquiry or a research study. The research design adopted for this study was descriptive survey research design which according to Kothari (2004) is a study concerned with describing the characteristics of a particular group or an individual.

This design was the most appropriate method as the researcher was interested in fact finding. It involved both qualitative and quantitative approach. Semi-structured interviews were used to collect qualitative data while semi-structured questionnaires were used to collect quantitative data from young dairy farmers and extension officers in Murang'a County. These two categories of respondents were chosen because they are involved in access, dissemination and use of agricultural information and they also understand the concept of dairy agricultural farming. The researcher also collected data through observation. Four sub-counties out of seven were selected

from Murang'a County because of their high level of dairy agricultural production and accessibility to infrastructure.

3.2.1 Variables

A variable is a concept that can take different quantitative values. The study investigated dependent and independent variables.

a. Dependent variable

This is a variable that depends upon or is a consequence of another variable. For this study, the dependent variable was access and use of dairy agricultural information by young farmers.

b. Independent variable

This is a variable that is antecedent to the dependent variable. In this study, the independent variables are those factors that influenced access and use of dairy agricultural information. These are availability of dairy agricultural information providers and access to and use of information communication technologies.

3.3 Location of the Study

The study was carried out in Murang'a County in four sub-counties namely Kangema, Kiharu, Mathioya, and Kigumo. They were chosen because of their high level of dairy agricultural production and accessibility to infrastructure.

Murang'a town is located 85 km North East of Nairobi, 70 km South East of Nyeri and 50 km South West of Embu. The chosen constituencies for the study are located along Kenol, Sabasaba, Muranga Highway which stretches to Aberdare Forest.

3.4 Target Population

The target population for this study included beneficiaries of One Youth One Cow initiative project and the agricultural extension officers in the four selected constituencies in Murang'a County. This is a population of 250 young small-scale dairy farmers and 12 agricultural extension officers. This population was targeted because they would provide important information on dairy farmers' information needs, sources of information and technologies used and as well as explain their information seeking behavior. This is also the population that will play a significant role in the development of dairy agricultural activities in Murang'a County. The total target population is two hundred and sixty two (262) members as illustrated below:

Table 3.1 Target Population of Dairy Farmers and Extension Officers

	Area	Target population
Dairy farmers	Kangema	57
	Kiharu	62
	Kigumo	67
	Mathioya	64
Extension officers	Kangema	3
	Kiharu	3
	Kigumo	3
	Mathioya	3
Total		262

Source: Department of Livestock Production, Murang'a County Government

3.5 Sampling Techniques and Sample Size

The target population for the study was finite and therefore the sample size for dairy farmers was determined using Krejcie & Morgan (1970) Table. The formula is as follows:

$$S = \frac{X^2 N P (1-P)}{d^2 (N-1) + X^2 P (1-P)}$$

Where:

S= required sample size

X= desired confidence level (1.96)

N= population size

P= population proportion assumed to be 0.5 (50%)

d= degree of accuracy 5% expressed as a proportion (0.05)

Based on this formula, a target population of 250 dairy farmers, a sample size of 152 dairy farmers was drawn from the table.

3.5.1 Sampling Techniques

The study used simple random sampling to select 152 small scale dairy farmers who are beneficiaries of one youth one cow project. A list of 250 members who benefitted from one youth one cow initiative and extension officers was provided from the Murang'a county office. Numbers were assigned to all the members and a Table of random sample was used to pick a sample. All the 12 members of agricultural extension officers were sampled for the study. Purposive sampling was used to select interviewees through the assistance of extension officers. This consisted of eight small scale dairy farmers who had an experience of two years and above in dairy farming and four agricultural extension officers who had an experience of 10 years and above in provision of dairy agricultural information services. Purposive sampling was also used to select four farmers to be observed based on their age by selecting the youngest in each sub county.

3.5.2 Sample Size

A sample size of 164 respondents was used as illustrated in Table 3.2. The sample comprised of 152 small scale dairy agricultural farmers and 12 agricultural extension officers. With the total

sample size of 152 dairy farmers, the sample size for each of the four constituencies was obtained as follows:

Target population from each constituency x Total sample size

Total target population

Table 3.2 Sample Size for Dairy Farmers and Extension Officers

Dairy Farmers			Agricultural Extension Officers		
Area	Target population	Sample size	Area	Target population	Sample size
Kangema	57	$(57 \times 152) / 250 = 34$	Kangema	3	3
Kiharu	62	$(62 \times 152) / 250 = 38$	Kiharu	3	3
Kigumo	67	$(67 \times 152) / 250 = 41$	Kigumo	3	3
Mathioya	64	$(64 \times 152) / 250 = 39$	Mathioya	3	3
Total	250	152	Total	12	12

Source: Researcher 2018

3.6 Research Instruments

The researcher mainly used questionnaires, semi structured interviews and observation schedules to gather data for this study. To meet the objectives of research, the researcher developed observation checklist and interview schedules.

3.6.1 Questionnaire

Orodho (2010) defines a questionnaire as a data collecting instrument which has the ability to collect a large amount of data in a reasonably short time. Questionnaires were used to obtain information from both dairy farmers and extension officers. Questionnaires were a suitable way of collecting data as the respondents were able to complete them freely at their own time. They are also confidential and time saving to the researcher. Considerations were made in the

construction of questions by using simple language and avoiding biases and ambiguity in order to motivate respondents. The respondents are young and literate and therefore the tool was appropriate for them. They were also able to read the questionnaire, understood it and expressed themselves freely.

The researcher took two days to distribute questionnaires to the sample members in the four sub-counties. The respondents were given three days to complete the questionnaires after which they were collected for analysis.

3.6.2 Interview Schedule

Interviews are essentially vocal questions that involve face to face interaction between the researcher and the respondent (interviewee) talking freely about a particular subject. The interview method of collecting data involves presentation of oral-verbal stimuli and reply in terms of oral-verbal responses (Kothari, 2004). Semi-structured interview are flexible, not completely predetermined and more controlled by interviewer. The researcher proposed to use face to face semi structured interviews with both the dairy farmers and extension officers. To be effective in conducting the interview, interview schedules were prepared as a guide with meaningful questions for the selected target interviewees. The questions were developed in a sequence of easy, closed questions and more difficult questions towards the end. The researcher used a recorder to capture information effectively.

3.6.3 Observation Schedule

Observation is a tool that provides information about actual behavior (Kombo, 2006). This method allows the investigator to directly observe things or situations without having to ask the respondents. The advantages of this method are that it eliminates biases, provides first hand

information as it is currently happening, and it's independent of respondent's willingness to provide information. It was mainly be used on dairy farmers and in two existing information centres.

The researcher prepared an observation checklist of items to be observed. Observation was carried out after the interview meetings. This worked as a validity check to verify some of the information provided during the interviews. The observation guide was used to observe the technologies applied by dairy farmers in search of information, the availability and currency of information sources in the existing District Library. The researcher recorded the information by taking photographs of observed items with the permission of the respondents.

3.7 Pilot Study

A pilot study was done in Maragwa sub-county. This was been selected through simple random techniques. This study consisted of ten (10) small scale dairy farmers and one (1) agricultural extension officer. The procedure for pretesting was the same as the one that was used for the main study only that the sample size was smaller. The purpose of the pilot study was to ensure that the data collection instruments were reliable. The pretest was done two weeks before the actual study but the information was not used in the final data collection. The data collected was analyzed to establish the suitability of the questionnaires and semi-structured interviews which were aimed at establishing whether the questions asked were relevant to the study and whether the answers received were clear. Corrections were made to the questions that were found to be inappropriate before they were administered to the actual target population of the study.

3.7.1 Validity

All selected procedures for collecting data should be examined critically to assess to what extent they are likely to be reliable and valid. Mugenda & Mugenda (2003) define validity as “the accuracy and meaningfulness of inferences which are based on the research results; it is the degree to which results obtained from the analysis of the data actually represent the phenomenon under study”. In this study, the researcher was concerned with content validity and applied expert validity method. Validity of the questionnaire was established by presenting it to two lecturers in the Department of Library and Information Science Kenyatta University who are conversant with the area under study. Their opinions were included before running the data collection process. During pilot survey the researcher also asked respondents whether the interviews questions defined were useful in measuring the content of the study and amendments were be made.

3.7.2 Reliability

Bell (2010) defines reliability as “the extent to which a test or procedure produces similar results under constant conditions on all conditions”. According to Kombo (2006), a reliable instrument gives consistent results. Interviews were conducted during pretesting of the study. The researcher sought the help of research assistance in conducting the interviews to compare the interviewer and interviewee understanding of the questions. The interview was done twice to the same group of respondents after an interval of one week in order to facilitate calculation of test re-test reliability. Scores from the two tests were subjected to correlation analysis through which correlation coefficient (r) of 1 was obtained. The following formula and steps were followed in the calculation of the coefficient.

Test	Average Age (x)	Score(y)	xy	X ²	Y ²
1	32	182	5824	1024	33124
2	33	186	6138	1089	34596
Summation (Σ)	65	368	11962	2113	67720

$$r = \frac{N \sum xy - (\sum x)(\sum y)}{\sqrt{[N \sum x^2 - (\sum x)^2][N \sum y^2 - (\sum y)^2]}}$$

Where;

r = Pearson correlation

N = number of pairs of score

$\sum xy$ = sum of the products of paired scores

$\sum x$ = sum of x scores

$\sum y$ = sum of y scores

$\sum x^2$ = sum of squared x scores

$\sum y^2$ = sum of squared y scores

$$r = \frac{(2 \times 11962) - (65 \times 368)}{\sqrt{[2 \times 2113 - (65 \times 65)][2 \times 67720 - (368 \times 368)]}}$$

$$r = \frac{23924 - 23920}{\sqrt{[4226 - 4225][135440 - 135424]}}$$

$$r = \frac{4}{\sqrt{[1][16]}}$$

$$r = \frac{4}{4} = 1$$

The correlation coefficient of 1 indicates existence perfect linear correlation.

Reliability of the instrument was confirmed through internal consistency test in which Cronbach's Coefficient Alpha was established. The researcher used ten items from question 11 and 16 in which Richter scale was used to evaluate relevance of various information needs

among dairy farmers and the farmer's level of agreement to some of the information seeking behaviors. A correlation of 0.7 or higher is acceptable in social science research. A reliable coefficient which generated an alpha of between 0.7 and 0.8 was attained and questions in the interview schedule were refined based on the study.

The following tables show the resulting analyses.

Case Processing Summary

		N	%
Valid		113	100.0
Cases Excluded ^a		0	0
Total		113	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.763	.883	10

The alpha coefficient for the ten items is .763, suggesting that the items have relatively high internal consistency since the coefficient is above .70 which is the recommended threshold for social science researches.

3.8 Data Collection Techniques

Qualitative and quantitative data was collected to answer the research questions that arise from the objectives of the study. The data was collected through the use of questionnaire, interview and observation. Out of the 152 sampled dairy farmers, 140 were issued with the questionnaires, eight were interviewed and four were observed. All the 12 extension officers were issued with the questionnaires and four of them were also interviewed.

The researcher distributed the questionnaires and also interviewed respondents with the help of a research assistant who is an undergraduate student and therefore understood the importance of data collection. To get access to the dairy farmers, the researcher and the research assistant had to go to the respective dairy cooperative creameries where farmers were registered. A list of the selected dairy farmers was used with the help of the creamery managers to identify farmers who were beneficiary of one youth one cow project. They gave out the questionnaires to the farmers in the morning and in the evening as they brought milk to the creameries. Questionnaires were sent out to those who were not met by the creamery managers. They ensured that the returned questionnaires were completely filled and also guided farmers who needed assistance. This ensured accuracy of response given. During the interviews sessions, a recorder was used to provide back up of the data collected in case of loss. A checklist with key issues under study was used to act as a guide and ensure consistency of the information discussed.

The researcher took seven consecutive days to complete the data collection process, where two days were for distributing the questionnaires and four days were for collecting the filled questionnaires and doing the interviews. Observation was done on the seventh day.

3.9 Data Analysis

Data collected by any means or method mean very little until they are analyzed and evaluated (Bell, 2010). Data collected from questionnaires, interviews, and observation was studied and analyzed. Data analysis for both quantitative and qualitative data was done by use of Statistical Package for Social Sciences (SPSS) software. Description and thematic analysis were used for qualitative data analysis while descriptive and inferential numeric analysis was used for quantitative data. Frequency tables, bar graphs, percentages and pie charts were used to present analyzed data. Presented data was interpreted in textual form and thereafter a final report was written.

3.10 Logistical and Ethical Considerations

Ethical considerations are the values the researcher bound to in conducting the research before data collection. Permission to conduct research was first sought from Kenyatta University whereby a University introductory letter was given to the respondents. The researcher sought research permit from the National Commission for Science Technology and Innovation (NACOSTI). The respondents were briefed and assured that all information given will be treated with the strictest confidentiality. All participants were offered the opportunity to remain anonymous by use of pseudonyms which helped maintain privacy.

CHAPTER FOUR

PRESENTATION OF FINDINGS, INTERPRETATION AND DISCUSSION

4.1 Introduction

This chapter presents the findings, interpretations and discussion based on the objectives and research questions of the study. The findings are presented in the following themes:

1. Information needs of young dairy farmers
2. Information seeking behavior of young dairy farmers
3. Information sources used in accessing dairy agricultural information by young dairy farmers
4. Technologies employed by young dairy farmers in accessing dairy agricultural information
5. Challenges encountered by small-scale dairy farmers in access and use of dairy agricultural information

4.2 General and Demographic Information

This section provides the general information on the return rate of the questionnaires and demographic data of the respondents.

4.2.1 General Information

The researcher carried out the study with the help of a researcher assistant in each respective sub-county of Murang'a under study. The Murang'a County Livestock department was committed and assisted the researcher get the required information and documents. However, the researcher faced some challenges in data collection owed to the character and status of the respondents. Some of the farmers are illiterate and required assistant in translation of questions. Some were also shy and the researcher had to convince them to provide information. For the 12 extension

officers, all the questionnaires were fully completed and the return rate was 100%. For dairy farmers, a few questionnaires were not returned and the researcher couldn't reach the respondents because their contacts were not working. The return rate of questionnaires was 81% where by 113 questionnaires out of 140 were returned. Table 4.1 below summarizes the return rate by dairy farmers per Sub- County.

Table 4.1: Return Rate for Dairy Farmers

Sub county	Targeted	Returned	Return Rate %
Kiharu	35	30	86
Mathioya	36	28	78
Kangema	31	27	87
Kigumo	38	28	73
Total	140	113	

Source: Research Data 2018

4.2.2 Demographic Data of the Respondents

The researcher collected demographic data on respondents that were related to their age category, marital status, education level, source of income and number of dairy cows they own.

The findings are presented as follows:

a) Distribution of Dairy Farmers by Gender

The researcher found it useful to describe the gender of the respondents as it is a key characteristic in regard to how they access and use dairy agricultural information. The distribution is as shown in Table 4.2.

Table 4.2: Distribution of Dairy Farmers by Gender

Gender	Frequency	Percentage
Male	70	61.9
Female	43	38.1
Total	113	100

Source: Research Data 2018

According to the table 4.2, majority of the respondents were male representing 61.9% while females 38.1%. This may be attributed to the fact that in rural traditional society men are believed to own family assets and also involved in farming and business while women take care of the family and involved with daily household activities. This shows that dairy farming is mainly practiced by men unlike other types of farming whereby studies on small-scale farmers by Ngongo (2016) and Benard (2014) have shown that majority of their respondents were females. This also indicate that majority of the dairy farmers who benefited from the one youth one cow initiative are men.

a) Distribution of Extension Officers by Gender

The researcher also studied the gender distribution of extension officers and the results are shown in Figure 4.1.

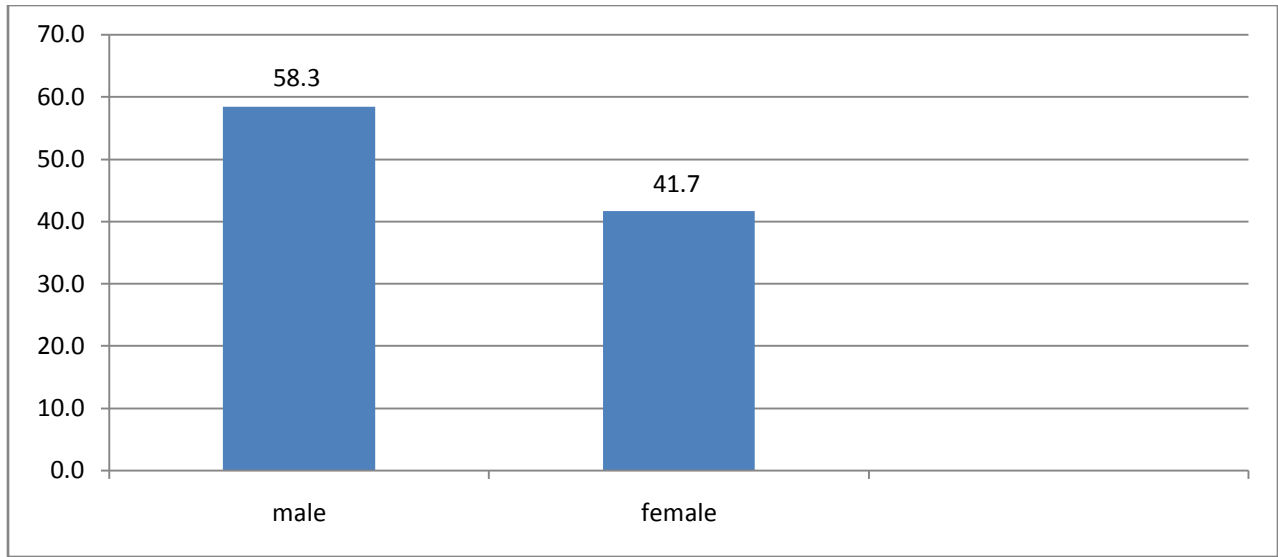


Figure 4.1: Distribution of Extension Officers by Gender

Source: Research Data 2018

Majority of the extension officers seven out of 12 were male with a representation of 58.3% while female were four with a representation of 41.7%. A study by Ng’ang’a (2013) on evaluation of access and use of agricultural information by extension officers also showed that majority of the respondents were male. It is an indication that the occupation is mainly dominated by men.

b) Distribution of Farmers by Age

Age is a key attribute of the study as it can affect how farmers access and use dairy agricultural information. Figure 4.2 shows distribution of farmers by age.

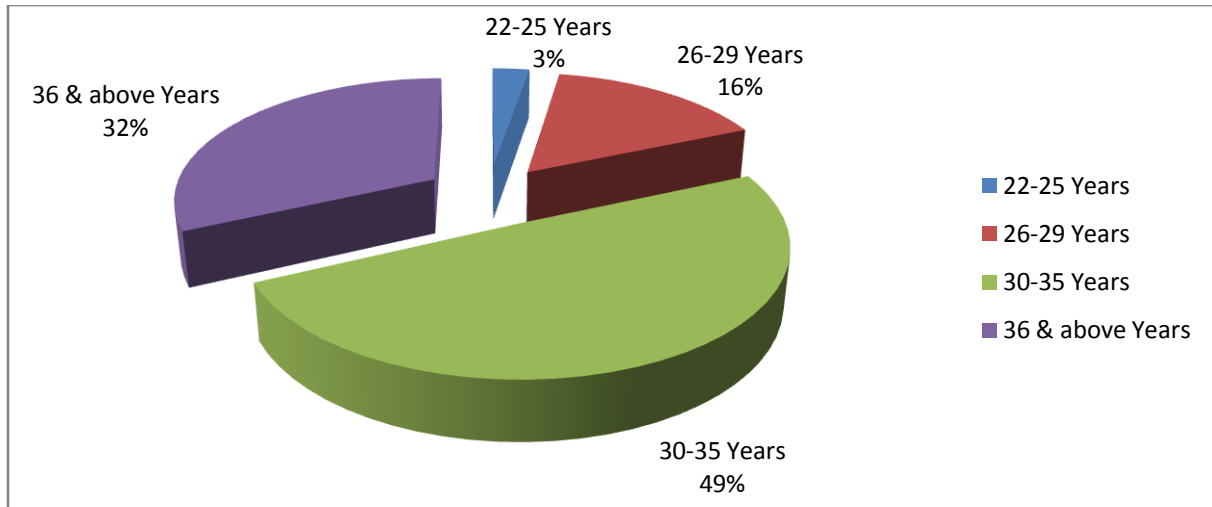


Figure 4.2: Distribution of Farmers by Age

Source: Research Data 2018

According to the Figure 4.3, out of 113 respondents, majority at 55 representing 49% both male and female fell between the ages brackets of 30-35 years, followed by respondents aged 36 years and above at 36 (32%), then 26-29 years at 18 (16%), and lastly 22-25 years at 4 (3%). The research had to study young dairy farmers between the ages of 18 to 35 years who benefited from One Youth One Cow initiative in the year 2015. The findings indicate that there were no respondents between the age of 18-21 years and also very few of them between the age of 22-25 years. This may be due to the fact that the completion age at school ranges at 18-20 years and thereby young people at this age may have joined college. At the age of 30 years and above most of the young people are usually through with college and are either looking for jobs or starting a business. This could be the reason why majority of the respondents fall within this age limit. They are also able to raise capital for dairy farming and most importantly suited for this study as they had enough experience in dairy farming to be able to provide relevant information.

c) Distribution of Extension Officers by Years of Working Experience

The researcher sought to find out the years of experience of the extension officers so as to determine the length of exposure in dissemination and use of dairy agricultural information as shown in Figure 4.3.

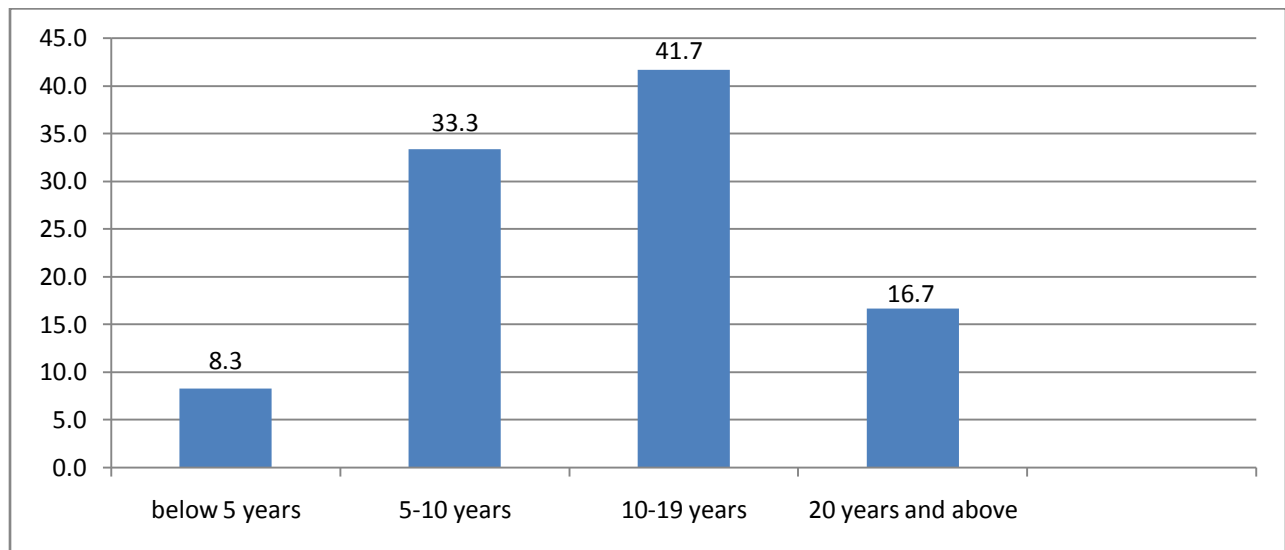


Figure 4.3: Distribution of Extension Officers by Years of Working Experience

Source: Research Data 2018

The findings revealed that out of 12 extension officers five had 10-19 years of experience representing 41.7%, four representing 33.3% had 5-10 years of experience, two representing 16.7% had 20 years and above experience whereas one representing 8.3% had a working experience of 0-5 years. Ng'ang'a (2013) study also showed that half of the agricultural extension officers respondents had a working experience of 21 years and above. These suggest that they are well exposed to agricultural information services and therefore suited to provide relevant information for the study.

d) Marital Status of Dairy Farmers

The researcher sought to establish the marital status of the farmers and the findings are as shown in Figure 4.4 below.

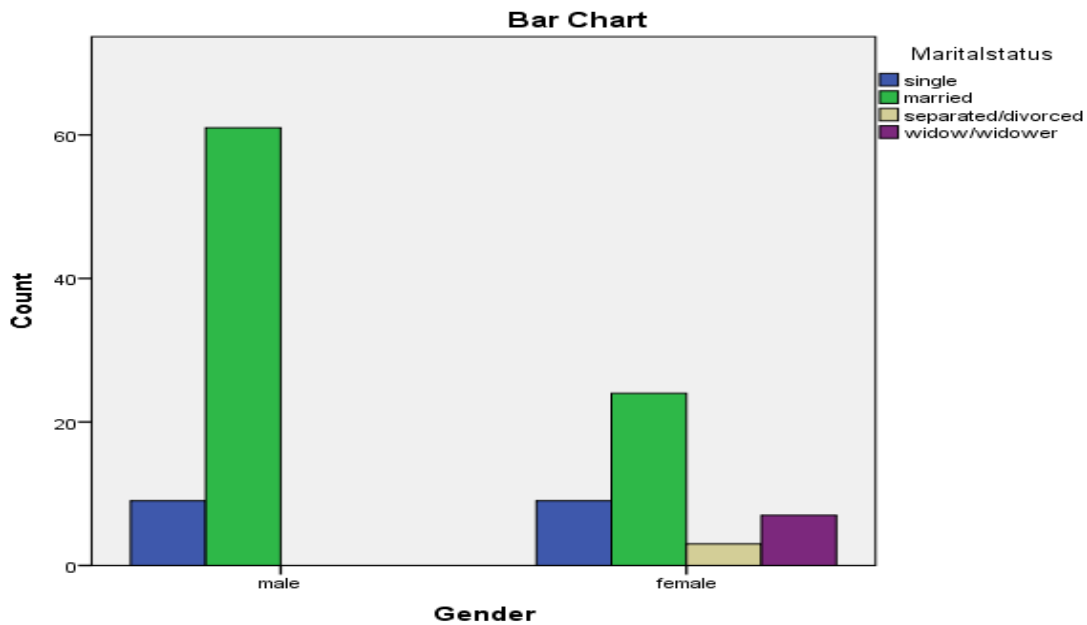


Figure 4.4: Distribution of Farmers by Marital Status

Source: Research Data 2018

According to Figure 4.4, 83 out of 113 respondents were married representing the majority. Male respondents were either married or single with married ones being the majority at 60 out of 70. Majority of female respondents were married counting at 23 out of 43, a good number were single with nine respondents, few were widows and others were separated/divorced with four and seven respondents respectively. Interestingly, Dieckmann (2009) commented that due to several constraints involved in dairy farming, notable changes are being seen in the division of labour in families meaning that both men and women are actively participating in all activities. These might be the reason as to why married farmers are more involved in dairy farming.

e) **Distribution of Farmers by Education Level**

The researcher sought to understand farmers' level of education level as it is a key aspect that could contribute information based on the study objectives. This is as shown in Figure 4.5 below.

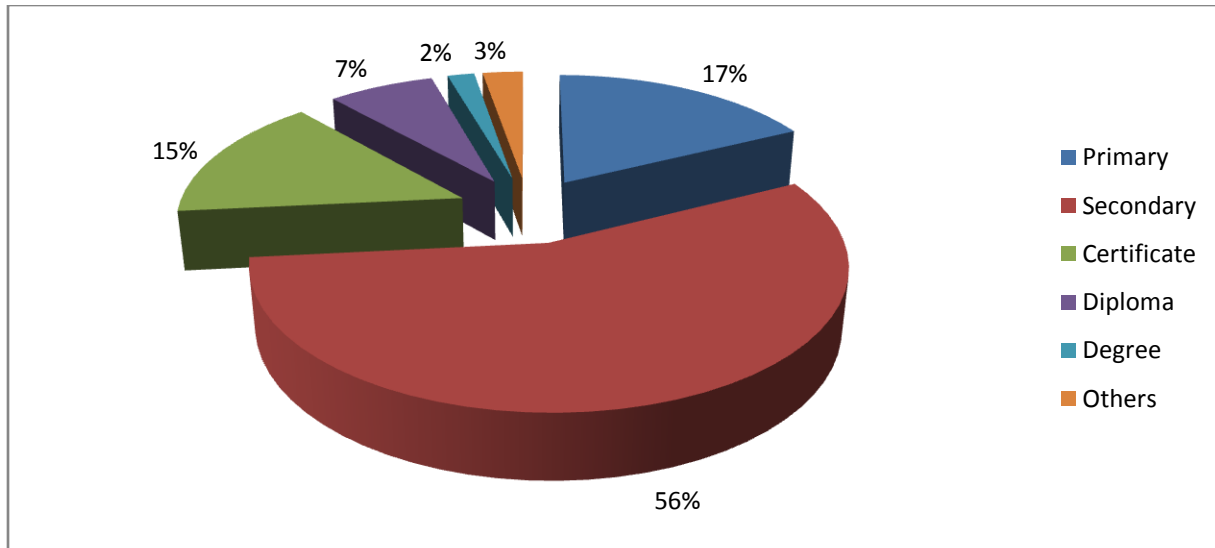


Figure 4.5: Distribution of Farmers by Education Level

Source: Research Data 2018

From the Figure 4.5 , majority of the dairy farmers 63 out of 113 representing 56% had attained secondary education level followed by 19 (17%) who had attained primary education level, then a few 17 (15%) on certificate and 8 (7%) diploma level and lastly very few 4 (3%) on degree and 2 (2%) at other level of education. These indicate that less than half of dairy farmers had attained certificate in any course. Babu et al. (2012) states that individual characteristics such as education level can affect and determine the characteristics that the farmer portrays as they search for information. According to Aina and Dulle (1999), farmer’s level of education affects the way farmers access information and adopt new agricultural practices. Educated farmers may be able to access and use various sources of information and thus improve their level of agricultural productivity.

f) Education Level of Extension Officers

The researcher sought to establish the education level of extension officers’ in order to determine their competencies in access and dissemination of dairy agricultural information services. This is shown in Figure 4.6 below:

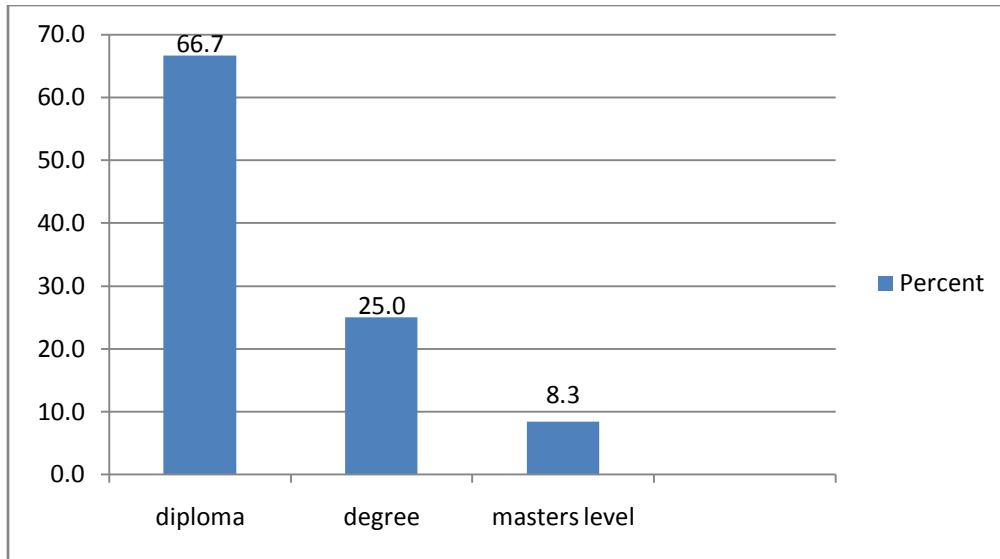


Figure 4.6: Distribution of Extension Officers by Education Level

Source: Research Data 2018

This study revealed that eight out of 12 agricultural extension officers had diplomas representing 66.7%, three had degrees at 25% and one at 8.3% had master's levels of education.

g) Farmers Source of Income

Farmers' source of income was established to determine their financial status in regard to access and use of dairy agricultural information as shown in Figure 4.7 below.

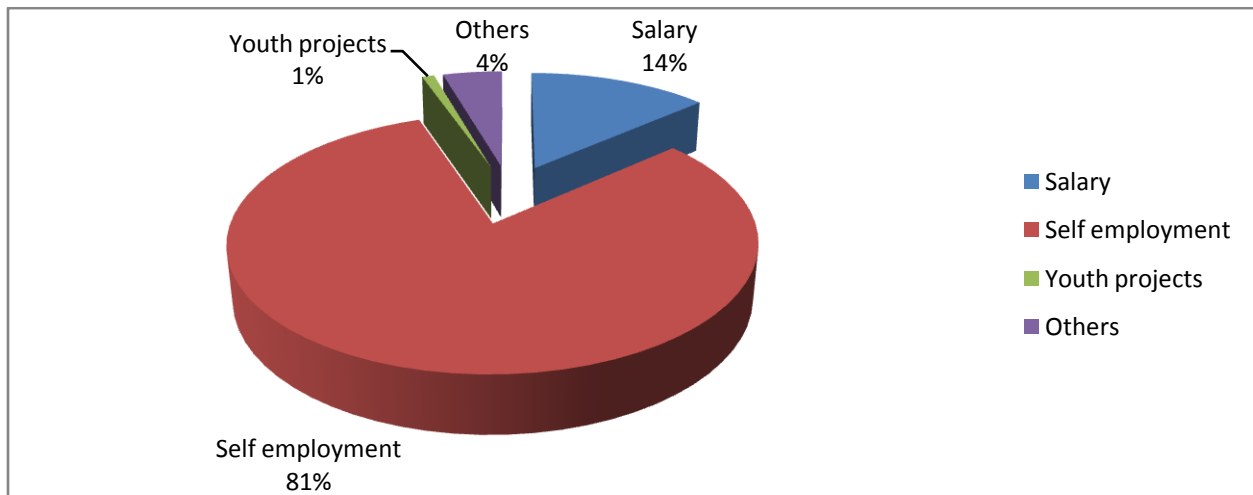


Figure 4.7: Distribution of Farmers by their Income

Source: Research Data 2018

From the findings, majority of the respondents 91 out of 113 are self employed representing 81%, followed by 16 respondents whose source of income is the salary representing 14% whereas the least number of the respondents at 5 (4%) and 1 (1%) get their income from youth projects and other different sources respectively. These suggest that majority of the farmers depend on dairy farming income that they get through milk production as one of the self employment source of income. This could also be attributed to lack of white collar jobs among the youth and thus engaging in self employment jobs. These jobs may not provide a stable source of income to farmers to facilitate purchase of information resources and services. Thereby, this may affect negatively their access to information. Benard, Dulle, and Ngalapa (2014) research on evaluation of information needs of rice farmers in Tanzania states that inadequate fund limits farmer accessibility to information services.

h) Number of Cows Owned by Dairy Farmers

This study also sought to determine the number of cows owned by the dairy farmers to establish the capacity in which they practice dairy farming. This is a characteristic that can affect the level of dairy agricultural information access. This is indicated below in Figure 4.8

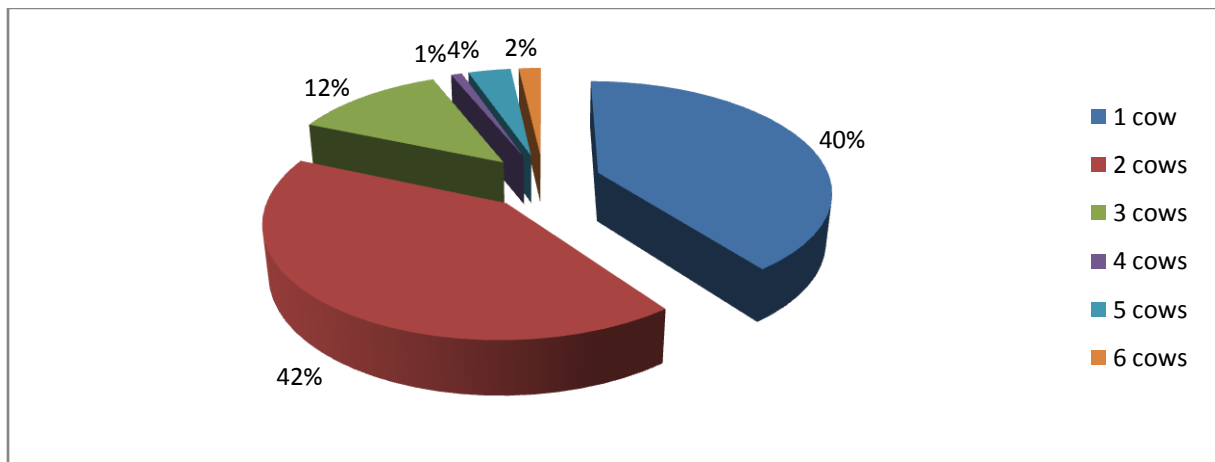


Figure 4.8: Distribution of Dairy Farmers by the Number of Cows they Own

Source: Research Data 2018

Majority of the respondents 47 out of 113 had two cows representing 42%. 45 out of 113 had one cow representing 40%. Only 21 out of 113 had more than three dairy cows. This might be due to the fact that small scale milk production is mainly dominated by smallholders who own few dairy cattle. Over half of the land in Murang'a County is used by small - to medium-size farm holders for crop cultivation and dairy farming (Kenyan Information Guide, 2015).

4.3 Information Needs of Young Dairy Farmers in Murang'a County

The first objective of this study was to assess the information needs of young dairy farmers in Murang'a County. This was to establish the dairy information needs required by farmers. The findings are presented in this section.

4.3.1 Farmers' Need for Dairy Farming Information

Farmers were asked whether they need dairy farming information. This is a determining factor on the basis at which they search and use information. This would also determine the usefulness of agricultural information to farmers. Their response is shown in Table 4.3 below.

Table 4.3: Farmers' Need for Dairy Farming Information

Response	Frequency	Percentage
Yes	112	99.1
No	1	0.9
Total	113	100.0

Source: Research Data 2018

All the dairy farmers except one respondent agreed that they need dairy agricultural information. Likewise, the interview findings revealed that all the eight respondents required dairy agricultural information. It can be assumed that dairy agricultural information is in high demand by majority of farmers in the Murang'a County. This is probably because information is required

by all groups of people in making decision of their daily activities. The findings agree with that of Idiegbeyan-ose & Theresa (2009) who argues that information enables farmers to make informed decisions regarding production, management and marketing of their farm products.

4.3.2 Search for Dairy Agricultural Information

Farmers were asked whether they search for dairy agricultural information. This forms a basis at which they use the various sources of dairy information. Their response is shown in Table 4.4 below.

Table 4.4: Search for Dairy Agricultural Information

Response	Frequency	Percentage
Yes	104	92.0
No	9	8.0
Total	113	100.0

Source: Research Data 2018

Majority of the farmers 104 out of 113 agreed that they search for dairy agricultural information as indicated in Table 4.3 above. Equally, the interview revealed that all farmers searched for dairy farming information. Majority explained that they search this information from their friends and neighbors because the agricultural extension officers are very few in their areas. This shows that dairy farmers in the area search for information but the interviews indicate that they face challenges in search of information.

4.3.3 Availability of Dairy Agricultural Information

Further, the study sought to determine availability of dairy farming information and farmers were asked if dairy agricultural information is available to them. The results are indicated in Table 4.5.

Table 4.5: Availability of Dairy Agricultural Information

Response	Frequency	Percentage
Yes	30	26.5
No	83	73.5
Total	113	100.0

Source: Research Data 2018

From the table above, it is clear that majority of the farmers 83 out of 113 disagreed that dairy agricultural information is readily available to them. This suggests that dairy farmers' agricultural information services are scarce or farmers may be facing challenges in accessing the services.

4.3.4 Types of Information Needs for Dairy Farmers

The study sought to determine the importance of dairy agricultural information. Farmers were further presented with ten types of information needs for dairy farmers and were asked to tick the relevancy of each to them. A Likert scale 1-4 was used where 1- indicated not relevant; 2- sometimes relevant; 3- often relevant; and 4-frequently relevant.

Table 4.6: Relevancy of Dairy Farmers Information Needs

Information need	Not relevant(1)		Sometimes relevant(2)		Often relevant(3)		Frequently relevant(4)		Mean score
	Freq.	%	Freq.	%	Freq.	%	Freq.	%	
Modern farming technologies	3	2.7	7	6.2	38	33.6	65	57.5	3.46
Nutritional and reproductive management	2	1.8	4	3.5	36	31.9	71	62.8	3.68
Milking operations and systems	2	1.8	6	5.4	34	29.7	71	63.1	3.54
Animal waste management	8	7.1	7	6.3	38	33.9	60	52.7	3.33
Diseases and pest control	1	0.9	4	3.5	42	37.2	66	58.4	3.53
Weather conditions	9	8.2	24	20.9	57	50	24	20.9	2.87
Business information	6	5.4	27	24.3	63	55.9	16	14.4	2.77
Government policies and plans	11	9.8	43	38.4	39	34.8	19	17	2.57
Market trends	7	6.2	23	20.4	62	54.9	21	18.6	2.86
Credit facilities	8	7.1	41	36.3	45	39.8	19	16.8	2.66

Source: Research Data 2018

Table 4.6 above shows that information on modern farming technologies, nutritional and reproductive management, milking operations and systems, animal waste management, diseases and pests control are frequently relevant to dairy farmers with the highest mean score of 3.46, 3.68, 3.54, 3.33 and 3.53 respectively. Information on weather conditions, business information, government policies and plans, market trends and credit facilities are also relevant to dairy farmers since they had attained average mean score of 2.5 and above at 2.87, 2.77, 2.57, 2.86 and 2.66 respectively. These indicate that dairy farmers require specific and relevant information for improved dairy farming practices. Soylu (2016) suggest that “professional efficiency and motivation of farmers can be enabled with the satisfaction of their information needs.”

Half of the farmers interviewed indicated that they needed information on dairy farming methods, breeding of dairy cows, diseases control, rearing of dairy cows, nutrition, dairy products processing, markets for dairy products, milk storage systems, dairy animal feeds, biogas

production, calves mortality rates and finally mixed farming practices. Further interviews for extension officers revealed that they provide information on modern farming information technologies, nutritional and reproductive management, milking operations and systems, animal waste management, diseases and pests control, weather conditions, business information, government policies and plans, market trends and credit facilities to dairy farmers. These findings are in tandem with Kumar and Chander (2011) study on dairy farmers' information needs which reflected that nearly all of the respondents confirmed that information on reproduction, feeding habits, health, climate conditions and e-governance as the most useful to their farming needs. Moreover, these findings can be anchored on Garfield (1979) theory of the Information Society since it postulates that access and utilization of information by minority groups, such as farmers make them powerful in performance of their day to day activities.

The study also sought to establish whether the extension officers have ever provided dairy information services to farmers for the last two years. This was in consideration that the One Youth One Cow project was initiated three years ago since the year 2015. All agricultural extension officers agreed that they have provided dairy information to farmers for the last two years. In addition, the study sought to establish the kind of information given to dairy farmers by extension officers. The results are shown in Figure 4.9.

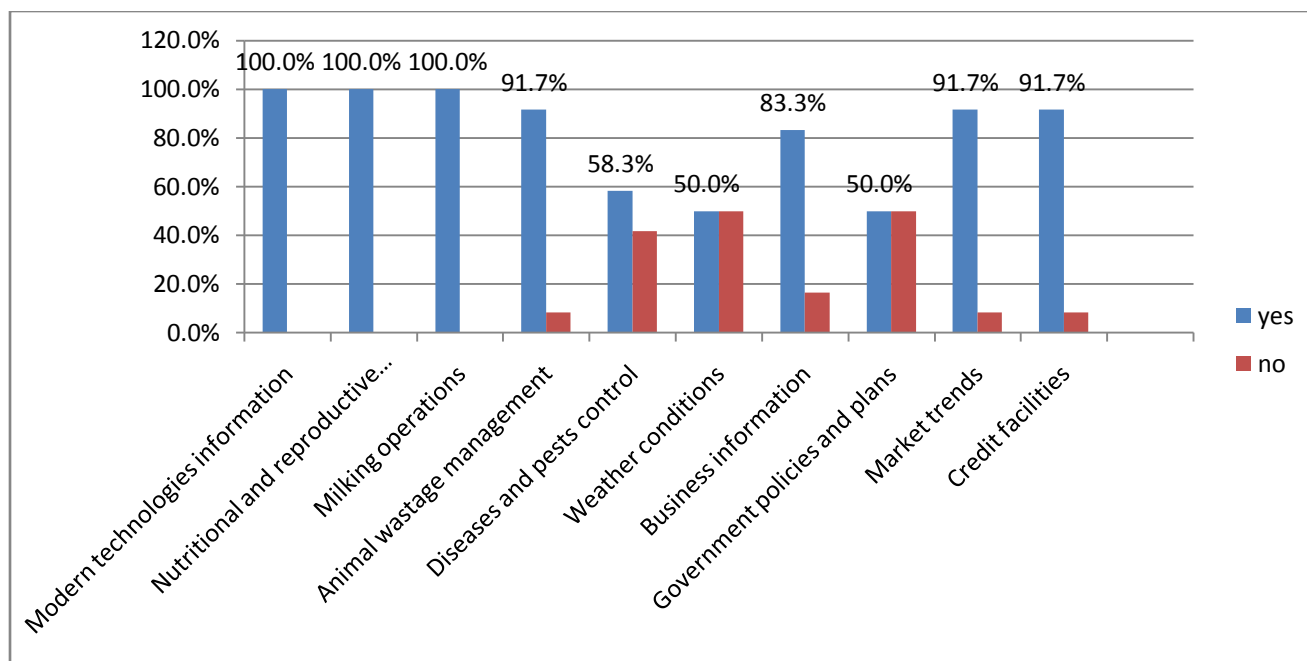


Figure 4.9: Information Offered by Extension Officers

Source: Research Data 2018

All the 12 agricultural extension officers agreed that they provide information on modern farming information technologies, nutritional and reproductive management and milking operations and systems representing 100%. Moreover, majority of them agreed that they provide information on animal waste management at 11 representing 91.7%, business information 10 (83.3%), market trends 11 (91.7%) and similarly credit facilities at 11 (91.7%). However, half of the extension officers agreed that they provide information on weather conditions at 6 (50%), government policies and plans 6 (50%), and diseases and pests control at 7 (58.3%).

Extension officers' interview also revealed that farmer's information needs can be initiated by either the farmer or the extension officer. The latter needs to conduct dairy farmer needs assessments so as to be informed of farmer information needs. This practice is in line with De Silva and Ratnadiwakara (2008) who emphasizes on the "value of information needs assessment

of users” and Babu, et al. (2012) who emphasized that identifying farmers’ information needs assists in coming up with suitable guiding principles and managerial innovations.

4.4 Information Seeking Behavior of Dairy Farmers

The second objective of this study was to establish the information seeking behavior of young dairy farmers venturing into dairy farming in Murang’a County. This was to gauge the individual factors that affect access and use of agricultural information. A list of statement on information seeking behaviors that could possibly be portrayed as they search for information was provided. Farmers were asked to indicate their level of agreement with each statement as it affects them. A Likert scale of 1-5 was used Where 1= Strongly disagree, 2= Disagree, 3= Fairly agree, 4=Agree, 5= Strongly agree. The results are shown in Table 4.7.

Table 4.7: Dairy Farmers Information Seeking Behaviors

Statement	Strongly disagree (1)		Disagree (2)		Fairly agree (3)		Agree (4)		Strongly agree (5)		Mean score
	Freq.	%	Freq	%	Freq	%	Freq.	%	Freq.	%	
It is important to search for infor.	0	0	1	0.9	1	0.9	19	16.5	92	81.7	4.79
I need assistance in searching for infor.	3	2.7	7	6.4	15	13.6	36	31.3	51	45.5	4.08
It takes time to search for infor.	2	1.8	11	10.1	24	21.1	38	33.9	37	33	3.83
Much effort is needed to search for infor.	2	1.9	30	26.2	46	41.1	18	15.9	17	15	3.16
I get confused by the infor. available	8	7.3	7	6.4	17	14.7	18	15.6	63	56	4.07
I don’t know which infor. to rely on	13	11.2	7	6.5	17	15	24	21.5	52	45.8	3.84
I use different sources of infor. for comparison	11	9.3	23	20.4	41	36.1	24	21.3	15	13	3.11
I don’t know infor. required	25	22	38	33.9	36	32.1	6	5.5	7	6.4	2.21

Source: Research Data 2018

This study revealed that the highest mean was at 4.79 where nearly all farmers at 92 out of 113 perceived the importance of searching information. Very few farmers at seven out 113 strongly agreed that they don't know information required. However, another 51 with a mean score of 4.08 strongly agreed that they need assistance in searching for information. 63 representing 56% with a mean score of 4.07 strongly admitted that they get confused by the information available. Others 37 with a mean score of 3.83 and 52 with a mean score of 3.84 strongly agreed that it takes time to search for information and they don't know which information to rely on respectively. This indicates that nearly half of the respondents have a negative attitude towards access and use of dairy agricultural information which could be negatively affected by factors that hinder access to information.

In relation to this, the extension officers were also presented with a list of information seeking habits statements that could be portrayed by farmers and were asked to indicate their level of agreement with each as it relevant to farmers. A Likert scale of 1-5 was used where 1= Strongly disagree, 2= Disagree, 3= Fairly agree, 4=Agree, 5= Strongly agree.

Ratings from the agricultural extension officers are presented in Table 4.8 below:

Table 4.8: Dairy Farmers Information Seeking Habits as Revealed by Extension Officers

Statement	Strongly disagree(1)		Disagree (2)		Fairly agree(3)		Agree(4)		Strongly Agree(5)		Mean score
	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%	
Farmers know the importance of dairy information	0	0	1	8.3	1	8.3	4	33.3	6	50	4.25
Farmers need assistance in searching for information	0	0	1	8.3	10	83.3	1	8.3	0	0	3.00
Farmers avail time to search for information	0	0	3	25	6	50	3	25	0	0	3.00
Information is readily available for farmers	0	0	2	16.7	8	66.7	2	16.7	0	0	3.00
Farmers get confused by the information available	0	0	1	8.3	9	75	2	16.7	0	0	3.08
Farmers don't know which information to rely on	1	8.3	6	50	1	8.3	4	33.3	0	0	2.67
Farmers use different sources of information for comparison	0	0	2	16.7	8	66.7	2	16.7	0	0	3.00
Farmers don't know information required	0	0	9	75	3	25	0	0	0	0	2.25
Farmers have adequate funds to acquire information resources	1	8.3	9	75	2	16.7	0	0	0	0	2.08
Farmers know how to use modern technologies to acquire information	2	16.7	7	58.3	4	33.3	0	0	0	0	2.33

Source: Research Data 2018

As observed from Table 4.8 above, extension officers strongly agreed that farmers know the importance of dairy information with the highest mean score of 4.25. This was followed by a mean score of 3.08 stating that farmers get confused by the information available. Farmers avail time to search for information, information is readily available for farmers and that farmers use different sources of information for comparison had all a mean score of 3.00. It's fair to agree with the above statement since they had all attained a mean score of 3 which is the neutral score. Farmers don't know which information to rely on, farmers don't know information required, farmers know how to use modern technologies to acquire information, and farmers have

adequate funds to acquire information resources were rated lowly attaining a mean score of 2.67, 2.33, 2.25 and 2.08 respectively.

The above findings connote that farmers have different information seeking habits which might have resulted from individual characteristics such as farming experience, education and age; trading characteristics such as size of farm, market orientation, kind of farm enterprise, debt level, and farm ownership; and physical location characteristics such as accessibility to market points and distance to nearest technological infrastructure just like observed by (Babu et al. 2012). Diekmann et al. (2009) study also pointed out that farmer attitude toward information search, farm sale, farming experience, access to technology and type of farming were good indicators of their information search approaches. Further, in rural areas information may be available but farmers are not able to access it because of low level of education or in poor financial status to attain the resources. However, Soyly, (2016) suggests that professional efficiency and motivation of the farmers can be enabled with the satisfaction of their information needs. Literate farmers may have high confidence in searching and using the available agricultural information by various sources.

4.5 Information Sources used by Dairy Farmers

The third objective of this study was to find out the various information sources used in accessing dairy agricultural information. This was to determine their knowhow on the available sources, their preference, convenience and usage. The findings are presented as follows:

4.5.1 Farmers Awareness on Sources of Dairy Agricultural Information

The study sought to establish if farmers were aware of the available sources of information. The factor was considered as it can affect access of information. The results are as shown in Figure 4.10 below.

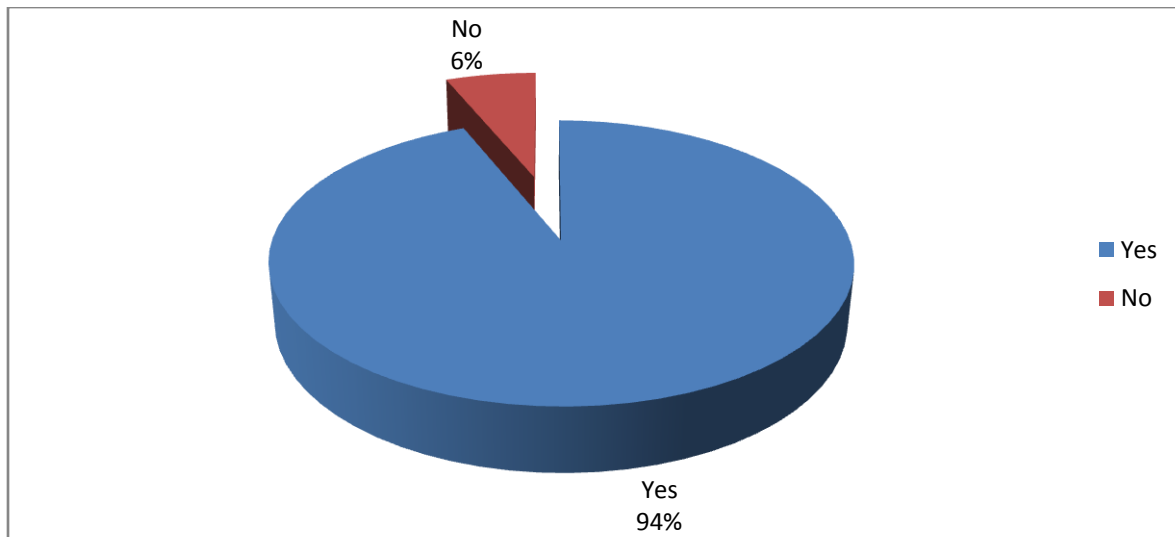


Figure 4.10: Farmers Awareness on Sources of Dairy Agricultural Information

Source: Research Data 2018

From the figure above, majority of the respondents 106 out of 113 representing 94% agreed that they are aware of the available sources of dairy agricultural information. This suggests that farmers know where to search for information.

4.5.2 Sources of Dairy Farming Information Used by Farmers

The study sought to establish the most common used sources of dairy information. Farmers were asked to select the sources of information they use to get dairy agricultural information. The results are shown in Figure 4.11.

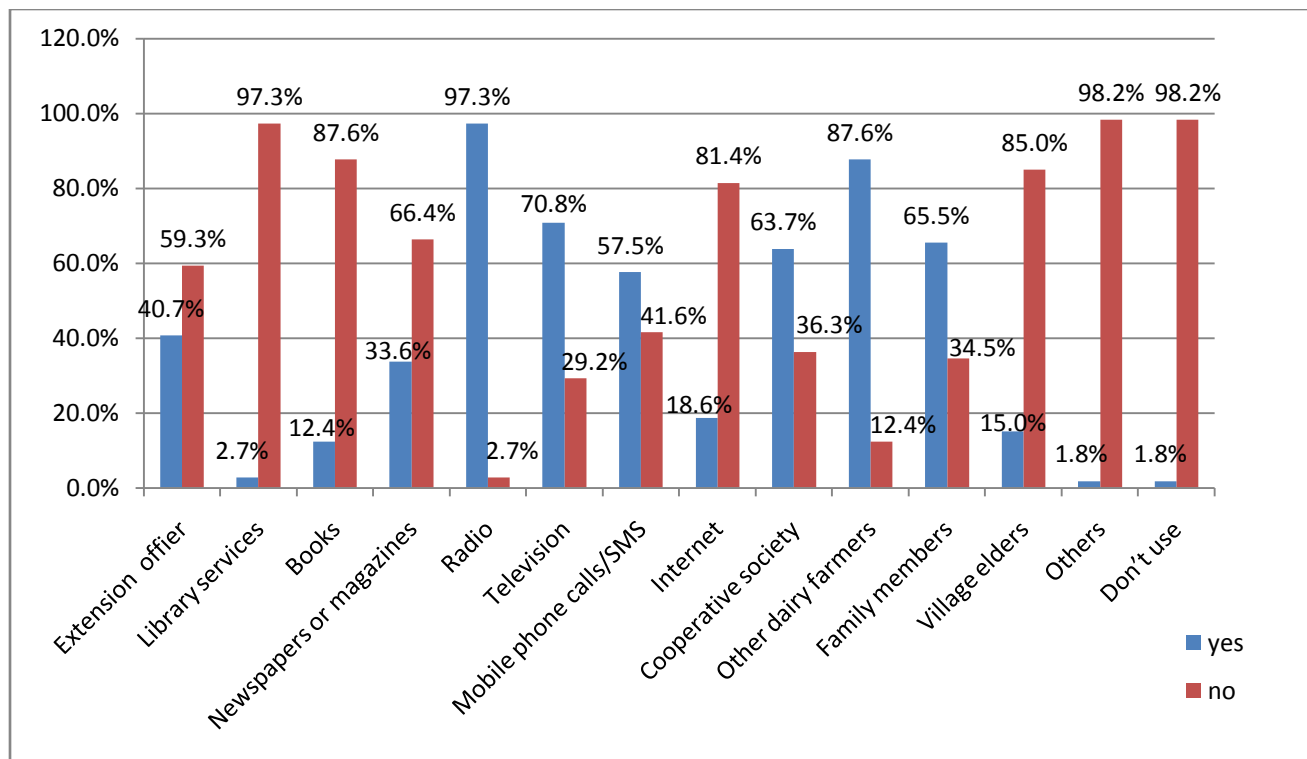


Figure 4.11: Sources of Dairy Farming Information Used by Farmers

Source: Research Data 2018

From the responses, Radio was the most used source of information with 110 (97.3%) respondents, followed by other dairy farmers with 99 (87.6%) then televisions with 80 (70.8%). 74 (65.5%) used family members, 72 (63.7%) used cooperative society, 65 (57.5%) used mobile phones, 46 (40.7%) used extension officers while 38 (33.6%) use newspaper & magazines. The most rarely used sources of information were library services with 3 (2.7%) respondents followed by books with 14 (12.4%), village elders at 17 (15%) then by internet with 21 (18.6%). Only two of the respondents at 1.8 % indicated that they use other sources not listed and similarly only two at 1.8% admitted that they don't use any source of information. Farmers interview indicated that farmers mainly search dairy farming information from radios, other dairy farmers, extension officers, cooperatives, televisions, neighbors' and family members. An interview with one of the farmers revealed the following as translated by the researcher:

“I mainly use radio and television to get dairy agricultural information. There are very informative programs like Mugambo wa Murimi at Inooro Radio and Television. There is also Smart Farm in Citizen Television and Shamba Shape Up at Citizen Television. Sometimes I also consult my neighbors who practice dairy farming and extension officers when I get to meet them.” (Gathered from interview discussion)

The study also identified the various sources used by agricultural extension officers in updating themselves with modern agricultural technologies. The findings are indicated in Figure 4.12

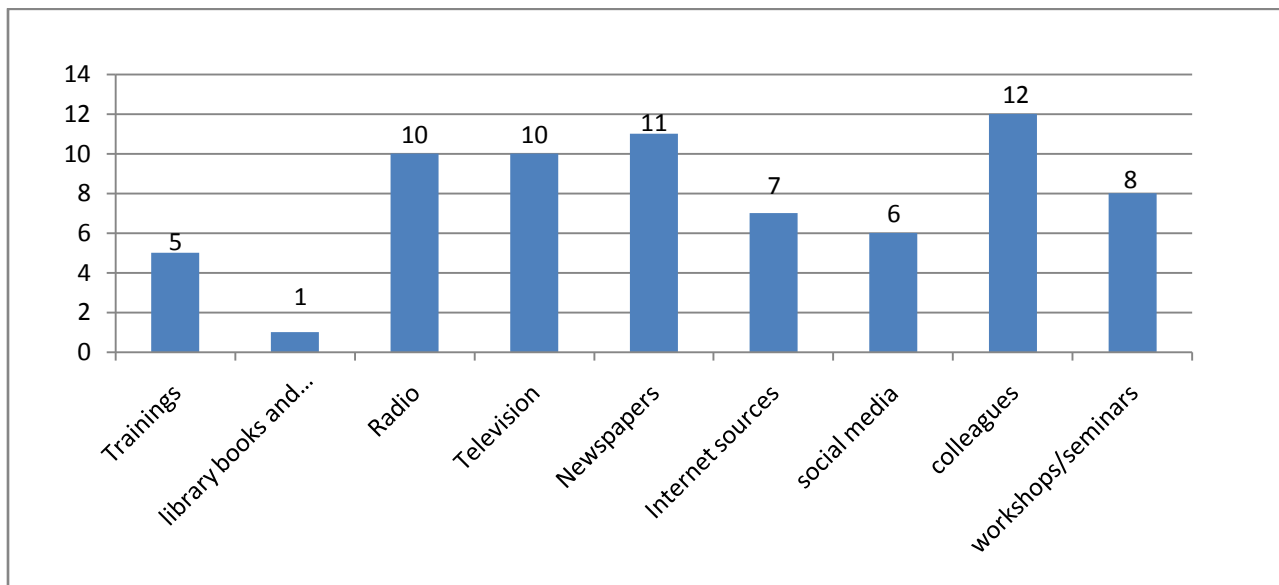


Figure 4.12: Extension Officer Ways of Updating with Modern Agricultural Technologies

Source: Research Data 2018

This study further revealed that all the 12 extension officers used colleagues to update themselves with modern agricultural technologies. This was followed by newspaper with 11 respondents and television and radio each with 10 respondents. Eight used workshops/seminars while seven used internet sources. Social media was used by half of the respondents while trainings by 5 respondents. The least used source is library books and publications with one respondent. Similar findings from an interview with an extension officer indicated the following:

“First of all, I use my own knowledge which I got from college trainings. I also frequently use radio and television to update myself with modern farming practices. My workmates also provides me with reliable information as they have worked for long as extension officers. There are also journals and magazines which provide very helpful information in all types of dairy farming. Sometimes I use Whatsapp group formed by extension officers to share and discuss what others have shared. This could have been a very good source of disseminating information to farmers but the challenge is that majority of the farmers are not able to use the smart phones, others have no interest in using social media while other are not able to purchase the devices.” (Response from an interview discussion)

4.5.3 Preferred Source of Information by Dairy Farmers

The study sought to determine the most convenient source of information for dairy farmers. They were asked to identify their most preferred source of information as shown in Figure 4.13 below.

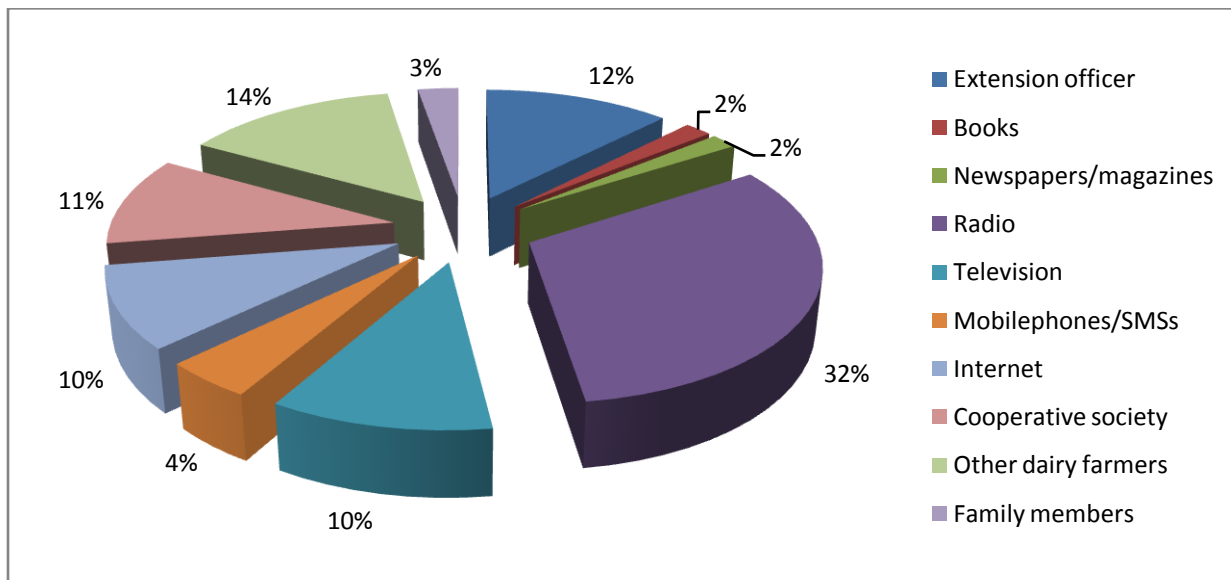


Figure 4.13: Preferred Source of Information by Dairy Farmers

Source: Research Data 2018

From Figure 4.13 above, the most preferred source of information by majority farmers is radio accounting 36 respondents out of 113 representing 32%, followed by other dairy farmers at 16 (14%), extension officer 14 (12%), cooperative society 12 (11%), both television and internet 11 (10%), mobile phones 5 (4%) and family members 4 (3%) respectively. The least preferred are books and newspapers/magazines both at 2 (2%) respondents. Majority of the respondents at 56 % have only attained secondary school level of education. This could be could be the reason why they do not prefer books as they contain complex knowledge which is difficult to understand. An interview with the farmers revealed that five out of eight respondents stated that they use radio because it provides information in vernacular language which they are able to understand.

The researcher did an observation at Murang'a District Library which is a branch of Kenya National Library Services. This was done to find out the accessibility of the library to the dairy farmers and also identify the acquired resources on dairy agriculture. It was found out that the library is located within Murang'a town and hence accessible to farmers within the area. There were very few resources on dairy farming information and the only print materials available were secondary school agriculture textbooks. A search from their database generated only 30 titles of books on general agriculture. Most of the books were also outdated having being published 10 years ago. These might also be the reason why books are unpopular sources of information within the study area. However there is free access to WIFI internet connection within the library. The library have not yet subscribed to electronic resources (e-books and e-journals). The observed information is shown in Plate 4.1 and 4.2 below.

KNLS MURANG'A DISTRICT LIBRARY					
DATABASE OF AGRICULTURAL INFORMATION MATERIALS					
3	KNL330807	Cheruiyot daniel	Longhorn secondary agriculture 1.	Longhorn	2005 290.00
4	KNL108787		Foundation agriculture bk 1,2,3&4	J.K.F	2005 220.00
5	KNL221326	Kamau njogu	Explore agriculture; students book 1.	Longman	2004 295.00
6	KNL332110	Kamau njogu	Longman explore Agriculture form 1.	Longman	2004 295.00
7	KNL456441	Kingori john	Test it & fix it; KCSE revision Agriculture	O.U.P	2011 560.00
8	KNL330802	Mailu julius	Longhorn secondary agriculture 2,3& 4.	Longhorn	2005 270.00
9	KNL305597	Migwi james	KCSE golden tips Agriculture	Macmillan	2006 455.00
10	KNLA193948	Migwi, James K	Premier golden tips agriculture for secondary sch	Moran	2007 660.00
11	KNL329383	Mulei charles	Secondary school Agriculture form 1,2,3&4.	N.U.P	2008 350.00
12	KNL221344	Mwangi	Explore agriculture		331.00
13	KNL332102	Mwangi solomon	Longman explore Agriculture form 3.	Longman	2004 357.00
14	KNL277606	Aggrey nyanjom	Certificate agriculture book 1,2,3.	E.A.E.P	2003 300.00
15	KNL4503874	Oyoko Ruth	Longman explore Agriculture form 2.	Longman	2003 395.00

KNLS MURANG'A DISTRICT LIBRARY					
16	KNL332074	Oyoko Ruth	Longman KCSE revision Agriculture	Longman	2007 485.00
17	KNL221350	Oyoko R	Explore agriculture form		370.00
18	KNL332105	Oyoko Ruth	Longman explore Agriculture form 2,4.	Longman	2003 395.00
19	KNL330805	Sigei peter	Longhorn secondary agriculture 2.	Longhorn	2005 255.00
20	KNL305654	Wachira anne	Macmillan secondary Agriculture bk 2,3,4.	Macmillan	2006 315.00
21	KNLA116083	Quick Reading	Quick Reading Agriculture form 1,2,3,4.	Longhorn	2011 280.00
22	KNLA116104	Revision KCSE	Revision KCSE Agriculture A1	Longhorn	2012 450.00
23	KNL330719	Sigei peter	Gateway secondary revision agriculture paper	Longhorn	2006 320.00
24	KNL329359	Mbithi peter	Restract of domestic wildant laboratory animals	N.U.P	2003 400.00
25	06-17190	Mulele CM	Metabolic and nutrition diseases of food animal	N.U.P	2003 450.00
26	06-17196	Mugera jerald	Verterinary pathology in the tropics	N.U.P	2000 1,300.00
27	KNL329307	Mules CM	Metabolic and nutritional diseases	N.U.P	2003 500.00
28	KNL103864	Wanyama jacob	Confidelity used ethnoveterinary knowledge	I.J.K	2005 200.00
29	KNL329299		A practical manual or animal physiology	N.U.P	1991 350.00
30	KNL329266	Mbithu M F	Basic principles of veterinary surgery	N.U.P	2009 750.00

Plate 4.1: A List of Agricultural Information Books in KNLS Murang'a District Library

Source: Observation



Plate 4.2: Free WIFI Hotspot Connection in KNLS Murang'a District Library

Source: Observation

Among the various ways the extension officers use to update themselves with the modern farming practices, they were also asked to state and explain their most preferred source of information and the findings are shown in Figure 4.14 below.

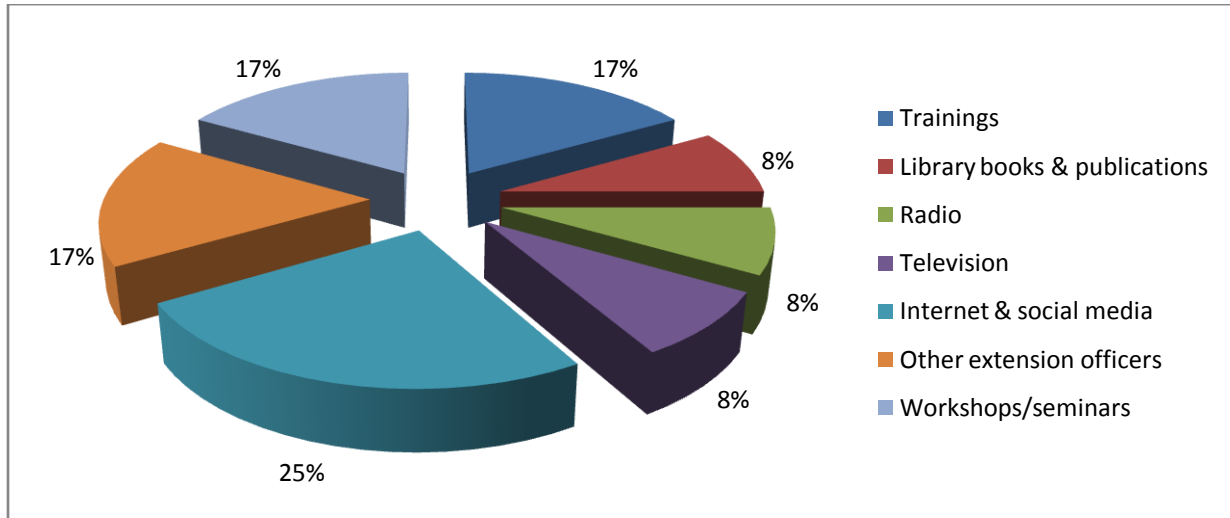


Figure 4.14: Most Preferred Source of Information by Agricultural Extension Officers

Source: Research Data 2018

Internet services were the most preferred source as indicated by 3 respondents representing 25%. They explained that it is easy to access via smart phone, fast, readily available and that it provides wide range of information. Other extension officer, trainings, and workshops/seminars accounted by 2 respondents each representing 17%. They were preferred by because from training they get trained in all areas of agricultural information practices hence they have accurate and reliable information. Other officers preferred workshops/seminars because they are participatory in nature. Some extension officers preferred their colleagues because they are easily available and have expertise and experience in the field of livestock production. Library books and publications, Television and radio were each by preferred by one respondent representing 8%. They justified that television were audio visual whereas radio provides weekly programs for

dairy farmers. Library books and publications were preferred because they provide detailed information though the respondent explained that they are not readily available.

4.5.4 Accessibility to Agricultural Extension Services by Dairy Farmers

Agricultural extension services being one of the main sources of information to farmers, it was useful for the study to determine its accessibility to dairy farmers so as to evaluate its usefulness and reliability. Farmers were asked to state how often their needs were attended to by agricultural extension officers. The responses are recorded in Table 4.9.

Table 4.9: Farmers Access to Agricultural Extension Officer Information Services

Period	Frequency	Percentage
Daily	7	6.2
Weekly	5	4.4
Monthly	28	24.8
Yearly	22	19.5
Never	51	45.1
Total	113	100.0

Source: Research Data 2018

This study further revealed that 51 representing 45.1% of the farmers have never received extension officers' information services. 28 accessed the services monthly while 22 on yearly basis representing 24.85 and 19.5 % respectively. Very few of the respondents adding to seven and five received the services on daily and weekly basis. These findings indicate that agricultural extension services are not frequently available to farmers and therefore this can be a major cause of information inaccessibility to farmers. Gakuru, Kristen & Stepman (2009) study also agree that

while the number of farmers is increasing the number of extension officers is going down and there is need to address the gap.

The above study on various sources of information by both farmer and extension officers illustrates that radio, other dairy farmers, television and extension officers were the main sources of information for farmers respectively. Internet, radio, mobile phones and other extension officers were mainly used by extension officers. The findings concur with Isaya, Agunga and Sanga (2016) studies which also yielded a high response rate of 96%, showing that radio were the primary sources of agricultural information for farmers. Yusuf, Masika and Ighodaro (2013) survey also reported that most farmers depend on friends, neighbours, and colleagues for farming information; however, the majority preferred extension officer services. Similarly, Benard, Dulle, and Ngalapa (2014) and Rees et al. (2000) studies revealed that the major sources of information for small-scale farmers are family members, markets, personal experience, neighbors, community associations and agriculture extension officers". However, the study disagrees with study by Rehman Ruby and Ismat (2013) which showed that the print media are the major sources of agricultural information, followed by fellow farmers and television in the areas investigated. Further, these findings are in tandem with Daniel Bell's 1973 information society theory which foresaw sudden increase in the distribution of scientific information and its broad accessibility by the public via mass media such as radio and televisions.

4.6 Dairy Farmers Use of Technology

The fourth objective of this study was to find out technologies employed by young dairy farmers in accessing dairy agricultural information in Murang'a County. The findings are provided as follows:

4.6.1 Farmers Awareness on Use of Technology

The study sought to establish farmer awareness on the use of modern technology in accessing information and also identify the particular technologies used in accessing dairy farming information. Farmers were asked their awareness to the use of technology and the findings are indicated in Figure 4.15.

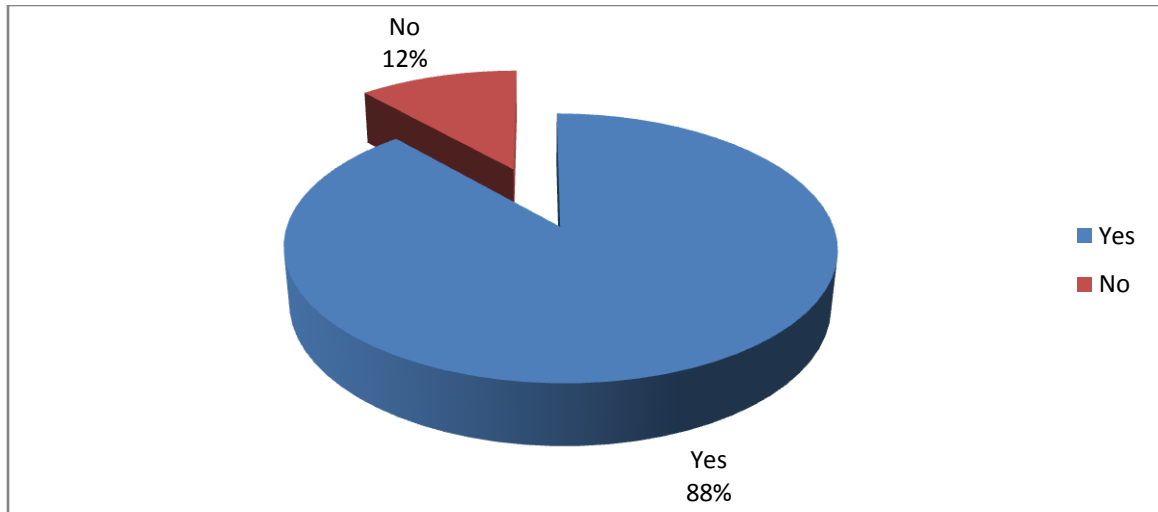


Figure 4.15: Farmers Awareness on Use of Technology

Source: Research Data 2018

Figure 4.15 shows that 99 farmers representing 88% agreed that they were aware of the use of technology in accessing agricultural information. This forms the majority of the respondents as only 14 representing 12% disagreed with the question. It can be deduced that dairy farmers in the area studied keep track of the modern sources of information.

4.6.2 Use of Technology by Dairy Farmers in Accessing Agricultural Information

It was importance for the study to establish the technologies used by dairy farmers and also determine the frequency of use. Respondents were further asked how often they use various

technologies in accessing dairy agricultural information and the responses are shown in Figure 4.16.

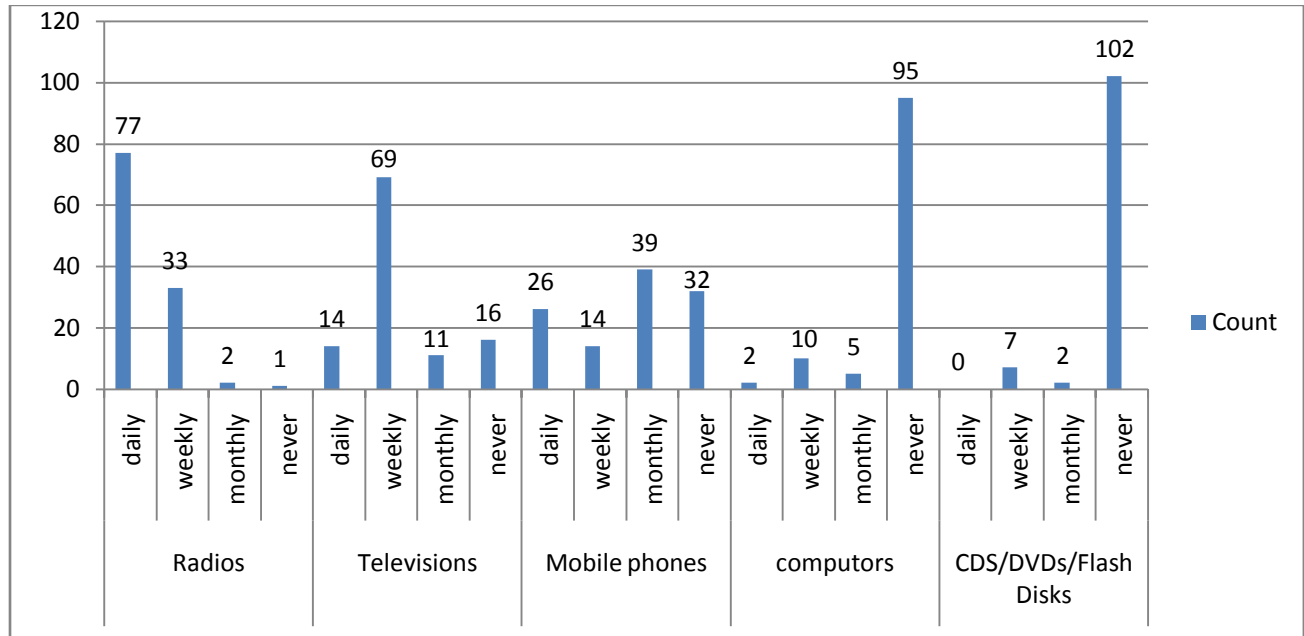


Figure 4.16: Use of Technology by Dairy Farmers

Source: Research Data 2018

According to Figure 4.16 above, out of 113 respondents, three quarter of them at 77 said they use radio on daily basis which was closely followed by 69 respondents who use televisions on monthly basis. Less than half standing at 26, 14 and 39 of the respondents acknowledged the use of mobile phones on daily, weekly and monthly basis respectively. Majority of the respondents at 95 and 102 never use computers /laptops /tablets and CDs/DVDs/Flash disks respectively. Mburu (2013) study on factors influencing access of agricultural information by smallholders showed also that 95% of the respondents preferred using radio over other ICT channels. During the interview, five out of eight respondents mentioned that they also use radio. They explained that they listen to farming programs and listen to news about dairy farming. This could be the reason why farmers in this area prefer the use of radio over the other channels of technology. One respondent acknowledged the use of television while the other two of the respondents said

that they don't use technology explaining that they are expensive, some require training, information from radio and television cannot be referred later, and they also experience problems with infrastructure in rural areas hindering access to technologies.

Moreover, farmers' observations established that farmers could tune radios from their mobile phones to get information. Majority of the farmers showed that they had mobile phones which they would show SMSs or calls with other farmers, extension officers and family members. They also used mobile phones to send and also receive money from cooperatives and friends and fairly to get information on market prices. Only one of the respondents had acquired a Smartphone. The researcher was able to takes pictures of the mobile phones used by the four farmers. This is as shown in Plate 4.3 below.

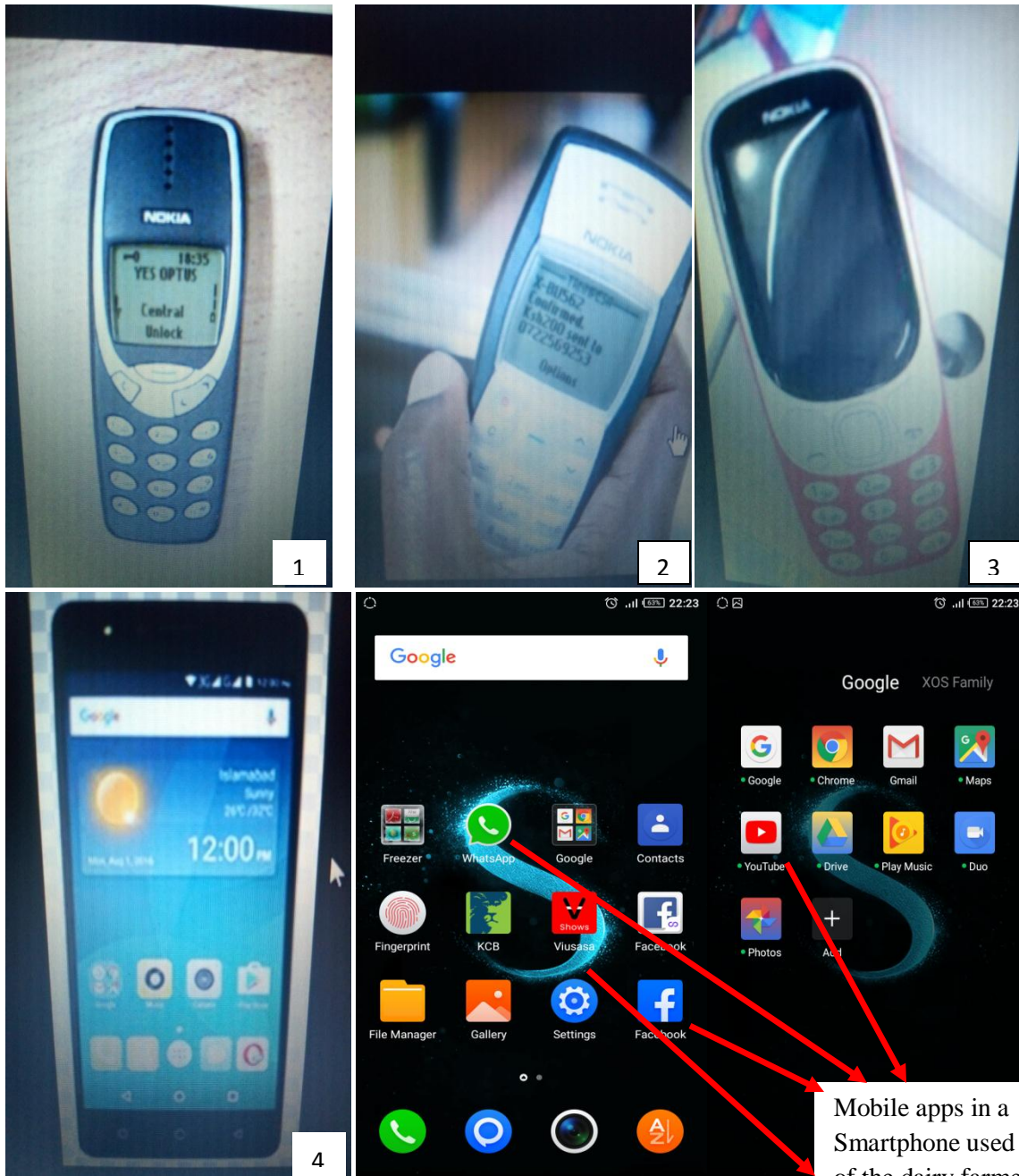


Plate 4.3: A Collation of Mobile Phones Used by Four Dairy Farmers.

Source: Observation

The extension officers were also asked to mention the technologies they used in acquiring and dissemination dairy agricultural information. This was to ascertain whether they embrace the use of technology among themselves and the farmers. The findings are as shown in Figure 4.17.

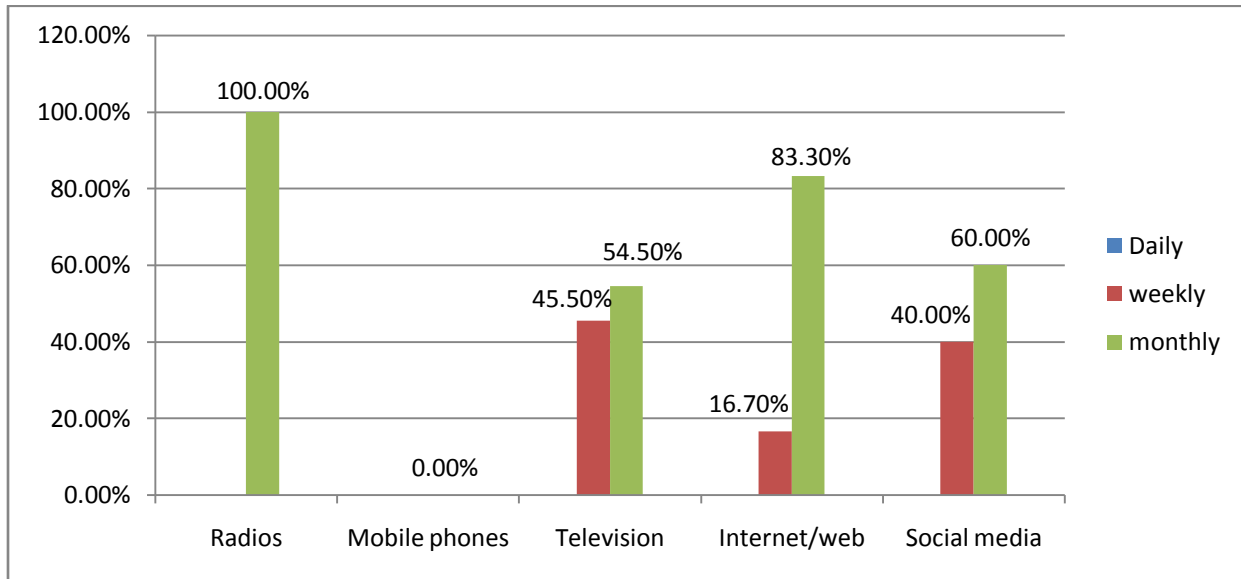


Figure 4.17: Use of Technology by Extension Officers

Source: Research Data 2018

As shown in Figure 4.17, it is clear that all the 12 agricultural extension officers used radio as a type of technology to acquire and disseminate information as indicated by radio representing 100%. At least half of the respondents used televisions on weekly and monthly basis representing 45.50% and 54.50% respectively. Social media was used by 7 (60%) of the respondents representing nearly two third respondents on monthly and almost half at 5 (40%) on weekly basis. None of the technologies was used daily and none of the officers used mobile phones to acquire or disseminate information. These findings illustrates that technologies are moderately used by extension officers in this area.

4.6.3 Use of Social Media by Dairy Farmers

The study sought to explore social media platforms used by dairy farmers in access and use of information. The respondents were asked to state whether they use social media and the response are presented in Figure 4.18.

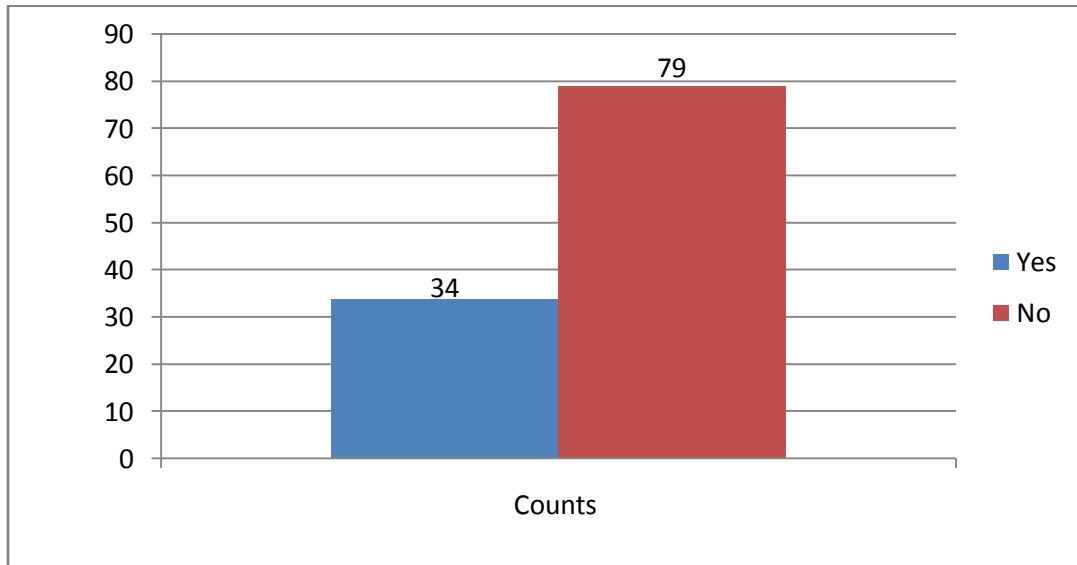


Figure 4.18: Use of Social Media by Dairy Farmers

Source: Research Data 2018

This study revealed that majority at 79 representing 70% of the farmers do not use social media to access agricultural information as shown in Figure 4.18 above. Only 34 representing 30 % admitted that they use social media. An observation made to farmers revealed that only one out four respondents had smart mobile phone that could access social media services. It had access to Whatsapp, Facebook, Youtube and Google applications. This is presented in Plate 4.3 above. Despite of having access to these applications, the farmer was not aware of how they could use them to access agricultural information. This shows that dairy farmers are not aware of the available social media platforms.

4.6.4 Social Media Tools Used by Dairy Farmers

Further the study sought to understand the adoption of social media platforms in access and use of dairy agricultural information. 34 respondents out of 113 agreed that they use social media. They were therefore were asked to select the social media tools they use. The findings are as shown in Figure 4.19.

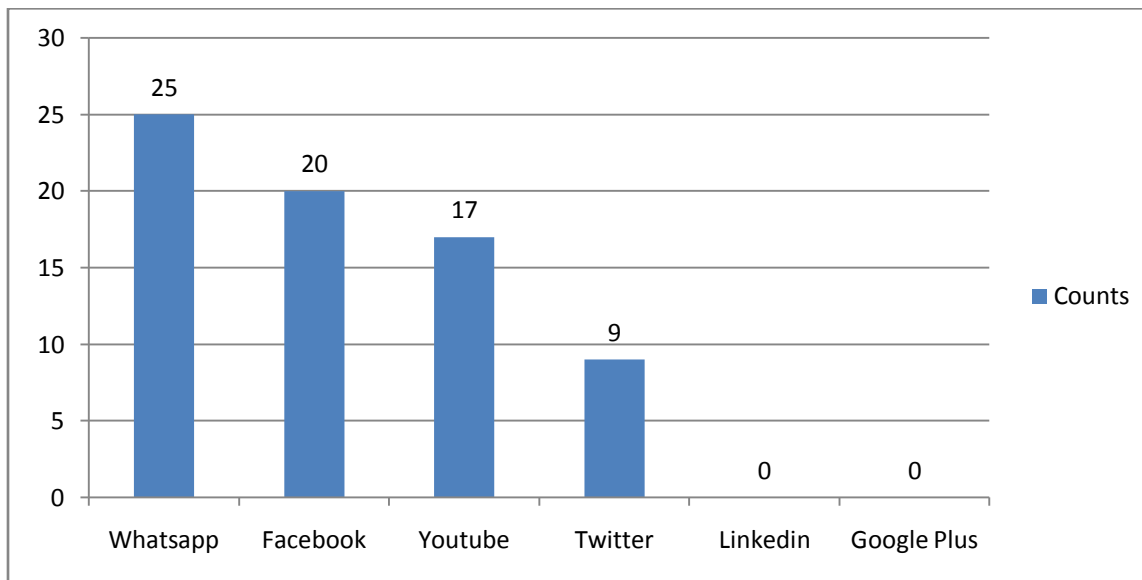


Figure 4.19: Social Media Tools Used by Farmers to get Dairy Agricultural Information
Source: Research Data 2018

From Figure 4.19 above, out of 34 respondents, Whatsapp was used by the highest number of respondents at 25 (73.5%) followed by Facebook at 20 respondents representing 58.8%. 17 respondents used Youtube accounting for 50% , nine representing 26.4 % used Twitter. None of the respondents used LinkedIn and Google plus. This indicates that only Whatsapp, Facebook and Youtube attained to be used by half of the respondents suggesting that Twitter LinkedIn and Google plus are not used and known by dairy farmers. In addition, an interview with an agricultural extension officer revealed the following:

“I use social media to access dairy agricultural information. We have a page in Whatsapp and Facebook we access, share and discuss issues among the agricultural extension officers. It becomes difficult to interact with farmers in these media because most of them do not own smart phones or computers, those who have them have no interest in these platforms, and majorities are illiterate. The young people use these platforms for socialization rather than accessing constructive information”. (Response from an agricultural extension officer)

These findings indicate that dairy farmers in this area rarely use social media tools in accessing agricultural information.

Further, the 34 dairy farmers who agreed that they use social media were also asked if they ask questions, contribute to discussions or share dairy agricultural information on social media platforms. Figure 4.20 below present the findings.

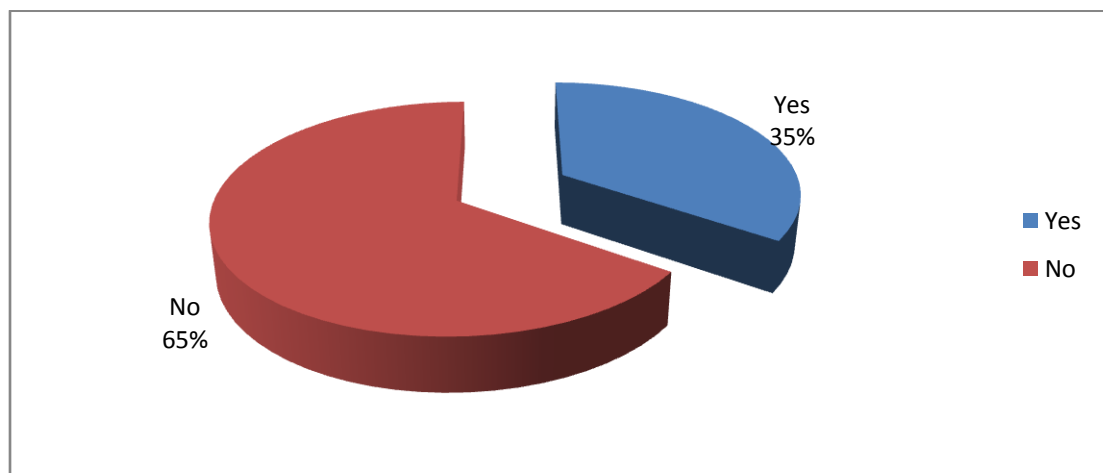


Figure 4.20: Farmers Response on whether they Ask Questions in Social Media

Source: Research Data 2018

As observed from Figure 4.20, 22 out of 34 respondents representing the majority at 65% disagreed that they ask questions, share and contribute to discussions in the platforms. In an interview with dairy farmers, only one of the eight respondents stated that they share dairy

farming videos, download dairy farming notes from you tube and also chat with friends on dairy farming issues. From the findings it can be noted that farmers who actively use social media do not use them for the purpose of accessing dairy agricultural information.

4.6.5 Farmers Satisfaction on the Use of Social Media

This study also sought to establish satisfaction of dairy farmers on the use of social media. This was to determine its convenience in access of information by dairy farmers. The 34 dairy farmers who agreed that they use social media were asked whether social media satisfy their dairy information needs. The findings are presented in Figure 4.21.

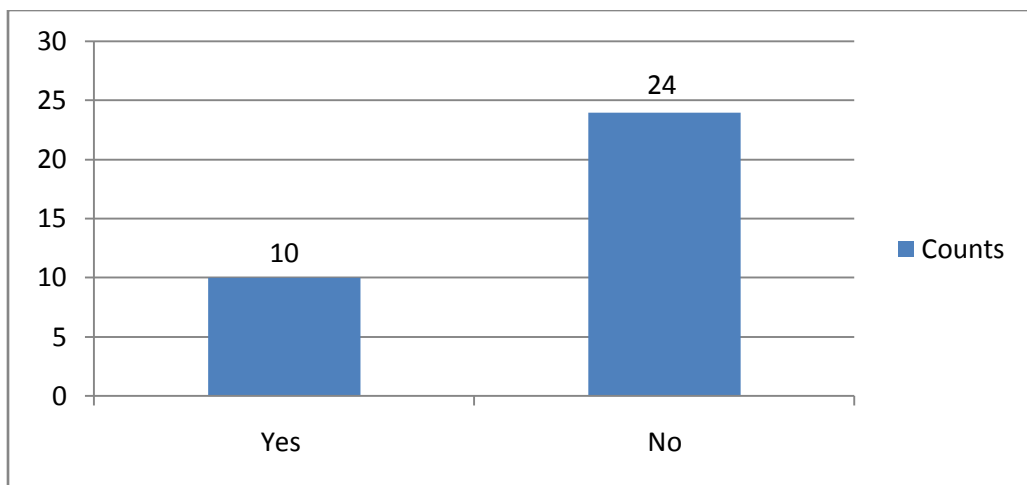


Figure 4.21: Farmers Satisfaction on the Use of Social Media

Source: Research Data 2018

Few respondents at 10 agreed that social media satisfy their information needs while majority at 24 disagreed. This suggest that dairy farmers in the area not confident in the use of social media.

4.6.6 Farmers Preference in Use of Technology over other Sources

The study sought to establish whether dairy farmers value the use of technology in accessing dairy agricultural information over other sources. Farmers were asked to state their preference and the findings are presented in Figure 4.22.

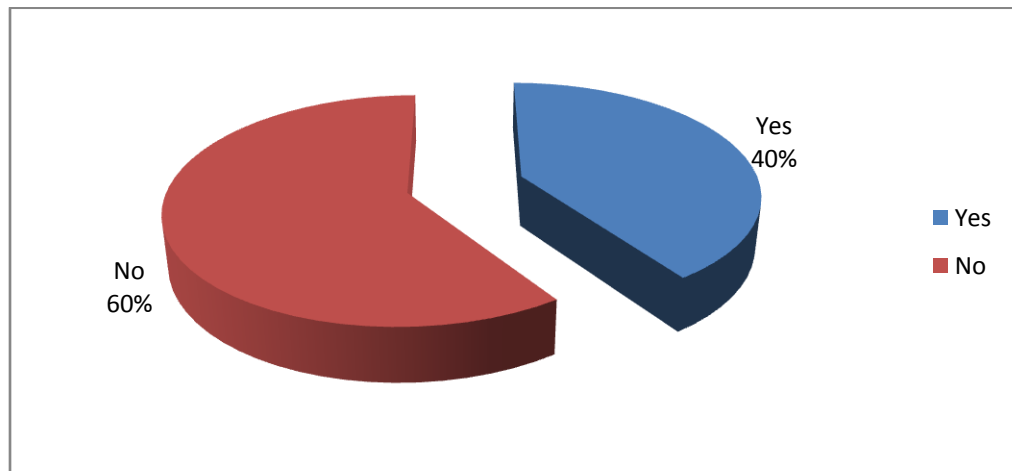


Figure 4.22: Farmers Preference in Use of Technology over Other Sources

Source: Research Data 2018

As shown in Figure 4.22 above, out of 113 respondents, less than half of the respondents at 45 (40%) preferred using technology to access dairy agricultural information over other sources. They explained that it is easily accessible, fast and provides comprehensive, current and first hand information. Majority of the respondents at 68 (60%) didn't prefer technology giving the reason that they face problem with power and poor network connection in the rural areas. The findings imply that technology would only be adopted by farmers if there is improved infrastructure in the regions.

From the above findings in regard to objective four of this study, it is evident that the use of technology by dairy farmers is very low especially the use of information communication technology such as computers, laptops, tablets, CD/DVDs and social media. This could be attributed to low level of education as revealed in this study where farmers have not acquired skills on how to use technology devices. Low source of income could also be a contributing factor where farmers do not afford the use of technology facilities. Farmers seems to be aware of this technology but do not use them.

Unlike in United States as explained by Raalte and Riel (2013) book on the use of social media shows that 76 % of farmers between the ages of 18 to 35 years use social media to share information, contact customers, and market their business; this study has revealed that majority of the young farmers do not use technology or social media to access agricultural information. Dairy farmers explained they face challenges in the use of technologies in that it is expensive, requires some training, language barrier, lack of exposure among other issues. The findings are in line with earlier studies done by Chukwunonso (2012) and Tiwari, Chakravarty & Goyal (2014) who found that ICT has been underutilized in accessing information due to barriers related with access to technology, access to ICT devices, farmer's IT skills, farmer's attitude, poor infrastructure, lack of awareness about internet, unavailability of ICT tools and lack of motivation to use them.

4.7 Challenges in Access and Use of Dairy Farming Information

The fifth objective of this study was to identify challenges facing farmers. This was to identify the main challenges hindering access and use of dairy agricultural information. A closed ended question was provided to the respondents with a list of possible challenges that farmers face in

accessing information. They were asked to select the one that applies to them. This is presented in Figure 4.23.

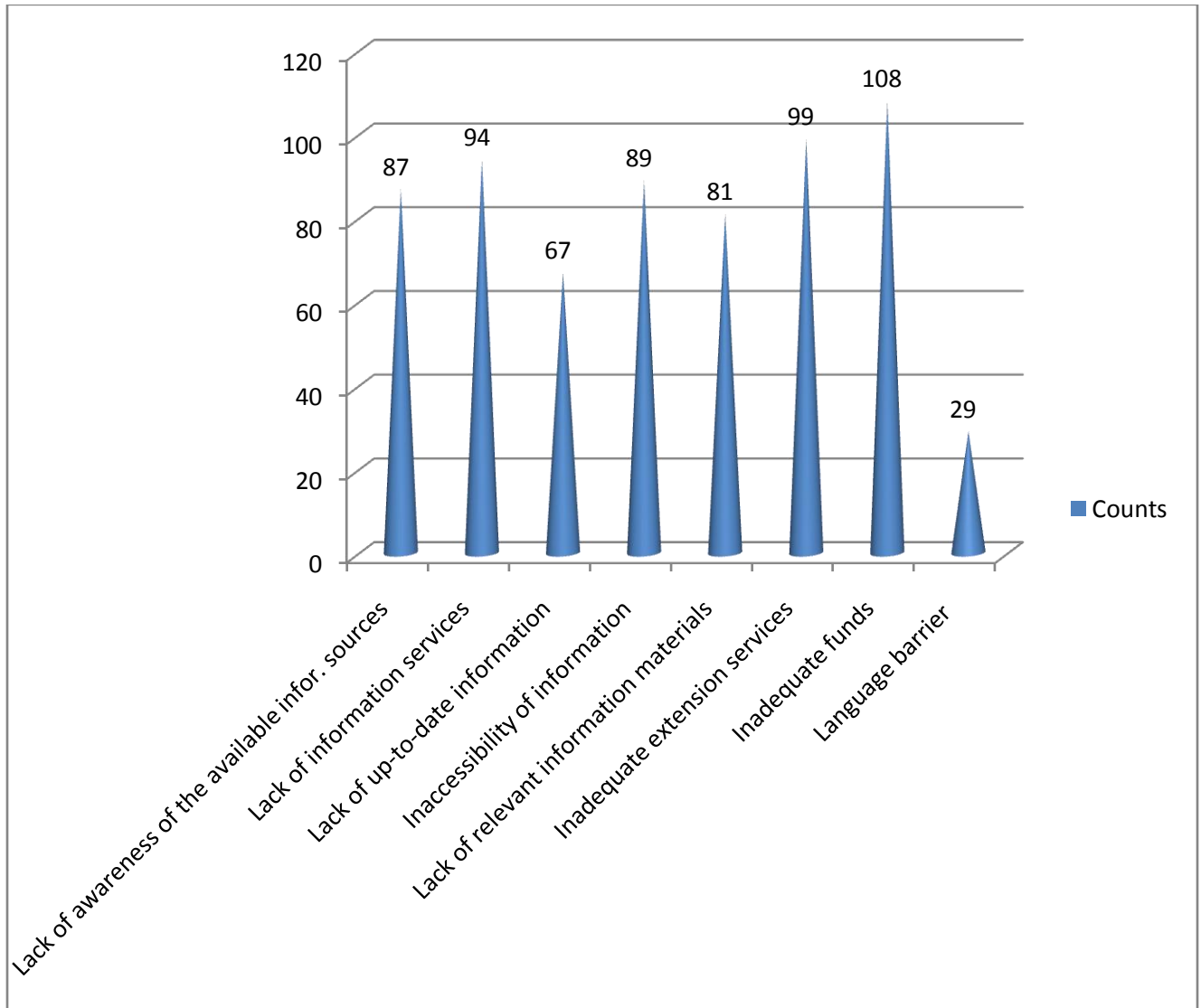


Figure 4.23: Challenges in Access and Use of Dairy Farming Information

Source: Research Data 2018.

From the above Figure 4.23, the highest number of dairy farmers at 108 (95.6%) agreed that they faced a challenge of inadequate fund. This was followed by inadequate extension services at 99 (87.6%), lack of information services was third at 94 (83.2%) while 89 (78.8%) faced

information challenges in accessibility to information. 87 (77%) lacked of awareness of the available information sources and others at 81 (71.7%) lacked relevant information materials. 67 (59.3%) reported lack of up-to-date information while a few at 29 (25.9%) experienced language barrier challenges.

From an open ended question, other challenges facing farmers are illiteracy, lack of support by the government, poor infrastructure in rural areas, low prices for dairy commodities, lack of dairy inputs and power blackout. Extension officers' questionnaire similarly revealed that low number of extension officers, low income levels to buy inputs such as information resources and devices, poor extension infrastructure, low funding by county government, illiteracy among farmers hence low use of tech, low rate of information dissemination and lack of libraries and resource centers as the major drawbacks to access of agricultural information among farmers. Further, extension officers' questionnaire revealed that low facilitation, poor infrastructure, lack of libraries dedicated to agriculture resources, illiteracy among farmers, lack of government support through funds making it difficult to reach farmers, poor policy implementation by government, lack of recognition by higher officers and unavailability of farmers as the major challenges occasioning them. Interestingly, all these challenges are similar to challenges unveiled by Matovelo (2008); Babu et al. (2012); Mtega and Bernard (2013) and Benard, Dulle and Ngalapa (2014).

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter presents a summary of the major research findings of the study. The researcher also provides conclusions and recommendations based on the findings and finally ends with a suggestion for further research.

5.2 Summary

The purpose of this study was to investigate access and use of dairy agricultural information by small scale young farmers. The study aimed at understanding how farmers get information on dairy farming for improvement in dairy farming production. The study was guided by five main objectives whereby data was collected from young dairy farmers and extension officers. This section presents a summary of the findings based on the objectives of the study as follows:

5.2.1 Information Needs of Young Dairy Farmers

The study sought to assess the information need of young dairy farmers in Murang'a County. All the dairy farmers except one respondent agreed that they need dairy agricultural information. Majority of the farmers agreed that they search for dairy agricultural information. However, most of the farmers disagreed that dairy agricultural information is readily available to them. It was further revealed that information on modern farming technologies, nutritional and reproductive management, milking operations and systems, animal waste management, diseases and pests control are regularly relevant to majority of the farmers. Similarly, all the extension officers agreed that they disseminate dairy agricultural information on modern technologies, nutritional and reproductive management and milking operations and systems.

5.2.2 Information Seeking Behavior of Young Dairy Farmers

The study sought to establish the factors affecting access and use of dairy agricultural information by young farmers in Murang'a County. Farmers were asked to indicate their level of agreement with statements intended to define their information seeking behavior. Farmers rated highly that it is important to search for information, that they need assistance in search of information and that they get confused by the information available. They neutrally rated that it takes time to search for information, that much effort is needed to search for information, they don't know which information to rely on and that they use different sources of information for comparison. Farmers lowly rated that they don't know the information required. Agricultural extension officers highly rated that farmers know the importance of information and strongly disagreed that farmers don't know the information required.

5.2.3 Information Sources Used in Accessing Dairy Agricultural Information by Young Dairy Farmers

The study further sought to find out the various information sources used in accessing dairy agricultural information. First, it was important to establish if farmers were aware of the available sources of information and majority agreed that they are aware of sources of dairy agricultural information. The most used and preferred source was radio, followed by other dairy farmers then televisions. Library services, books and internet were rarely used. Almost half of the farmers were not able to access agricultural extension officer services. Majority of the extension officers commonly use their colleagues, newspapers, radio and television to update themselves with modern farming technologies. They rated internet services as the most preferred source of information.

5.2.4 Technologies Employed by Young Dairy Farmers in Accessing Dairy Agricultural Information

Further, the study sought to find out technologies employed by young dairy farmers in accessing dairy agricultural information in Murang'a County. Majority of the farmers agreed that they were aware of the use of technology in accessing agricultural information. Three quarter of the respondents use radio on daily and monthly basis. Television was rated second; mobile phones were rarely used while majority never used computers /laptops /tablets and CDs/DVDs/Flash disks. On the use of social media, it was revealed that majority of the farmers do not use social media to access agricultural information. Also, majority neither agreed that they ask questions, share and contribute to discussions in the platforms nor were they satisfied with the use of social media. In addition, less than half of the respondents revealed that they preferred using technology to access dairy agricultural information over other sources. All the extension officers use technology to acquire and disseminate information on monthly basis. Radio was highly used, followed by internet/web services then social media.

5.2.5 Challenges Encountered by Small-Scale Dairy Farmers in Access and Use of Dairy Agricultural Information

Finally the study sought to identify the challenges facing dairy farmers in access and use of agricultural information. A list of possible challenges was provided and farmers were asked to select the ones that apply to them. It was established that the most common challenges faced by majority of the farmers were inadequate funds, inadequate extension services, lack of information services and inaccessibility of information and lack of awareness of the available information sources. Other additional challenges stated by most of the dairy farmers were

illiteracy, lack of support by the government and poor infrastructure in rural areas. Majority of extension officers revealed that major challenges they face in dissemination of agricultural information are low facilitation, poor infrastructure, lack of agricultural libraries dedicated, illiteracy among farmers, lack of government support through funds, poor policy implementation by government, and unavailability of farmers.

5.3 Conclusions

On the basis of these research findings, the following conclusions have been made by the researcher:

Firstly, it can be deduced that dairy agricultural information is high demand by young dairy farmers in the areas under study. Farmers know the types of information they need however this information is not readily available in their regions. They also seek specific information that is relevant to their day to day dairy farming practices but rarely go further to seek information on weather conditions, government policies and credit facilities.

Secondly, young dairy farmers have a positive attitude towards searching for agricultural information however there are individual factors that hinder information access. These are lack of exposure, lack of confidence, illiteracy, lack of funds and technical difficulties in information access.

Thirdly, the study concludes that the main sources of dairy agricultural information for dairy farmers in the area are radio, other dairy farmers and television. Radio was mainly preferred because farmer could tune in to the local channels which provide information in local languages. Other dairy farmers were sourced because they happen to be their neighbors and therefore readily available and approachable. Television was also used because it provides audio visual

information that has both sound and pictures and hence understandable by farmers. Extension officers were not readily available as there very few in every sub county and could not reach all the farmers. Libraries, books and internet were rarely used because there are no libraries in the rural areas of Murang'a except one national library in Murang'a town, farmers also lack fund to purchase information resources like books which are not also readily available. Poor infrastructure and lack of exposure on use of technologies limits access to internet services.

Fourthly, the researcher concludes that the use of technology in access of dairy information is very low among the young dairy farmers in the study area. The findings showed that social media, computers /laptops /tablets and CDs/DVDs/Flash disks were rarely used. Farmers seemed to be literate but due to technophobia and lack of exposure, they lack confidence and develop a negative attitude towards the use of these technologies.

Finally, the study concluded that the main challenges facing young dairy farmers are inadequate funds, inadequate extension services, lack of information services, illiteracy, lack of support by the government and poor infrastructure. These challenges are also owed to the individual factors that affect information seeking behavior.

5.4 Recommendations

In order to address the challenges faced by young dairy farmers in access and use of dairy agricultural information, the study recommends the following:

1. The government should recruit more extension officers within Murang'a County to ensure improved extension services. Extension officers should assess dairy information needs of farmers thereby provide relevant and accurate information. Workshops and training should be regularly provided to extension officers to keep them updated with the current information

needs of farmers. Adequate funds should also be allocated to extension services to enable the officers reach farmers in all regions.

2. Murang'a County Government should set up agricultural resource centers within the rural areas with qualified information providers. They should assess the information needs of dairy farmers, select and acquire useful agricultural resources. The centers can also provide mobile information services like Current Awareness Services (CAS) and Selective Dissemination of Information (SDI). Through this accessibility of current information is enhanced to the farmers' doorsteps.
3. The Kenya National Library in Murang'a County in collaboration with the Department of Livestock Production in Murang'a County Government can set up annual exhibitions and information literacy programs for dairy farmers. This should be done in the sub counties for a period of one week so as to reach farmers in the rural areas. During these programs, they can train farmers on how to access agricultural information, resources available and also provide brochures on the same. These creates farmers awareness and improve their information seeking behavior whose some were negatively affected by factors such as lack of exposure, lack of confidence and technical difficulties in information access.
4. The government through the Murang'a County, Department of Livestock Production staff can repackage information resources for dairy farmers. These resources can be published and be distributed to farmers through cooperative creameries and other stocked in the existing libraries within the county. It is an economical way of enhancing farmers' access to agricultural resources.
5. Murang'a County Government should set up cyber cafes within the sub counties and educate dairy farmers on the use of technologies such ICTs. This is to improve farmers access to

agricultural information through all types of technologies since radio is the most used and preferred form of technology.

6. The government needs to improve infrastructure in the rural areas of Murang'a County as dairy farmers complained of lack of power and poor network connections within their regions. This promotes the use of ICT technologies such as computers, tablets, social media etc in access of agricultural information.

5.4.1 Recommendations for Further Research

1. There is need to investigate on policies set up by the government in adoption of Information Communication Technologies (ICT) in access and dissemination of agricultural information to small-scale farmers.
2. A similar study can be carried out in a different county in Kenya in order to understand the role of dairy agricultural information in dairy farming practices.
3. Further study can be undertaken to establish the agricultural information strategies that could be undertaken to effectively disseminate agricultural information to other types of small-scale farmers in rural areas.

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APPENDICES

APPENDIX I – QUESTIONNAIRE FOR DAIRY FARMERS

Questionnaire NumberLocation..... Date Issued.....

Transmittal letter

**Martha Wanjiku Thuo,
PO BOX 60909-00200,
NAIROBI.**

Email: mwthuo12@gmail.com

Dear respondent,

RE: REQUEST TO COLLECT DATA

I am a Master's student in Kenyatta University, Department of Library and Information Science. I am carrying out a research on access and use of dairy agricultural information by small-scale young farmers in Murang'a County, Kenya.

I have chosen you as one of my respondents because you will be able to provide the required information. Your response will be highly appreciated. Kindly fill in the blanks spaces or tick within the respective boxes as required. Please feel free to answer all the questions. The information provided will be treated with confidence and will be used mainly for the purpose of this study.

Thank you.

Yours Sincerely,

Martha Thuo.

SECTION A: GENERAL INFORMATION

Kindly tick appropriately or fill in the spaces provided to all the questions.

1. What is your gender?
 - a. Male []
 - b. Female []

2. What is your age category?
 - a. 18 – 21 []
 - b. 22 – 25 []
 - c. 26 – 29 []
 - d. 30 – 35 []
 - e. 36 and above []

3. What is your marital status?
 - a. Single []
 - b. Married []
 - c. Separated/Divorced []
 - d. Widow/Widower []

4. What is your highest level of education?
 - a. Primary level []
 - b. Secondary level []
 - c. Certificate level []
 - d. Diploma level []
 - e. Degree level []
 - f. Masters level []
 - g. Others (Please specify).....

5. What is your main source of income?
 - a. Salary []
 - b. Self employment []
 - c. Youth funds []
 - d. Others (Please specify).....

6. How many dairy cows do you own?
.....

SECTION B: DAIRY FARMER INFORMATION NEEDS

7. Do you need dairy agricultural information?
 - a. Yes []
 - b. No []

8. Do you search for dairy agricultural information?
 - a. Yes []

b. No []

9. Are information services readily available to you?

a. Yes []

b. No []

10. Have you ever received information services from agricultural extension officers?

a. Yes []

b. No []

11. Listed below are types of information needs for dairy farmers. Please indicate the relevancy of each type of information need on the scale of 1-4. Where 1= not relevant, 2= sometimes relevant, 3= often relevant, 4= frequently relevant

Type of information need	1	2	3	4
Modern farming information technologies				
Nutritional and reproductive management				
Milking operations and systems				
Animal waste management				
Diseases and pests control				
Weather conditions				
Business information				
Government policies and plans				
Market trends				
Credit facilities				

12. How often are your information needs attended to by agricultural extension officers?

a. Daily []

b. Weekly []

c. Monthly []

d. Yearly []

e. Never []

SECTION C: INFORMATION SOURCES AND SEEKING BEHAVIOUR

13. Are you aware of any sources of dairy agricultural information?

a. Yes []

b. No []

14. Which of the following sources of information do you use to get your dairy agricultural information? Tick as many as applicable

a. Extension officer []

b. Library services []

c. Books []

d. Newspapers/magazines []

e. Radio []

- f. Television []
- g. Mobile phone calls/SMS []
- h. Internet []
- i. Cooperative society []
- j. Other dairy farmers []
- k. Family members []
- l. Village elders []
- m. Others please specify
- n. Don't use any source []

15. Which is your most preferred source of information in question 14 above?

.....

16. Listed below are information seeking behaviors that could possibly be portrayed by farmers. Please indicate your level of agreement with each as it affects you. A scale of 1-5 is used Where 1= Strongly disagree, 2= Disagree, 3= Fairly agree, 4=Agree, 5= Strongly agree.

Information seeking behavior	1	2	3	4	5
It is important to search for information					
I need assistance in searching for information					
It takes time to search for information					
Much effort is needed to search for information					
I get confused by the information available					
I don't know which information to rely on					
I use different sources of information for comparison					
I don't know information required					

SECTION D: INFORMATION TECHNOLOGY

17. Are you aware of the use of technology in accessing agricultural information?

- a. Yes []
- b. No []

18. How often do you use the following devices to access and use dairy agricultural information? Tick where appropriate.

Device	Daily	Weekly	Monthly	Never
Radio				
Television				
Mobile phones				
Computer/laptops/tablets				
CDs/DVDs/Flash disks				

19. Do you use social media to access dairy agricultural information?

- a. Yes []

b. No []

20. If your answer to Q.19 is yes above, which of the following social media tools do you use to get dairy agricultural information? Tick where applicable

- a. Whatsapp []
- b. Twitter []
- c. Facebook []
- d. You tube []
- e. Linked in []
- f. Google plus []
- g. Others (Specify)

21. Do you ask questions, contribute to discussions or share dairy agricultural information on social media platforms?

- a. Yes []
- b. No []

22. Do social media satisfy your dairy information needs?

- a. Yes []
- b. No []

23. If No to Q.22 above, Explain Why.

.....

24. Do you prefer using technology to access dairy agricultural information over other sources?

- a. Yes []
- b. No []

25. If Yes Q.24 above, Explain Why.

.....

26. Below is a list of possible challenges that dairy farmers face while accessing dairy agricultural information. Please tick appropriately the ones that apply to you.

- a. Lack of awareness of the available information sources []
- b. Lack of information services []
- c. Lack of up-to-date information []
- d. Inaccessibility of information []
- e. Lack of relevant information materials []
- f. Inadequate extension services []
- g. Inadequate funds []
- h. Language barrier []

27. What other challenges do dairy farmers face in access and use of dairy agricultural information?

.....
.....
.....

28. How do you think these problems may be solved?

.....
.....
.....
.....

Thank you.

APPENDIX II - QUESTIONNAIRE FOR EXTENSION OFFICERS

Questionnaire NumberLocation..... Date Issued.....

Transmittal letter

Martha Wanjiku Thuo,

PO BOX 60909-00200,

NAIROBI.

Email: mwthuo12@gmail.com

Dear respondent,

RE: REQUEST TO COLLECT DATA

I am a Master's student in Kenyatta University, Department of Library and Information Science.

I am carrying out a research on access and use of dairy agricultural information by small-scale young farmers in Murang'a County, Kenya.

I have chosen you as one of my respondents because you will be able to provide the required information. Your response will be highly appreciated. Kindly fill in the blanks spaces or tick within the respective boxes as required. Please feel free to answer all the questions. The information provided will be treated with confidence mainly for the purpose of this study.

Thank you.

Sincerely,

Martha Thuo.

SECTION A: GENERAL INFORMATION

Kindly tick appropriately or fill in the spaces provided to all the questions.

1. What is your gender?
 - a. Male
 - b. Female

2. What is your highest level of education?
 - a. Certificate level
 - b. Diploma level
 - c. Degree level
 - d. Masters level
 - e. Others please specify.....

3. How long have you worked as an agricultural extension officer?
 - a. Below 5 years
 - b. 5-10 years
 - c. 10-19 years
 - d. 20 years and above

SECTION B: SPECIFIC RESEARCH QUESTIONS

4. Have you ever provided dairy information services to farmers for the last two years?
 - a. Yes
 - b. No

5. If yes above, which of the following information have you provided to dairy farmers? Tick where appropriate

Type of information need	Tick
Modern technologies information	
Nutritional and reproductive management	
Milking operations and systems	
Animal waste management	
Diseases and pests control	
Weather condition	
Business information	
Government policies and plans	
Market trends	
Credit facilities	

6. How often do farmers search for dairy information services from you?
 - a. Daily
 - b. Weekly
 - c. Monthly
 - d. Yearly
 - e. Never

7. Below is a list of information seeking habits that could possibly be portrayed by farmers. Please indicate your level of agreement with each as it relevant to farmers. A scale of 1-5 is used where 1= Strongly disagree, 2= Disagree, 3= Fairly agree, 4=Agree, 5= Strongly agree.

Information seeking habits	1	2	3	4	5
Farmers know the importance of dairy information					
Farmers need assistance in searching for information					
Farmers avail time to search for information					
Information is readily available for farmers					
Farmers get confused by the information available					
Farmers don't know which information to rely on					
Farmers use different sources of information for comparison					
Farmers don't know information required					
Farmers have adequate funds to acquire information resources					
Farmers know how to use modern technologies to acquire information					

8. How do you update yourself with modern agricultural technologies?

- a. Trainings []
- b. Library Books and Publications []
- c. Radio []
- d. Television []
- e. Newspapers []
- f. Internet sources []
- g. Social media []
- h. Colleagues/other extension officers []
- i. Workshops/seminars []
- j. None at all []
- k. Others specify.....

9. Which is the most preferred source of information for you in question 8 above?

.....

10. Explain why it is preferable for you in question 9 above

.....

11. Do you use technology to acquire and disseminate information to farmers?

- a. Yes []
- b. No []

12. If yes to Q.10 above, which of the following technologies do you use in disseminating information and how often? Please tick appropriately

		HOW OFTEN (TICK)		
ICTS	TICK IF USED	DAILY	WEEKLY	MONTHLY
Radio				
Television				
Mobile phones				
Internet/Web				
Social media				

13. Is technology important in provision of dairy agricultural information?

- a. Yes []
- b. No []

14. If yes above, please give reasons for your answer.

.....

.....

15. What challenges do you face in access and provision of dairy agricultural information in Murang'a County?

.....

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.....

.....

16. What do you think could be the challenges faced by dairy farmers in access of agricultural information in Murang'a County?

.....

.....

.....

.....

Thank you.

APPENDIX III - INTERVIEW SCHEDULE FOR DAIRY FARMERS

Location.....

Date.....

Part One: General Information

1. What is your age?
2. What is your highest level of education?

Part Two: Specific Research Questions

3. For how long have you practiced dairy farming?
4. Do you have any training in dairy farming?
5. Do you as a farmer need any dairy agricultural information?
 - a. If yes, what kind of information do you require?
 - b. If not, why?
6. Do you search for dairy agricultural information?
 - a. If yes, which sources of information do you use and how often?
 - b. If no, which of the following reasons could be the cause?
 - i. You need assistance in searching of information
 - ii. There is no enough time to search for information
 - iii. You do not know which information source to use
 - iv. You do not know where to get information
 - v. You need funds to access the information
 - vi. You get confused by the available information
7. Are extension and information services readily available and accessible for you as a dairy farmer in Murang'a County?

- a. If yes, are the information services useful?
 - b. If not, why?
8. Do you use technology in accessing dairy agricultural information?
- a. If yes, which tools and how do you use the tools?
 - b. If no, why not?
9. How often do you use the technology tools?
10. What is your opinion in use of technology over the other sources?
11. What challenges do you think farmers encounter in searching dairy agricultural information?

Thank you for your time!

APPENDIX IV - INTERVIEW SCHEDULE FOR EXTENSION OFFICERS

Location.....

Date.....

Part One: General Information

1. What is your highest level of education?
2. How long have you worked as agricultural extension officer?

Part Two: Specific Research Questions

3. Do you provide dairy agricultural information to farmers?
 - a. If yes which type of information do you provide?
 - b. If no, why?
4. How often do you disseminate this information to dairy farmers?
5. Who initiates the need for information?
6. Which sources of information do you use to enable you disseminate information to farmers?
7. What are the reasons for using the above stated sources over other sources?
8. Are dairy farmers able to access agricultural information sources?
 - a. If yes, which ones?
 - b. If no, why?
9. Do you use technology in dissemination of agricultural information?
 - a. If yes, which ones and how do you use them?
 - b. If no, why?
10. With your experience, which technology tools do farmers in Murang'a County use in access of dairy agricultural information?

11. Do you think technology is useful in dissemination of agricultural information?
 - a. If yes, how is it useful to you?
 - b. If no, why?
12. What challenges do you come across in access and dissemination of dairy agricultural information?
13. What challenges do farmers face in access and use of dairy agricultural information?

APPENDIX V - OBSERVATION SCHEDULE FOR DAIRY FARMERS

Name of Sub-County.....

Date.....

Day	Area	Information Needed	Collected Data
One	Technology used	1. Demonstration or evidence of use
Two	Information resource centres (Libraries, resource centres etc)	1. Adequacy of resources 2. Currency of resources 3. Location and accessibility

APPENDIX VI - WORK PLAN

SN	ACTIVITY	Time Frame
1.	Proposal writing	June to July, 2017
2.	Proposal defense	October, 2017
3.	Preparation of data collecting instruments	December, 2017
4.	Pilot Study	January, 2018
5.	Data collection	February, 2018
6.	Data analysis	March, 2018
7.	Report writing	April, 2018
8.	Graduation	July 2018

APPENDIX VII – BUDGET

SN	ACTIVITY	COST (KSHS)
1.	Laptop	35,000
2.	Printing of research proposal, questionnaires, interview schedules and observation schedules	10,000
3.	Stationery	1,000
4.	Pilot study transport and general expenses	1,000
5.	Data collection transport and general expenses	8,000
6.	Report printing and binding	2,000
7.	Other expenses	2,000
	TOTAL	59,000