AN IDENTIFICATION AND EVALUATION OF FACTORS INFLUENCING SMALLHOLDER DAIRY FARMERS' CHOICE OF AGRICULTURAL CREDIT SOURCE: THE CASE OF GITHUNGURI DIVISION OF KIAMBU COUNTY

BY

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DECLARATION

STUDENT'S DECLARATION

This thesis is my original work and has not been presented for a degree in this or any other university.

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SUPERVISORS' DECLARATION

This thesis has been submitted for examination with our approval as the university supervisors.

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DEDICATION

I dedicate this thesis to my sons Joseph and Dennis who did not get the attention they deserved at their tender ages as I was busy working on this thesis. My love for you is irreplaceable. May God bless you abundantly!

ACKNOWLEDGEMENT

ABSTRACT

The objective of this study was to determine if credit attributes and farmers' characteristics influence smallholder dairy farmers' choice of specific agricultural credit sources and also evaluate their significance. The significance of this objective arises out of the fact that Kenya's population has continued to increase both in the rural and urban areas, with the latest population estimates showing that Kenya's population is now over 39.8 million people (2009 projection). This population increase has resulted into pressure on land.

As high potential agricultural land per capita holdings diminish in Kenya due to high population, it is critical that farmers attain high levels of economic efficiency to contribute to household food security and to overall national development. The population growth and density has a dual relationship with dairy farming. First, the high population creates market and price incentive for dairy production. Second, it causes pressure on land, leading to small land holdings per household thus leaving the farmer virtually with no option but to increase production by use of improved technologies. To adopt improved technologies, farmers need capital to finance their operations. For smallholder farmers, such capital can only come from credit sources because their marginal propensity to save is low. It is also surprising that small scale farmers in Kenya only absorb about a third of total agricultural credit that is available to them despite the fact that they account for about 80% of the marketed agricultural produce in Kenya (Nyangito et, al, 2004). Thus there is need to find out what factors determine the smallholder farmers' choice of credit source for those who access credit.

The study employed a conceptual and empirical model of analysis based on the Consumer Choice Theory as developed by Lancaster (1966) which postulates that preferences for goods are a function of the attributes possessed by the goods rather than the goods per se. An important implication of this theory is that the overall utility of a good can be decomposed into separate utilities for its constituent characteristics or traits. This translates into using the attributes of the good as the argument of the function in terms of utility function. A good can thus be described by the attributes that generate the utility or disutility to the individual. For credit access, this permits the analysis of farmers' preference in terms of the utility they perceive to result from various credit attributes, so that the farmer is assumed to make a choice from various alternatives by considering the alternative that gives the highest utility to him or her.

Credit sources were classified into five models namely: Community owned rural finance, Donor led rural finance, Employed workers' SACCO, Government led rural finance, Managed SACCO and Private Commercial banks. Primary data was collected from three hundred and forty seven (347) farmers randomly selected in Githunguri Division of Kiambu County using pretested structured questionnaire. A multistage random sampling procedure was used.

The study established that credit attributes and farmers' characteristic significantly influenced farmers' choice of a particular credit source. The study concludes that, in order to raise the credit access of small holder dairy farmers to acceptable level, there is need to repackage the loan products to suit the needs of both the farmers and the financial institutions. The study also concludes that lending policies and respective financial products need to be compatible with the borrowing preferences of the smallholder dairy farmers. These policies need to address consumption credit demand that is compatible with small holder dairy farmers' ability and willingness to pay. In the absence of this type of provisioning, there is need for public policy to lower education and health care costs for the small holder dairy farmers since such costs affect their productive capacity. Market research to monitor and inform on farmer characteristics and their preferred credit attributes should be undertaken on a continuous basis since the farmer's needs are dynamic. However, this study was limited in relation to the type of data that the farmers could provide, and this made it impossible to use Multi Nominal Logit analysis to give a more elegant evaluation of the factors that influence choice, as envisaged by the researcher. Therefore, further studies could be undertaken to try and get richer data sets, such as longitudinal and panel datasets, which were not possible to collect in this study due to time and budget constraints.

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LIST OF ABBREVIATIONS

ACZ	Agro – Climatic Zone
ADC	Agricultural Development Corporation
AFC	Agricultural Finance Corporation
CBS	Central Bureau of Statistics
FAO	Food and Agricultural Organization
FOSA	Front Office Service Association
GDP	Gross Domestic Product
GOK	Government of Kenya
IDF	International Dairy Federation
KCC	Kenya Cooperative Creameries
KNBS	Kenya National Bureau of Statistics
KWFT	Kenya Women Finance Trust
MoL&FD	Ministry of Livestock and Fisheries Development
NGOs	Non –Governmental Organizations
SACCOs	Savings and Credit Cooperatives
SRA	Strategy for Revitalizing Agriculture
UHT	Ultra Heat Treated

CHAPTER ONE: INTRODUCTION

1.0. Dairy Industry In Kenya

Kenya is an Agricultural based economy with agricultural sector contributing about 25% of the GDP (GOK, 2007, KIPPRA 2009). Dairy farming is an important part of the agricultural sector and it contributes about 3.5% to the GDP (GoK, 2007). The dairy industry in Kenya is the single largest livestock production sub-sector contributing to 14% of the agricultural gross domestic product (GDP) and 3.5% of the total GDP (Muriuki et al., 2003). The dairy sector plays an important role in food security, creating employment, generating income, and enhancing the livelihoods of dairy farmers, traders, processors and all participants in the entire milk supply chain (Kinambuga, 2010). The total dairy herd is estimated at 3.4 million heads and it produces about 3.1 billion litres of milk annually (Kenya National Bureau of Statistics (KNBS), 2010); Ministry of Livestock and Fisheries Development (MoL&FD, 2003). The smallholders have dominated the dairy production owning about 98% of the total dairy herd (Peeler and Omore, 1997). The smallholder dairy households are estimated to be over 1.5 million in number. This accounts for more than 85% of the annual total milk production and 80% of the 1.8 billion litres of milk marketed annually (MoL&FD 2003; Stall et al., 2001).

Small holder dairy farming is mostly practiced in ago-climatic zone (ACZ) 1-4 in the Central and Rift Valley provinces and the Coastal lowlands. Smallholder dairy farms are also highly concentrated in peri-urban areas. This is mainly due to the ease of access to milk marketing channels. Small-scale dairy farmers typically keep 2 or 3 dairy cows, with their followers, on approximately one hectare of land alongside other livestock, while also engaging in arable agriculture. (Staal, 2007) Large-scale dairy farms are owned by both private firms and public institutions, such as the Agricultural Development Corporation (ADC). An estimated 500,000 dairy cattle are kept in this system. Friesian cattle are the dominant breed, but Ayrshire and Channel Island breeds are also found. Some farms in the drier areas keep a cross breed of Sahiwal with Bos Taurus breeds. (Dairy Report, 2005)

Milk production and consumption has always been a big business in East Africa, and the dairy industry in Kenya is considered amongst the large agricultural sub-sector alongside horticulture and tea. There are about 1.8 million rural households keeping some 6.7 million dairy cows in Kenya. **(**Staal, 2007). These small-scale farmers and traders handle more than 80 per cent of all the milk marketed in the country. Kenyans are amongst the highest milk consumers in the developing world, consuming an estimated 145 litres per person per year on average. The value of the milk marketed in East Africa as a whole is estimated at USD1.7 billion a year. This excludes the 34 per cent of the region's milk that is consumed on-farm, which is an important source of household nutrition, (Staal, 2007).

The small scale farmers can compete with the industrialized world's biggest dairy producers if they were not constrained. The constraints they face are mainly land, labour and capital. Capital is the most important, since labour can be supplemented with family labour as opposed to hired labour, while land can only be improved through use of improved technologies which require capital. Capital could be obtained either from savings or credit. Mostly farmers result to credit due to their low marginal propensity to save (Staal, 2007).

The livestock sector has continued to boost the agricultural sector. The quantity of marketed milk in Kenya rose by 6.2 per cent from 2005 to stand at 361 million litres in 2006. The value of marketed dairy produce has continued to show an upward trend due to the increase in the price of milk and the quantity of marketed milk. (CBS, 2007) There is therefore, need to improve the efficiency of dairy production and marketing for equitable distribution of income and hence poverty alleviation among households especially in the rural areas in line with the Vision 2030 (GoK, 2007). Recommendations for dairy development must therefore be based on the prevailing dairy farming circumstances, opportunities and challenges in the region.

1.1. Milk Production Status And Trends

The dairy sector has experienced significant changes over the years, resulting in a major shift towards market-oriented smallholder production. This has been caused mainly by the suitable climatic conditions, significantly improved fodder technology and dairy cattle population, high urban population and incomes and the high consumption of milk and dairy products. In addition

to the economic importance of milk, cattle manure is used to improve soil fertility resulting in increased pasture/fodder production on smallholder farms (Kinambuga, 2010)

In the year 2004, total cows' milk production in Africa was 21,244,474 tons from a total of 46 million dairy cows, thus giving an average milk yield of 461 Kg milk per cow over the year, which is only one fifth of world average yield. (FAOSTAT, 2006)

Kenya is among the top five African milk producing countries in terms of volume and these include Sudan, Egypt, South Africa and Algeria. The first four countries alone produce 52% of the total milk in Africa so that Kenya alone produces 48%. Kenya is estimated to produce 4 billion litres of milk per year, mainly from central and rift valley provinces. However, only 87 percent was consumed in the year 2007. About 13 per cent of the milk produced is either spoiled or fed to calves (Staal, 2007). Milk spoilage may result from lack of storage facilities. Milk spoilage can be reduced or avoided if the farmers had storage facilities. The facilities, e.g. coolers and refrigerators, are expensive. Given the constraints facing small holder farmers, credit would assist them purchase the facilities.

1.2. Opportunities For Kenyan Small Holder Dairy Farmers

The country is generally self-sufficient in milk and dairy products. However, the demand for milk and dairy products in developing countries is estimated to increase by 25% by 2025 (Delgado et al., 1999), mainly due to human population growth, further urbanization, increased disposable income, greater diversity of food products to meet nutritional needs, and increased opportunities for domestic and external trade. Dairy imports in developing countries are estimated to reach 38.9 billion litres of milk equivalent by 2030 (Food and Agriculture Organization (FAO) and International Dairy Federation (IDF, 2004). The country has the potential to increase milk production from the current 4.2 billion litres in 2009 to over 5.0 billion litres in 2014 (Kinambuga, 2010).

In 2007, dairy exports from Kenya increased notably. Liquid milk buyers include major food manufacturers, such as Cadbury, whereas powder milk is exported to other sub-Saharan African countries, including South Africa, as well as to Asia and the Middle East. In addition, the UHT

milk market is opening up and Kenya is now exporting long-life milk to Mauritius and South Africa. (Staal, 2007)

High producer prices, coupled with surplus supplies of milk in Kenya, could make Kenya a significant player in a growing market for ultra-heat treated milk (UHT) which needs no refrigeration until the packages are opened.

The UHT Milk market presents an opportunity for private processors to build new processing plants. These opportunities call for increase in milk production by the farmers, but farmers are limited by resources. The smallholder farmers could take advantage of the opportunities, were it not for their constraints. With land constraint, the only option they have is to invest in technology, e.g. cross-breed dairy cows, and intensive zero-grazing. This requires capital. Since their marginal propensity to save is low, they result to credit.

1.3. Statement Of The Problem

The significance of this study arises out of the fact that Kenya's population has continued to increase both in the rural and urban areas, with the latest population estimates showing that Kenya's population is now over 39.8 million people (2009 projection). This population increase has resulted into pressure on land. As high potential agricultural land per capita holdings diminish in Kenya due to high population, it is critical that farmers attain high levels of economic efficiency to contribute to household food security and to overall national development. The population growth and density has a dual relationship with dairy farming. First, the high population creates market and price incentive for dairy production. Second, it causes pressure on land, leading to small land holdings per household thus leaving the farmer virtually with no option but to increase production by use of improved technologies. To adopt improved technologies, farmers need capital to finance their operations. For smallholder farmers, such capital can only come from credit sources because their marginal propensity to save is low. It is also surprising that small scale farmers in Kenya only absorb about a third of total agricultural credit that is available to them despite the fact that they account for about 80% of the marketed agricultural produce in Kenya (Nyangito et, al, 2004).Thus there is need to find out what factors determine the smallholder farmers' choice of credit source for those who access credit.

Improving production on the already constrained land means use of improved breeds and technologies. This will require capital, either from farmers' savings or from credit. Small holder dairy farmers' marginal propensity to save is low. The income they get is just enough to cater for their consumption and other basic needs, thus leaving less or no income for saving. They thus resort to credit to improve production of the already constrained land through use of high yielding breed cattle and intensive zero- grazing system. With land as a constraint, intensive zero-grazing system is the most appropriate dairy production system.

Understanding the link between technologies with borrowing, saving and investment behaviour of producers is imperative (Nyikal, 2000). Many studies have been done on agricultural credit in Kenya but they were not specific to the dairy sector farmers and their preference on credit. Some of these studies are (Nyikal, 1990 & 2000) among others. (Nyikal, 1990) concluded that the greatest need is not loans but reorganisation of existing resources to improve productivity. With many financial institutions, given that there are many alternative financiers that the farmers can go to for credits, it is important to understand how the farmers make their choices

However some studies have been done on small holder dairy in Kenya in general and Kiambu district in particular. (Hearles and Kinoti, 1984, Nell, 1992, Freeman, et. al 1998 and Kilungo, 1999). They point out the importance of smallholder dairying, emphasise on the need to use intensive dairy farming methods and note lack of credit as a constraint facing the dairy farmers and that impacts negatively on dairy productivity. These studies however do not address factors influencing farmers choice of agricultural credit despite concluding that credit is a constrain facing dairy farmers.

(Nyangito, et al., 2004) found that smallholder producers received only a third of the total credit given to dairy farmers in Kenya yet they are the most and produce the most, approximately 80% of the total marketed milk. He further stated that there is need to find out why these farmers get the least yet produce and market the most. He also cited liberalization of interest rates and lending policies as factors that have made it difficult for small scale farmers to access credit.

Many of the existing studies were undertaken over ten years ago and many changes have occurred since then. For example, there are more commercial banks, microfinance institutions (e.g. K-Rep, Faulu – Kenya) and dairy cooperatives which are offering credit to dairy farmers in

the country and many financiers operate differently with respect to interest rate, loan repayment period, loan review period, collateral, credit rationing, and repayment flexibility.This study attempted to fill the vacuum regarding the factors that influence smallholder dairy farmers' access to agricultural credit. There was need to assess farmers' demand for credit, since borrowers are not homogeneous in terms of their need for credit and marginal productivity of credit differs with different borrowers. This understanding would ensure that the greatest impact from credit is achieved. **Specifically there was need to find out what determines smallholder farmers' choice of agricultural credit sources**. This may help financial institutions to repackage their loans to suit the needs of the farmers in order to achieve a higher impact. It may also answer the question why the smallholder farmers receive less credit relative to large scale farmers yet they are the most numerous and produce most of the milk in Kenya.

1.4. Objectives

The objective of the study was to determine the significance of the various factors that influence smallholder dairy farmers' choice of a specific agricultural credit source.

Specific objectives:

(i) To identify the various factors (both formal and informal) that influence farmers to make decision on which credit source to patronize.

(ii) To rank the farmer's choice of a particular credit source, given the credit attributes.

1.5. Research Questions

The study proposition was that the following were the major credit attributes that influenced the choice of a particular credit source by the farmer: credit rationing, repayment period, interest rate, repayment flexibility (rescheduling), loan review period and collateral and that the following were the major farmers' characteristics that influenced their choice of different credit source: age, education level, gender, past loan experience and farm size.

The study attempted to answer the following research questions:

(i) Do credit attributes, namely: Credit rationing, repayment period, interest rate, repayment flexibility (rescheduling), loan review period and collateral, influence smallholder dairy farmers' choice of a particular credit source in Githunguri division?

(ii) Do farmer characteristics, namely: Age, education level, gender, past loan experience and farm size, influence smallholder dairy farmers' choice of a particular credit source in Githunguri division?

(iii) What is the significance of each of the factors in (i) and (ii) above in influencing the farmers choice of a particular credit source?

1.6. Justification

Dairy farming continues to play a major role in the Kenyan agricultural sector. The dairy sector is dominated by small scale farmers who contribute over 80 per cent of the total milk production.

On average, credit to agriculture in Kenya is estimated at less than 10% of the total credit provided through the domestic financial system. The small scale farmers are estimated to get only a third of the total credit that is available in agriculture. (Nyangito, *et al*., 2004) it is not known why smallholder farmers get the least credit share yet they are, and produce, the most.

The unavailability of suitable credit to livestock farmers, especially the small-scale sector, remains one of the challenges that continue to hold back the performance of this sector (Republic Of Kenya, Economic recovery Strategy, 2006). In order to increase small scale farmers' access to credit, and given the many financiers, it is important to understand farmers' preferences for the alternative agricultural credit terms. For example, which of the main credit factors (interest rate, loan repayment period, loan review period, collateral, credit rationing, and repayment flexibility) is most important to the farmers.

The financial institutions would also be interested in finding out whether the farmers' characteristics influence their choice of credit source. This would help them develop credit products that are customer focused.

CHAPTER TWO: LITERATURE REVIEW

2.1 Theoretical Considerations of Agricultural Credit and Classification of rural financial services in Kenya

2.1.1 Introduction

The study was dealing with smallholder dairy farmers who were constrained by land resource. Faced with this constraint, they had to use improved technology, including high milk yielding breed dairy cows. Since they have limited resources and low savings capacity, they resort to borrowing. Credit enables them to adopt the technology and thus increase production.

2.1.2 Agricultural Credit

Agricultural credit has long been identified as a major input in the development of the agricultural sector. Credit is viewed as more than just another resource such as labor, land, equipment and raw materials (Rahji, 2000). One of the reasons for the decline in the contribution of agriculture to the economy is lack of a formal national credit policy and paucity of credit institutions, which can assist farmers. Credit access helps to expand farmland size and production. (Olagunju, 2000) affirmed that credit facilities as well as the use of agricultural capital and labor resources accelerate the adoption process and expand the scale of production.

The availability of credit occupies a central place of development strategies. (Jia, 2006). Credit is important in fostering agricultural development. Government and donors spend billions of shillings supporting credit activities in low income countries. Most of these activities are justified by the impact that loans have on ultimate borrowers: credit demand filled, additional crops produced, changes in modern inputs use and borrowers' increased income. This is because in case of nil or poor return from agriculture, farmers can use credit to restart.

In Kenya, there are both formal and informal credit sectors, but there is a large interest rate difference. The formal financial sector refers to the financial systems that operate under direct supervision by the Central Bank. These are made up of commercial banks, certain specialized government banks, and non-bank financial institutions, such as investment houses, insurance companies, financing companies and security markets. The informal sector includes friends,

relatives, credit co operatives, rotating savings and credit associations and an array of landlords, millers, traders and other agents who use financial dealings as an important financial subsidiary.

The formal sector mainly deals with large scale enterprises and well-off clientele which can satisfy their stringent loan conditions, while the informal sector provides savings and credit facilities for small farmers in rural areas and for lower income households and small scale enterprises in urban areas. The formal sector has complex administrative procedures that are beyond the understanding of the rural masses and small savers, while the informal sector uses procedures that are simple and straightforward as they emanate from the local cultures and customs which are easily understood by the population (Germidis, et al., 1991).

The informal sector is assumed to be the recipient of the spill over. However, studies have found out that this is not the case as the informal sector not only absorbs spill over demand of the poorest agent, but other people who can afford formal loans prefer informal sector (Boucher, et al., 2007). This shows that informal credit is as important as the formal credit.

On average, credit to agriculture is estimated at less than 10% of the total credit provided through the domestic financial system. (Nyangito, et al., 2004) Credit access is not only affected by interest rate but by all characteristics of credit. This study attempts to find out how all credit factors in totality affect smallholder dairy farmers access to credit.

Before market liberalization in Kenya, formal agricultural credit was provided at subsidized rates through the Agricultural Finance Corporation (AFC). However, this parastatal experienced difficulties in recovering loan advances and had to stop lending at subsidized rates. Even then AFC lending rates have remained lower than commercial rates and are more stable. Although banks are legally required to lend between 17% and 20% of their loan portfolio to the agriculture sector, the local banking system has been conservative in lending to agriculture. This is probably owing to risks in agricultural production. The situation has been worsened by liberalization of interest rates and lending policies. These have made it difficult for small scale farmers to access credit.

It is estimated that the bulk of agricultural credit goes to the large scale farmers while small holder producers receive only one third of the total credit (Nyangito, et al., 2004). Despite being

the most numerous, smallholder farmers get only 10 per cent of available national agricultural credit. Smallholders produce about 80% of the total marketed milk.

Agricultural Finance Corporation remains the major formal financier of agriculture. AFC was established under the provisions of Act No.1 of 169 to assist in the development of agriculture by making loans to farmers, cooperative societies, incorporated group representatives, public bodies, local authorities and other persons engaging in agricultural activities. Other financiers of agriculture include commercial banks, non-bank financial institutions, various crop marketing and processing parastatals and, to a limited extent, various non- governmental organizations like Care Kenya, Faulu Kenya among others. It is thus worth studying how the different financiers affect farmers' choice of credit source, given both the financiers' attributes and the farmers' characteristics and this is what this study attempted to do.

2.1.3   Classification Of Rural Financial Services In Kenya

Rural credit market segmentation into different sectors has long been recognized in the literature on credit markets in developing countries (Adams, 1995; Braverrnan and Guash, 1986; Gonzalez-Vega, 2003; Guirkinger, 2005; Hoff and Stigliz, 1990). Despite the segmentations, it is not well established how the smallholder farmers make their choice of the credit source and the factors that influence their choice decision. This study focus was on the factors that influence smallholder dairy farmers' choice of agricultural credit sources, based on farmer's characteristics and the agricultural credit attributes. The choice is thus assumed to be based on a set of attributes. Therefore, the credit sources were reclassified into five distinct lending models, based on guidelines described by (Kibaara, 2006).

The various rural financial services in Kenya are classified into five models, namely: Community owned rural finance, Donor led rural finance, Government led rural finance, Managed SACCO and Private commercial banks. The models are as explained below

Model 1: Community Owned Rural Finance Model (Self Help Groups e.g. POWDEP)

This is where a given community forms groups which are eventually registered as associations with the assistance of donor agencies. Membership is through monthly contributions. The objective of this model is to reduce poverty through improved access to financial services mainly

in the low population density areas with high incidences of poverty. The main beneficiaries are the low and medium income populations who have few alternatives to financial services. Members provide each other with various types of help, usually nonprofessional and nonmaterial, for a particular shared, usually burdensome, characteristic. The help may take the form of providing and evaluating relevant information, relating personal experiences, listening to and accepting others' experiences, providing sympathetic understanding and establishing social networks.

Challenges of this Model include: Targeted robberies attracted by money that is kept in the safe in fairly insecure buildings and yet it is not economical to regularly transport the money to the link banks due to infrastructure problems such as poorly developed rural infrastructure (road and communication network). Poor road net work increases transaction costs of transporting monies to the link banks regularly. Lack of proper Policy and regulatory framework to spur the growth of rural financial services has also been identified as a key challenge. These community associations offer unregulated services and are referred to as Front Office Services Associations (FOSA). In case of the collapse of the association, the members will have no recourse of recovering their deposits. Management personnel lack the necessary management skills required to run financial services associations.

High interest rates charged by this type of associations may discourage borrowing and thus deny the revenue required for sustainability.

This Model has additional opportunities that include consideration of other sources of financing from the upcoming wholesalers of rural finance.

Model 2: Private Commercial Bank Led Model (e.g. Equity and Family Bank)

The Private Commercial Bank Led Model is a Case of Emerging Indigenous Commercial Banks that is potentially important source of rural financial services. Most mainstream banks have undergone major restructuring, such as closing branches in the rural areas to cut down on costs and improve profits in the recent past. This has left a gap in the rural financial services which has partly been filled by the emerging indigenous banks, such as Equity and Family bank.

The Equity and Family Bank models work on the principle of taking banking services closer to the people. Although the banks reach a wide range of clients, the majority of its clients are low-end salaried workers, and micro and small businesses. In addition, the rural farming community can access supervised short term loans for horticulture, dairy, coffee and tea productions.

The Equity Bank has captured a market niche in the banking sector in Kenya in terms of the low income earners by addressing the perceived exorbitant price and attendant charges of loan and savings products. The main financial services offered under the dairy industry include a deal between Equity Bank and New Kenya Cooperative Creameries (KCC) where farmers borrow between Kshs 1,000 and Kshs 500,000 for farm development, animal feeds, veterinary services and an increase of their stock. The bank in 2006 set aside Kshs 500 million to be loaned to farmers at an interest rate of 15% and has been increasing the Kitty over the years.

Family Bank was introduced in 1984 and it offers dairy products with the following features: the loan is intended to develop dairy production and other customer needs, such as school fees. The farmer must be a Family Bank account holder and has to deliver the milk to an established milk processor, such as New KCC, Brookside, and Spin Knit. The Loan amounts depend on the amount and value of milk delivery. Unsecured loan amounts of up to Kshs 100,000 can be given to the farmers. Repayment period is 12 months. Affordable interest rate is charged on the loan with no guarantors required.

An opportunity exists for expansion because the model has demonstrated that the low income population in the rural area is bankable.

Model 3: Donor Funded Microfinance (e.g. KWFT)

Women Lawyers, Bankers, Financial Experts, Entrepreneurs, Managers and Trainers got together in 1981 and formed the Kenya Women Finance Trust (KWFT). Their vision was to set up a financial Institution devoted to addressing solely financial needs of women. In fact, their specific objectives were to set up a woman serving, woman led Bank.

In its early days, KWFT depended substantially on donor grants to finance both lending activities and administrative expenses. Since 1994, KWFT began borrowing from other NGOs and the financial sector for incremental capital. By March 2003, 60% of the outstanding portfolio was

financed by funds borrowed from commercial sources, locally and internationally. The Ford Foundation as a social investor was the first in this category to support scaling up strategies for KWFT through a US $ 3 Million loan under the Programme Related Investment Facility.

KWFT has no notable financial product for dairy development but has partnered with AMIRAN for an agricultural product designed to provide its clients with a complete solution and access to modern farming methods. The main features of their products include: Farmer's greenhouse drip system and excavated or liner fish ponds together with fingerlings and flexible loan repayments of up to 18 months on a monthly basis. The main benefits are access to modern agricultural methods and technologies.

Model 4: Government Led Rural Finance (AFC)

Agricultural Finance Corporation (AFC) is a government owned non-bank financial development institution. Since its inception in 1963, AFC has remained a vehicle for delivery of agricultural credit to farmers. AFC performed well in its initial three decades of existence. However, the performance of AFC began to experience deterioration in the late 1980's. The liberalization of the agricultural sector and the subsequent collapse of most of the agricultural produce marketing bodies by 1989 dealt a heavy blow to the AFC's loan programs.

The AFC model nearly collapsed in the 1990s but from 2003 the government embarked on improving access to rural credit and financial services through the Strategy for Revitalizing Agriculture (SRA). Part of this initiative involved restructuring the operations of the AFC by:

(i) Appointing a new board and a chief executive officer.

(ii) Implementing the performance contract to improve management and increase accountability.

(iii)Writing-off accumulated bad debts.

(iv)Releasing Kshs. 1.3 billion, as equity to be disbursed over a period of five years (2003-2007).

(v) Channeling the Japanese grant of Kshs. 759 million to AFC for seasonal crop credit.

The major challenges faced by the AFC lending model are:

(i) Prohibitive loan transaction costs for small scale farmers

(ii) Non-Skilled support staff, leading to lots of inefficiencies in the system

(iii)Delayed payments, and lack of enforcement of irrevocable orders for produce delivered to support organizations like the KCC.

Opportunities exist for the AFC lending model to pursue e.g. venturing into Value addition loans, a departure from financing primary production only, introduce Wholesale/group lending approaches to circumvent the issue of security requirements for individual members as well as reduce the cost of offering credit.

Model 5: Managed SACCOs (e.g. Githunguri Dairy and Community SACCO and Kiambu Unity Finance Co-operative Union Ltd)

This model involves a SACCO managed as a micro finance institution. Members in the SACCO buy shares which are used as collateral for leveraged loans.

Githunguri Dairy and Community Sacco Ltd is a well established and fast growing Institution offering financial services to its members with an aim of improving their economic well being.

Kiambu Unity Finance Co-operative Union Ltd is a microfinance institution that provides banking services for members of its constituent cooperative societies such as Kabete Dairy Farmers cooperative Society.

2.2 Empirical Studies On Agricultural Credit and Choice Credit Sources

In their study on the agricultural credit problems and policies during the transition to a market economy in Central and Eastern Europe, (Johan, *et al.,* 1997) accessed the problems of financing the Central and Eastern Europe during the transition and the role played by the government. They found out that the problems in the credit market for agricultures stems from both the demand and supply side. They also found out that Credit rationing, interest rate, past loan repayment, farm income and collateral influenced farmers' access to agricultural credit.

The research is similar to the current study in that the two studied look at the demand and supply side of agricultural credit. The two studies further consider the following credit attributes as influencing access to credit; Interest rate, collateral, credit rationing past loan repayment and farm income. The studies consider both the lenders characteristics as well as the borrowers' characteristics.

The studies are different in that the prior study looks at the problems and policies during the transition to economy and considered credit to general agriculture in Europe while the later study looks at choices of agricultural credit sources by smallholder dairy farmers in Kenya. Europe is a developed country while Kenya is a developing Country; it was worth finding out whether the finding would be similar for the two studies.

(Sharon, et al., 2002) carried out a study on the borrowers' preferences in the agricultural credit. The study aimed at identifying the attributes that farm borrowers valued in credit relationships as well as the trade-off in those attributes. The study used conjoint analysis to look at both the lender attributes as well as the borrowers' characteristics. The study concluded that the time-to-loan decision, the amount of the loan provided, the interest rate and specialization in agriculture were key attributes farmers preferred in their lender. Likewise the agricultural borrowers' desires of their lenders are basically homogenous across the demographic dimensions of age, education, farm size, and credit supplier.

The study is similar to the current study in that the two studies considered borrower's preferences to agricultural credit with respect to the credit attributes' as well as the farmer characteristics. The studies differ in the scope of coverage with the later studies covering more credit attributes and farmer characteristics. The current study uses mainly descriptive analysis while the former study used conjoint analysis. The findings were however similar in that they looked at borrowers preferences of agricultural credit given the credit attributes as well as the farmer characteristics.

In their study on factors affecting loan repayment performance of smallholder farmers in Ethiopia, (Sileshi et al., 2012) found that smallholder farmers within the study area sourced their credit from both formal and informal credit institutions. The study used multi stage sampling

technique and applied a two limit tobit regression model to identify factors that influenced loan repayment. The results indicated that agro ecological zone, off-farm activity and technical assistance from extension agents positively influenced the loan repayment performance of smallholder farmers, while production loss, informal credit, social festival and loan-to-income ratio negatively influenced the loan repayment of smallholder farmers.

Loan repayment is of paramount importance to the financiers and they would thus be of their interest to consider factors affecting loan repayment at the time of giving out loans. Some of the factors identified in the study were also considered in the current study such as farm income, off-farm activities and assistance from the extension agents.

This study is similar to the current study as the two studies looks at both the formal and informal sources of credit and the smallholder farmers in the two cases had credit from both formal and informal sectors. The studies are different in their main objectives with the prior study looking at factors affecting loan repayment while the current study looked at factors influencing farmers' choice of agricultural credit source.

(Komicha H.H, 2007) carried out a study on farm households Economic Behavior in Imperfect Financial Markets. He analyzed the borrowing behavior of farm households by considering sectoral choice of farm households among formal, semiformal and informal credit sectors and the factors contributing to their choice. The study used Multinomial logit model which is founded on economic model of random utilization to estimate sectoral choice probabilities and their determinants. He found that most households borrowed from the informal sector despite its high interest rate. This led to his conclusion that "factors other than interest rate significantly affected farm household's sectoral choice of credit sources.

Other factors such as loan processing time, type of loan, credit information and loan size were found to have more weight in determining farm households' borrowing behavior from a particular sector. Timeliness in loan processing was found to be an importance factor, especially for farm households since they are engaged in farming activities where inputs used need to match with the natural process in agricultural production. Other sources of credit were semi

formal and formal sectors. The two studies are similar in that they considered other factors over and above the interest rate to influence the smallholder farmers' choice of credit source.

In her study of Rural Financial Services in Kenya: What is Working and Why? (Kibaara, 2006) classifies the various rural financial services in Kenya into five models, namely: community owned rural finance, donor led rural finance, government led rural finance, managed SACCO and private commercial banks. The two studies are similar in that they both classified the various sources of agricultural credit into various models. The studies however differ since the former study looked at credit sources in the entire country while the later study was specific to credit sources in Githunguri division of Kiambu County.

(Nyikal, 2000) concluded that financing agricultural improvement programmes via loan funds would only benefit some cases and not all. She further recommends some preconditions for successful smallholder agriculture and agricultural credit which include:

(i) Existence of attractive investments opportunities in Agriculture, i.e. the opportunity must be profitable.

(ii) Access to improved technology

(iii)Favourable market prices and easy access to market.

(iv)Appropriate policy framework, including market level interest rate on loans.

(v) Presence of a strong institution and policy framework with the capacity to ensure access by small farmers and disadvantaged groups.

With many financiers, it is important to understand how the farmers make their choice.

The study focuses on dairying in an area that meets most of the preconditions for the successful agricultural credit as given in (Nyikal, 2000). For instance, smallholder dairying in Kiambu is a profitable enterprise and past studies have proved this. The neighbouring Nairobi city and its environs provide a ready market for fresh milk and other farm produce. The dairy sector currently requires use of latest technology, such as intensive zero grazing units, animal feeds and high breed dairy cows. Financing the dairy sector would thus be viable.

(Nyikal, 2000), Recommended appropriate policy framework on market interest rate and capacity to ensure access by smallholder farmers'. Since credit has characteristics other than interest rate, it is worth studying how these characteristics affect smallholder farmers' credit choice, and there is need to determine the farmers' choice of credit. This is important in that it can assist the suppliers of credit screen the farmers in giving out loans. It could also assist the policy makers to see how best they can ensure the smallholder farmers' access to credit after finding out their preferences and the importance they attach to the credit characteristics.

The intensive dairy farming system is commonly called Zero grazing system. According to (De Jong, 1996), the zero grazing units was developed in Kenya to solve the constraint of land scarcity and to improve on milk production through the introduction of cubicle housing for cattle, improved fodder and recycling manure. Exotic breeds and their crosses are kept under intensive grazing mainly for commercial dairy purpose. The system is mainly concentrated in the Central Province, Rift Valley Province and the coastal lowlands where land holdings average to less than one acre save for rift valley that has four to five acres per household. (Peeler and Omore, 1997) As a result, animals are confined in one place where they are zero grazed with fodder cut from the field. Manufactured feeds, such as wheat bran and dairy meal, are widely used.

The zero grazing has several advantages over other grazing systems. The most important is that it offers higher and more regular income throughout the year: The output per hectare compares favourably with that of cash crops. (Maarsse, et al., 1998) It also has a better fodder utilization, increased milk output, better manure management and intensive land use. The main disadvantage of the zero grazing system is that it involves high investment costs. (Staal, et al., 1997) The focus of this study was credit access under intensive (Zero Grazing) System which is disadvantaged by high investments costs. The costs are either met from savings or borrowed funds. Due to low savings capacity for small scale farmers, credit is necessary and the factors influencing its access are worth studying.

The strength of the smallholder dairy farming lies in the existence of a basic infrastructure for marketing, provision of inputs and services and the availability of the dairy cattle. The government policies have been favourable to small scale dairy development. By empowering the

rural communities with technologies in animal husbandry, several highly successful enterprises have emerged as independent commercially viable rural dairy projects. This has not only improved the nutritional state for rural households but also provided income and employment. The weaknesses of smallholder dairy farming are the small family farms, and low or no capital. (Mugivane, 2000)

The lack of suitable credit to livestock farmers, especially the small-scale sector, remains one of the challenges that continue to hold back the performance of this sector. Most institutions are reluctant to provide credit to small livestock farmers. The agricultural finance corporation was established to overcome this constraint. However, the Agricultural Finance Corporation cannot effectively cover all the farmers. Republic Of Kenya, (Economic recovery Strategy, 2006) in his study on small holder dairy production in Kiambu district, (Kilungo, 1999) found that lack of credit was a constraint facing the dairy farmers. The study did not find out whether the credit constraint was supply based (credit attributes) or demand based (Farmers' characteristics).

This study attempts to find out whether indeed lack of credit is still a constraint in smallholder dairy farmers in Kiambu district. The study further looks at the factors that influence smallholder dairy farmers' choice of credit from both supply and demand side.

In her study of Smallholder Dairy in Kenya, (Ngigi, 2004) had the following findings:

(i) Ecologically, smallholders operate a range of intensification technologies, from purely range-fed systems to zero-grazing, stall-fed regimes.

(ii) In the intensive systems, they recycle manure and fodder between crop and livestock enterprises.

According to (Ngigi, 2004), the drivers of change are improved breeds. Widespread introduction of highly productive breeds of dairy cows, or grade cattle, has been the major source of increased productivity in Kenyan dairying. Provision of efficient and affordable reproductive services has therefore remained a central pillar of the country's dairy development strategy. In the early decades following independence, from 1964 to 1987, the government heavily subsidized artificial insemination services. (Ngigi, 2004) appreciates that this is expensive, but was silent on how it would be financed. Though expensive, this strategy did result in widespread adoption of

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improved breeds. By looking at farmers' choice of credit, this study attempts to answer the question of how the expensive strategy can be effectively financed and thus sustained.

(Owango, et al., 1998) found out that the process of intensification has occurred at a rapid rate over the previous ten years, with consequent changes in livestock management, feeding strategies, and land allocation. They said that purchased feeds are now a primary nutrient source for smallholder producers, thus increasing their exposure to the market. Further, animals continue to be significantly under-nourished, leading to performance well below potential. Although some of these processes can be understood, the underlying strategies of Smallholders for coping with land pressure and market forces are not well known.

The cluster analysis in (Owango, et al., 1998) identified specific homogeneous groups of producers who share similar resources and strategies. Some are particularly resource-poor with limited access to services and formal markets. Few respondents used long-term credit for their dairy enterprise, such as for cattle purchases or shed construction; a third said that they had no need of such credit and approximately, a half said that either it was unavailable or was too costly. All these studies agree that technology and zero grazing is the way out for the smallholder dairy farmers. However the study failed to find out what exactly made credit expensive. The current study looks at the characteristics of credit and ranks them according to their importance to the farmer. (Owango, et al., (1998) and Kilungo, 1990) cite lack of credit as a constraint. To adopt the intensive dairy system, capital is required and this is mainly raised through credit. In their study on credit constraint and smallholder dairy in East Africa, (Freeman, et al., 1998) concluded that while credit had an impact on dairy productivity, there is need to accurately assess farmers' demand for credit, because borrowers are not homogeneous in terms of their need for credit and marginal productivity of credit differs with different borrowers. The current study differs from (Freeman, et al., 1998) because that study only considered one characteristic of credit while this study considers many credit characteristics. However the two studies are similar in that they both look at credit in small holder dairying.

2.3 Economic Theory

The current study is based on a Consumer theory framework. The farmer is assumed to make a choice from various alternatives by considering the alternative that gives him or her maximum

utility. The consumer theory as developed by (Lancaster, 1966), postulates that preferences for goods are a function of the attributes possessed by the goods rather than the goods per se. An important implication of this theory is that the overall utility of a good can be decomposed into separate utilities for its constituent characteristics or traits. This translates into using the attributes of the good as the argument of the function in terms of utility function. A good can thus be described by the attributes that generate the utility or disutility to the individual. For credit access, this permits the analysis of farmers' preference in terms of the utility they perceive to result from various credit attributes.

This was the basis for the evaluation of the significance of the credit attributes in the choice of a particular credit source by the smallholder dairy farmers.

CHAPTER THREE: METHODOLOGY

3.0 Conceptual Framework: In Relation To Theory

The Conceptual framework for the choice of agricultural credit source by smallholder dairy farmers in Githunguri is represented in Figure One (1). This study was conceptualized as a choice study, where the Agricultural Credit Source taken by a smallholder dairy farmer was determined by the credit attributes and the farmers' characteristics. As indicated elsewhere, this study borrows from the consumer theory. The consumer theory as developed by (Lancaster, 1966), postulates that preferences for goods are a function of the attributes possessed by the goods rather than the goods per se. An important implication of this theory is that the overall utility of a good can be decomposed into separate utilities for its constituent characteristics or traits. This translates into using the attributes of the good as the argument of the function in terms of utility function. A good can thus be described by the attributes that generate the utility or disutility to the individual.

Smallholder dairy farmers' decision to obtain credit from one of the five distinct lending models, which were classified based on Kibaara, (2006), was hypothesized to be influenced by various factors. These include: credit attributes, such as credit rationing, repayment period, interest rate, repayment flexibility (rescheduling), loan review period and loan collateral. In addition, farmers' characteristics such as age, education level, gender, past loan experience and farm size, were also hypothesized to influence smallholder dairy farmers' choice of credit source.
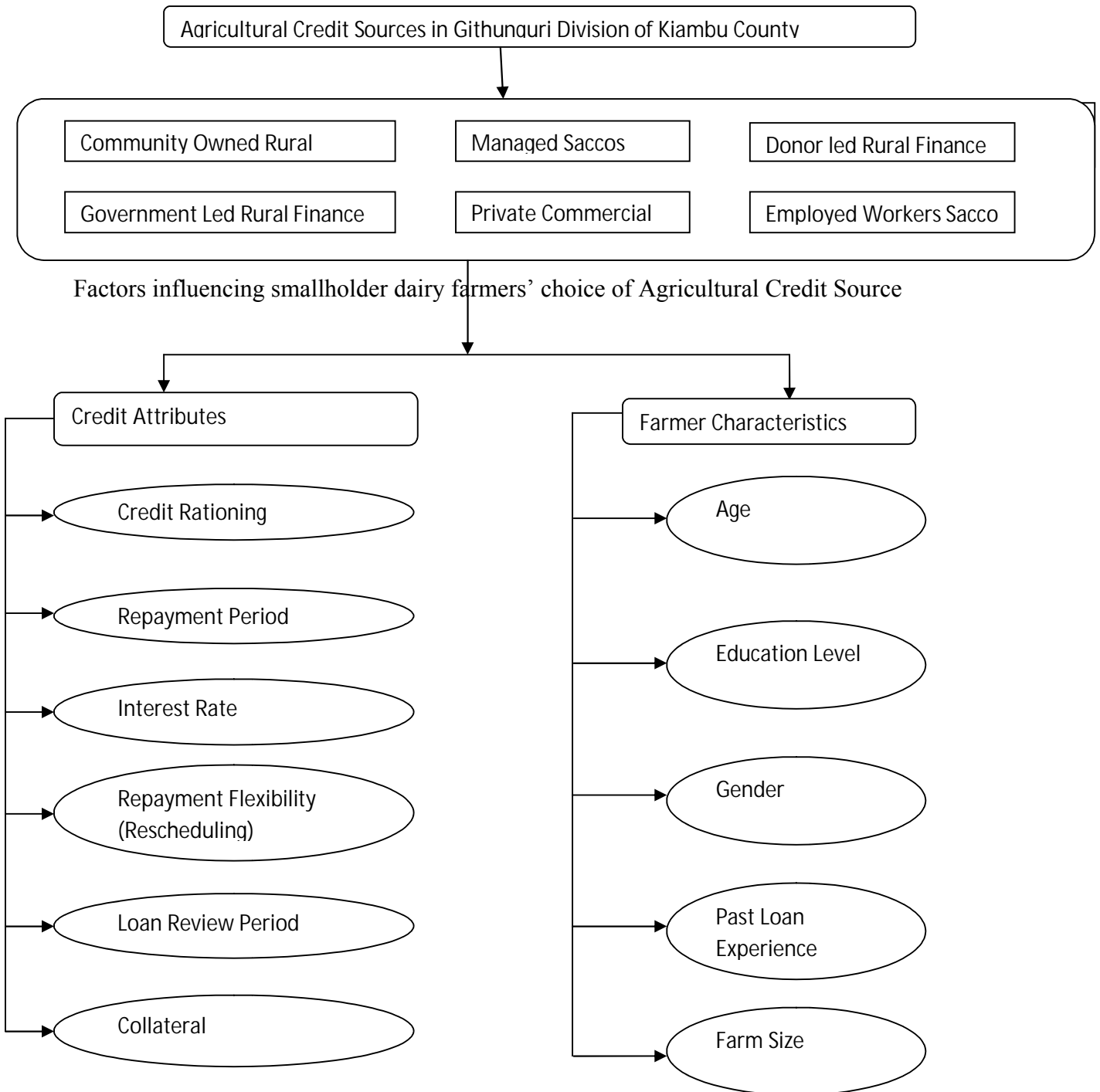
Figure 1: Conceptual framework for smallholder dairy farmers' choice of Agricultural Credit Source in Githunguri Division.

Source: Author's conceptualization (2011)

Based on the above conceptual framework, the following was undertaken:

(i) Descriptive Analysis to determine whether credit attributes and farmer characteristics significantly influenced farmers' choice of credit source.

(ii) Farmers' ranking to determine the importance of the various credit attributes and farmer characteristics.

This being a descriptive analysis study the hypothesised factors were expected to have a high or low percentage and ranked as either more important or less important by the farmer in his choice of credit source. Factors that had a high percentage and were ranked as more important by the farmer were the ones considered to influence the farmers choice of which agricultural credit source to patronize.

3.1.1 Data Collection

Primary data was collected using a pretested questionnaire which was personally administered by the researcher. The information gathered was both qualitative and quantitative. Data included: choice of credit attributes as well as farmers' characteristics. Farmers were also asked to give their preference of the various credit terms in order of their priority. The farmers were also asked to give the various farmers' characteristics that influenced their credit choice in order of their priorities. This made it possible to find out whether the credit attributes as well as the farmers' characteristics influenced the farmers' choice of credit and their importance to the farmer.

3.1.2 Area Of Study

The study was conducted in Githunguri Division of Kiambu County. See the map of Githunguri division Figure two (2) on page 26.

Kiambu County lies within the southern part of the Province, sharing boundaries with Nairobi and Kajiado districts to the South. The major agro ecological zones range from LH 3-5 to UM 2-6, and the latitudes ranges from, 1300-1900 metres above the sea level. The district receives bimodal rainfall. Long rains from (March to June (250-1600mm) and the short rains from (October to December (100-1200mm). The district experiences moderate temperatures and humidity and both are modified by the altitudes.

Kiambu is a high agricultural potential district with a land surface area of 258,700 hectares, of which 142,200 are arable (Ombui et,al., 1996). The land potential ranges from low to medium. Two thirds of the total arable land comprises small farms (less than five hectares in most cases), while the other one third is made up of large farms (more than twenty hectares) which are mainly coffee or tea plantations. Land is mainly under individual freehold tenure.

According to the Central Bureau of Statistics (CBS, 2010) Kiambu District has a population of about 147,763 persons in the 2009 census giving a population density of 562 persons per square kilometer.

Small-scale mixed farming is the main income generating activity in the district. Smallholder dairy farming is a major activity. Other activities include production of coffee and tea as cash crops and horticulture, maize and beans for subsistence. The City of Nairobi and its environs serve as the major outlet for both fresh milk and other types of farm produce. Being part of the Nairobi milk shed, milk from Kiambu district is directly delivered to the city by dairy cooperatives and itinerary milk vendors. (Owango et al., 1997)

Githunguri Division was selected for this study since it produces the highest amount of milk in the district and has most dairy farmers and many financial institutions. Credit providers in the area include: Agricultural Finance Corporation, Githunguri Dairy Farmers Co-op, Commercial Bank of Kenya, Co-operative Bank, Equity Bank, Family Bank and Kiambu Unity among others.
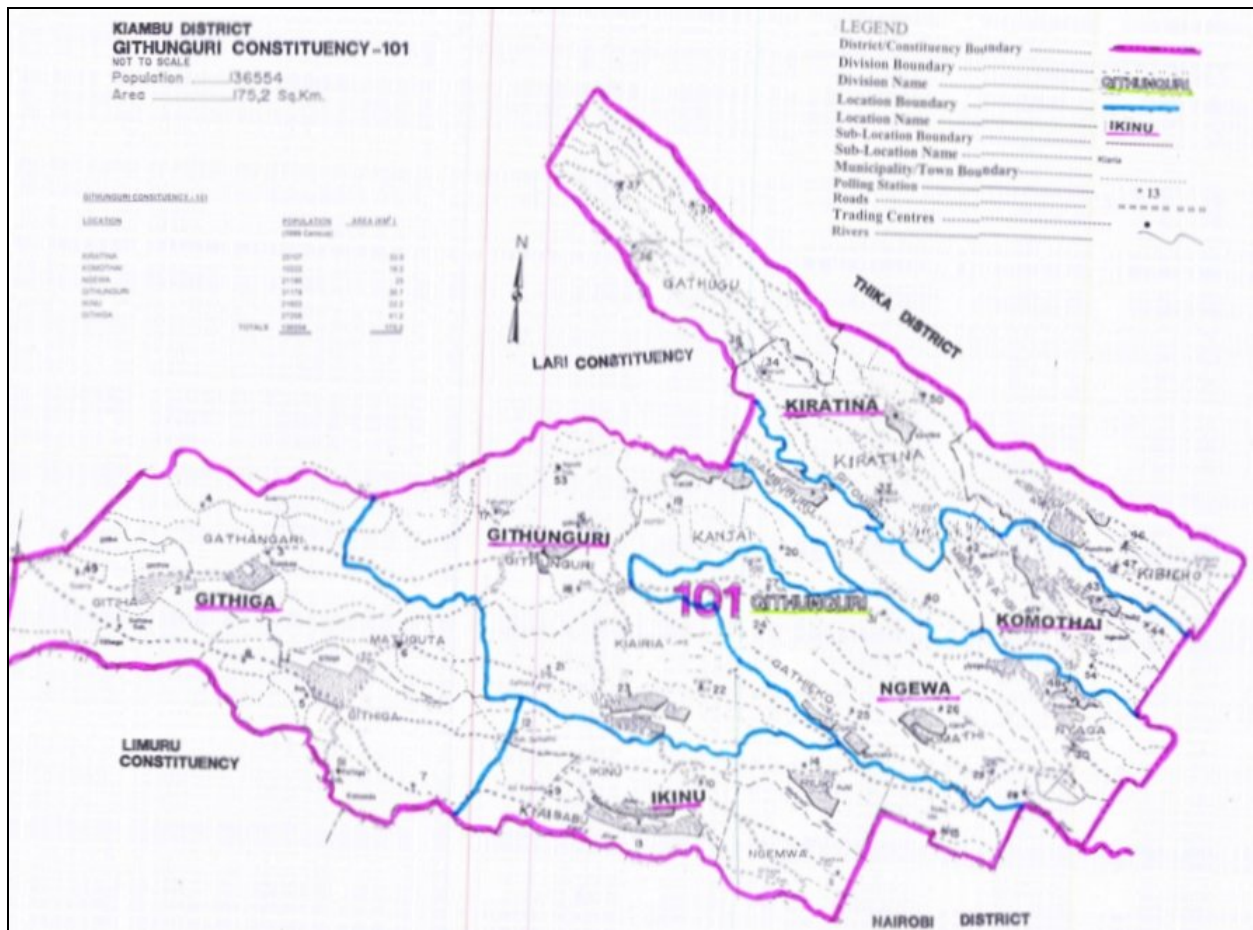
Figure 2: Map showing the administrative boundaries of Githunguri division.

Source: www.marsgroupkenya.org/constituencies 10th November 2010

3.2 Sampling Design

3.2.1 Sampling Procedure

A multistage sampling procedure with simple random sampling was used to select farmers for the study. This involves sampling a set of geographical area then sampling a subset of the areas within those areas. In this study, the Agricultural Officer in charge of the division assisted in identifying all the farmers in the division. Dairy farmers were selected from the list. To have a representative sample, the dairy farmers were randomly selected from six locations in Githunguri division. Six locations were considered due to limitation of finances which was inadequate to

cover all the locations. The locations, namely Komothai, Kiratina, Ngewa, Githunguri, Ikinu and Githiga were randomly selected. A list of farmers was also obtained from the dairy cooperatives in the division and farmers randomly selected from it. The study concentrated on smallholder dairy farmers. Preference was given to the farmers practicing zero grazing system but a few practising other systems were also selected. The study included farmers with and without credit since it aimed at finding out farmers' choice of a specific agricultural credit source.

Data was obtained from sample farmers through interviews using a pretested structured questionnaire. The farmer survey was undertaken in December, 2010 and January, 2011. Data collected included information on farmers' characteristics and credit attributes, relating the two with use or non-use of a particular credit source.

Githunguri division has 12,000 small holder dairy farmers (Muriuki H.G, 2006). Assuming the farmers were evenly distributed in the 20 locations each location had 600 farmers giving 3600 farmers in the selected five locations. The population of small holder dairy farmers for this study was thus 3600. Since the population was less than 10,000 the minimum sample size was calculated using the formula by Fisher (1998):

$N = (Z^2 Pq) D/d^2$

P = Probability of visiting a farm, finding the farmer and being able to conduct an interview being 50%.

Z = standard normal deviate (1.96) which corresponds to the 95% confidence level.

d = Degree of accuracy desired (0.05).

$q = (I - P) = 1 - 0.5 = 0.5$

D = 1 (Design effect) because each small holder dairy farmer in the study area encountered will fill in the questionnaire. Source author, 2011

$N = (1.96*1.96*0.5*0.5*1)/ (0.05*0.05) = 384$

Therefore, the desired sample size in the sampling frame of 3600 farmers was given by

$nf = 384/(1+(384/3600))$

=347

The desired sample size was, therefore, 347 respondents.

CHAPTER FOUR: RESULTS AND DISCUSSION

4.0 Agricultural Credit Sources

The analysis of the 347 smallholder dairy farmers interviewed revealed that about thirty point five six (30.56%) of the farmers had taken credit from Githunguri dairy Sacco, followed by Agricultural Finance Corporation twenty one point nine (21.90%). The least preferred source of credit was Employed workers Sacco from which only two point eight eight (2.88 %) of the farmers had taken credit. A summary of the credit sources and corresponding credit uptake percentages by farmers is shown in Table 1 below.

Table 1: Summary of Choice of Credit Source

CREDIT SOURCE	Freq.	Yes (R) Percent
Githunguri Dairy Community Sacco	106	30.56
Agricultural Finance Corporation	76	21.90
K.W.F.T	38	10.95
Family Bank	26	7.49
Barclays	23	6.63
Kiambu Unity Finance	19	5.47
Equity Bank	17	4.90
PAWDEP	16	4.61
Self Help Group	16	4.61
Employed Workers SACCO	10	2.88
Total	347	100

Source: Author (2011).

The choice of credit sources could be explained by the fact that most farmers in Githunguri sell their milk to Githunguri Sacco which is the largest dairy Sacco in the area. The Sacco offers credit to the farmers in forms of cash, animal feeds and school fees, amongst other loan products. The farmers' loan repayment is deducted from their milk proceeds. This arrangement is convenient to the farmers and could explain their high credit uptake from the Sacco.

Employed Workers Sacco had the least credit which could be explained by the fact that only few farmers interviewed were employed and with credit access from their employers Sacco.

This study focus was on the factors that influence smallholder dairy farmers' choice of agricultural credit sources, based on farmer's characteristics and the agricultural credit attributes. To get a better understanding of the various credit sources and their attributes, the various credit sources as given in table one (1) were reclassified into five (5) distinct lending models based on the guidance as described by Kibaara (2006) as given in table two (2) below.

Table 2: Summary of Choice of Credit Source after reclassification

Model type	Freq	Yes (R) Percent
Managed Sacco	120	34.58
Government Led Rural Finance	79	22.77
No choice of credit source	68	19.6
Private Commercial Bank	39	11.24
Donor Led Rural Finance	20	5.76
Community Owned Rural Finance	18	5.19
Employed Workers SACCO	3	0.86
Cumulative Total	347	100

Source: Author, (2011).

From the study results above, it is evident that most farmers from Githunguri had access to credit from managed Sacco model. This is an informal form of credit. The findings agree with the World Bank report which indicates that over 80% of the world population relies on informal financial arrangements, (World Bank, 2001). This also concurs with (Bucher et al., 2007) who states that the informal sector is assumed to be the recipient of the spill over. However, studies have found out that this is not always the case as the informal sector not only absorbs spill over demand of the poorest agent, but other people who can afford formal loans also prefer informal sector (Lamberte *et al*., 2006). This finding also agrees with (Komicha H. H, 2007) who found out that the largest proportion of farm households from Ethiopia (50%) borrowed from the informal sector despite it charging the highest interest rate.

Despite the high interest rate charged by the Managed Sacco, farmers preferred it due to its repayment flexibility and faster loan processing. The farmers also preferred the Sacco as it also gave them loans for purposes other than agricultural development such as school fees and food staffs. The Sacco also processed their loans within a short time and could reschedule their loan repayment to suit their income availability.

The second most popular source of Credit in the area was Government Led Finance. This is mainly attributed to the low interest rate charged by AFC and partially due to the fact that some farmers avoided group responsibility. The fact that despite its low interest rate is was not the most preferred lending model is proof enough that factors other than interest rate influenced farmers' choice of credit source. The main reasons cited by the farmers as to why they did not choose AFC include: Cumbersome loan documentation, rigidity in collateral slow decision on loan request among others.

Only few farmers chose commercial banks as their source of credit. This could be attributed to the fact that, farmers could identify more with Saccos where they delivered their milk or Agricultural Finance Corporation that specifically serves the farmers. Most Commercial banks are mainly associated with employed and high profile persons making farmers to shy away from them. Commercial banks such as equity banks are however making an effort to bring their services closer to the rural community. This is geared toward ensuring the rural community saves and access credit from the commercial banks.

4.1 Factors Influencing smallholder dairy farmers' choice of Credit Source

4.1.1   Descriptive analysis of Social Demographic Information

It was also found that in Githunguri, 54% of the sampled farmers were male while 46% percent were female. Generally the level of women participation can be seen to be slightly low in the study area. This is an indication that many of the people who control resources in the household are male, thus they are the ones who are involved in farm business decision making. The women however are involved in the daily management of the dairy by feeding and milking. This notwithstanding they are restrained in terms of making major decisions like credit access and source, the type of breeds, system of rearing, number of cows to be kept and the marketing channel among other critical decisions.

As for age sets, majority of the respondents were aged 41-50 (55.62%) followed by the age set 51-60 (24.21%) and finally 31-40 (20.17%). This indicates that most of the farmers are fairly aged. This could be explained by the fact the youth are yet to fully embrace farming and thus farming is largely considered an activity for the old people who have retired from active employment or preparing to retire

On education status, the results were as follows: 2.6% had no formal education while 11% were of primary, 50.7% were of secondary, 30.3% were of college and 5.5% were of university education levels. This shows that the farmers interviewed were fairly educated, they thus could understand credit and make an informed decision on which credit source to patronage. The respondents had dependants from their immediate family, extended family and other dependants. All respondents resided on the farms was mainly due to the fact that Kiambu is only a few kilometers from Nairobi town and therefore most people who were employed or had businesses in Nairobi commuted from their homes.

4.1.2   Farm Characteristics

On income sources, 58% depended purely on farm income, 21% had farm and business income, 17% had employment and farm income and 3% had farm, business and employment income. Income sources are important in credit as they improve the repayment capacity of the borrower.

It is important to supplement dairy income with other sources, as dairy income is considered seasonal with peaks on calving down of the animals and off-peak on drying off the dairy cows.

The land holdings results were as follows: 60% had small scale farms, 38% medium and 25 large scale farms. The respondents' land tenure categories were 44% freehold, 42% communal, 12% both communal and family, and 2% freehold and lease hold tenure. 65% had title deeds while 35% had no title deeds. The land size and tenure of ownership is vital in credit as land size determines the production which ultimately affects repayment while the tenure is vital in areas where land is used as collateral to secure credit.

On machinery ownership, the results were: 33% had chuff cutter, 32% had no machinery, 16% had vehicle and chuff cutter, 7% had tractor, vehicle, chuff cutter and milking machine, 5% had hand implements, 4% had vehicles only and 2% had water pumps only. Machineries are important as they could act as collateral to secure credit.

The respondents' cattle breeds were as follows: 80% Friesians, 19% Friesians and Ayshire and 2% Ayshire only. Animal breed determines the milk production levels and affects credit repayment directly or indirectly.

4.1.3   Credit Attributes

The analysis revealed the following information: 86% had access to both credit information and credit, while 14% had no access to credit information and had not chosen any credit source. 90% had taken a loan in the past, while 10% were servicing their first loan. 58% had taken a loan in the past from their current financier, with 42% changing their previous financier for a new one. This implies that the borrowers established a good relationship with their former lenders and there was thus no need to switch the lender. This tallies with findings of (Sharon et al., 2002) which found that the better a relationship with the financial institution, the harder it is for a borrower to switch lenders. The respondents' cited following reasons for changing their previous financier:

(i)   55% had no specific reason but just wanted to sample out what other financiers had to offer.

(ii)   17% needed a bank that could process their loans within a short time

(iii)   8% preferred Sacco's due to their flexibility repayment

(iv)   6% wanted a financier that could accept other collaterals apart from title deeds

(v)   5% wanted a lower interest rate

(vi)   4% changed due to political interference in their previous financier

(vii)   3% wanted to avoid group responsibility

(viii)   2% changed due to credit rationing in their previous financier

Table 3: Credit attributes that influenced choice of credit source

Credit Attribute	Yes (R)
Interest Rate	209
Repayment Flexibility	180
Repayment Period	179
Processing Period	167
Collateral	162
Rationing	97
Cumulative Total (N)	994

Source: Author, (2011).

From the above responses the frequencies of the credit attributes that influenced choice of credit was computed as follows: $F = R/N$ where:

F: Frequency
R: Response
N: Cumulative Total Responses

The summary of the credit attributes in order of their importance is shown in figure 3 below.
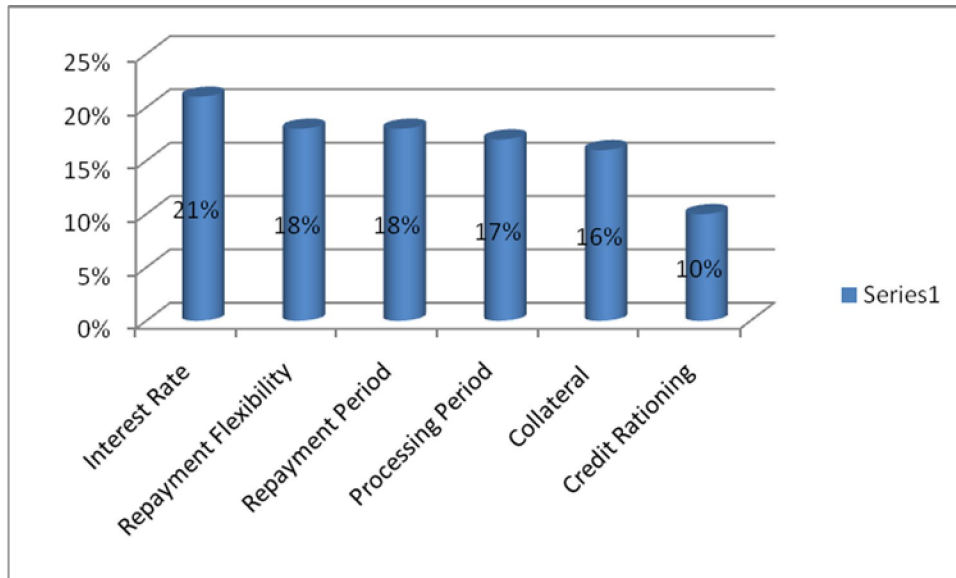
Figure 3: Frequency distribution of credit attributes that influenced choice of credit source

From the above figure, it is apparent that farmers' choice of a particular credit source was influenced by interest rate offered, repayment flexibility, repayment period and processing period. Other factors that influenced the choice were Collateral and Credit rationing. The results indicate that interest rate was a key attribute of credit source as it had the highest percentage of 21%. This agrees with findings of (Johan et al., 1997) who found out that problem in accessing credit was mainly due to high interest rates.

Farmers require ample repayment period to enable them repay their loans. They thus preferred a credit source that would give them long term loans. This finding agrees with (Hart and Moore, 1994) who found out that borrowers usually prefer longer-term debt contracts due to the liquidity (insurance) effects they implicitly provide. On the contrary, short-term debt contracts confront borrowers with risks of credit rationing, increased interest rates and higher transaction costs. However, the lenders willingness to provide long-term contracts depends directly on the durability and suitability of the underlying assets and collateral

Income from dairy enterprises is not uniform as farmers have high income after the cows calf down while the income reduces after the cows are dried off. The smallholder dairy farmers would thus prefer a credit source that can reschedule their loan repayment as this would cater for fluctuations in income.

Processing period, which is the time a financial institution takes to make a loan decision, was also found to influence smallholder farmers' decision of credit source. This agrees with (Sharon et al., 2002) who found out that farmer respondents indicated that the time-to-loan decision, the amount of the loan provided, the interest rate and specialization in agriculture were key attributes they prefer in their lender. It also concurs with (Komicha H.H, 2007) who found that loan processing time, loan type, loan size and credit information had more weight in determining the farm households borrowing behavior from a particular sector. The findings, however, differ with Komicha, (2007) and Sharon et al, (2002) in that; in the current study credit rationing did not influence smallholder dairy farmers' choice of credit while it influenced credit choice in the previous studies.

Collateral was not found to be more influential in choice of credit source. This could be explained by the fact that there was a variety of collateral options offered by the different lending models.

Table 4: Ranking of the importance of the Credit Attributes

CHARACTERISTICS	RANK
Interest Rate	1
Credit Rationing	1
Repayment Flexibility	3
Processing Period	4
Repayment Period	5
Collateral	6

Source: Author, 2011

In ranking, farmers attached a lot of importance to interest rate and credit rationing which was ranked number one. Farmers are cautious while taking loan to ensure that the interest charged is affordable. This concurs with Sharon et al., (2002) who found that borrowers were not willing to trade a higher interest rate for other attributes (time-to-loan decision, commitment level, loan

terms, and specialization in agricultural lending). This explains why this credit attribute was ranked first.

Although credit rationing was ranked highly, giving it equal importance with interest rate as number one, it was not found to be a key factor influencing credit source by the farmers. This could be explained by the fact that unlike interest rate that farmers are not willing to trade for other attributes, the case is contrary for credit rationing. Interest rate and credit rationing importance could be compared, as found out by (Hart and Moore, 1994) in their conclusion that 'short-term debt contracts confront borrowers with risks of credit rationing, increased interest rates and higher transaction costs'. Credit rationing was thus considered important because the farmers had a budget at the time of applying for the loan which if not financed fully due to credit rationing would affect project implementation and ultimately affect the loan repayment.

Farmers also preferred flexible repayment as their earnings from the farm were not always regular. Processing period was important as the farmers' calendar was specific and any delay in releasing the loan funds as a result of high processing period affected the farmers negatively. This agrees with (Komicha H.H, 2007) who found out that timeliness of the loans was an important factor as farm households engaged in activities where input uses need to match the natural process in agricultural production.

Smallholder dairy farmers ranked collateral as the least important factor; this is explained by the availability of different collateral options. Farmers could offer land, guarantee one another or use other loose assets, such as machinery or dairy cows, as collateral for their loan, depending on the credit model they opted to patronize.

(a.) Problem Limiting Access to Credit

The respondents cited the following problems as the main ones they encountered when trying to access credit. Getting guarantors 31%, High valuation cost 6%, Credit rationing 18%, Collateral (Title deed) 8%, Long loan review period 20%, Fixed loan application time 5%, Cumbersome documentation 5%, Difficulty in getting back savings after loan repayment 4%, High interest rate 25%, and short repayment period 1%.

(b.)Satisfaction with current Financier

Only 25% of the respondents were satisfied with their current financier. They cited the following reasons for non satisfaction: Rigidity in loan repayment 27%, Long loan processing period 7%, Credit rationing 20%, Collateral rigidity 16%, Products unsuitable for farmers 3% and 11% cited problems related to processing cost and documentation.

4.1.4 Dairy Farmer characteristics

Table 5: Farmers' characteristics that influenced choice of credit source

Response	Yes (R)
Age	79
Gender	246
Loan Experience	270
Farm size	247
Education	0
Cumulative Total (N)	842

Source: Author, (2011)

From the above responses the frequencies of the farmer characteristics that influenced choice of credit was computed as follows: F = R/N where:

F: Frequency

R: Response

N: Total Cumulative responses

The summary of the farmer characteristics in order of their importance is shown in figure 4.
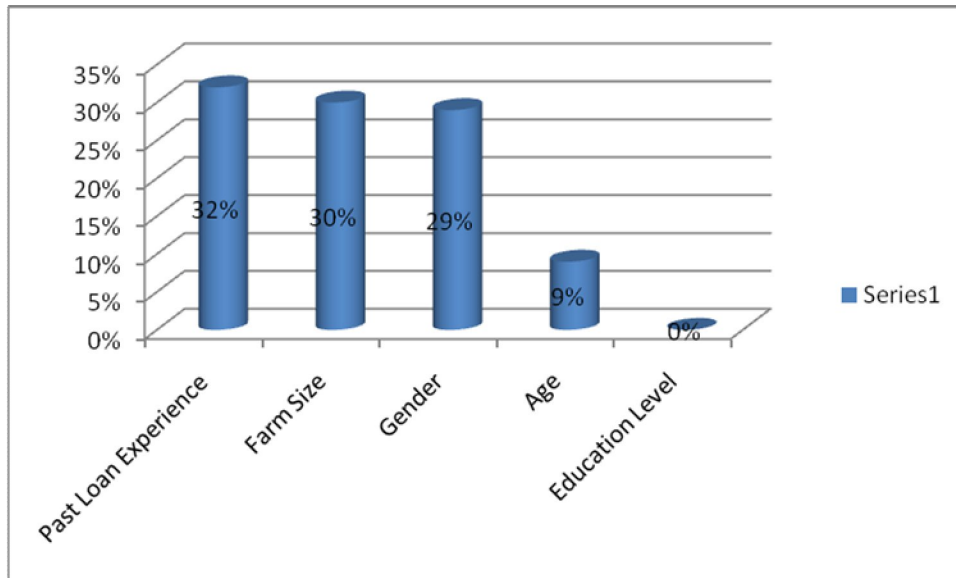
Figure 4: Frequency distribution of farmer characteristics that influenced choice of credit source

Past loan experience, farm size and gender were the main factors that influenced farmers' choice of credit source, while age had the least influence on credit choice. This is mainly due to the fact that the past loan experience raised the confidence of both the financial institutions as well as the farmers in similar credit transactions. Default risk was lower once a farmer has repaid his previous loans and has his past records with the bank. Similarly farmers identified with a financier whom they had already dealt with as opposed to a new financier. This finding concurs with (Sharon et al., 2002) the better a relationship is between the borrower and the financial institution the harder it is for a borrower to switch lenders. The relationship is built from past loan experiences.

Farm size was important as it has a dual relationship with the credit source choice. First, farm size offered collateral for loan in instances where title deed is used to secure loans, and second farm size directly determined the production level which in return determined the loan repayment level. Collateral and loan repayment levels are important credit factors that lenders consider while making a decision on loan request.

The farmers considered gender to be an important characteristic that influenced their credit choice. This was important as some financial institutions in the area such as KWFT banked on women while other institutions attached a lower default risk to women.

Age and education level were not key determinant of credit source choice. The ranking of the characteristics is shown in the table below.

Table 6: Ranking of the importance of the farmers' characteristics

CHARACTERISTICS	RANK
Age	4
Gender	3
Loan Experience	1
Farm Size	2
Education Level	5

Source: Author, 2011

The ranking compared with the frequency distributions of the farmer characteristics on credit choice. The farmers ranked Loan experience as number one indicating that it carried the most weight in choosing credit source. This can be explained by the fact that farmers who have had past loans are in a better position to get another loan as the financial institutions will refer to them as less risky clients.

Farm size was ranked second; this is importance as the farm size determines both collateral value where land is used as security and repayment capacity since farm size determines production levels. Age was ranked number four, young farmers are considered to be more agile and energetic thus more preferred by financial institutions, however, young farmers face challenges of lack of collateral where title deed is required. Gender was ranked as the third important factor that influenced credit choice. Education level was ranked as the least important factor with concurred with the frequency distribution which found this factor to have zero percent frequency which implies that this factor did not influence farmers' choice of credit.

4.1.5 Support Services

i. Access of Farmers to Support Services

On support services, 96% of the respondents had access to farmer support services. Table seven (7) gives such support services.

Table 7: Type of Farmer Support Services Accessed

SUPORT TYPE RESPONSE	Number	Frequency %
No Response	13	4
Animal Husbandry	122	35
Credit management	10	3
Extension	70	20
Farmer to farmer learning	9	3
New Dairy Farming techniques	31	9
Veterinary & vaccination services	92	27
Total	347	100

Source: Author, 2011

The ranking of support services accessed were as follows: Animal husbandry 35%, Veterinary and vaccination services 27%, Extension services 20%, new dairy farming techniques 9%, and credit management and farmer to farmer training 3% each.

Organization's support given to the farmers is important as it is during this forum that the farmers are enlightened on improved methods of production, availability of better markets and available sources of credit. A summary of organizational support is given in Table eight (8) below.

Table 8: Organization Support Type

SUPPORT TYPE RESPONSE	No	%
No Response	94	27
Cooperative Society	125	36
Financial Institutions	18	5
None	47	14
Private companies	63	18
Total	347	100

Source: Author, 2011

The ranking of services provided by organizations was: Cooperative societies 36%, Private companies 18%, and financial institutions 5%.

ii. Main problems encountered in accessing farmer support services

The respondents' faced the following problems when trying to access farmer support services: Unreliable services with their quality not guaranteed 54%, financial constraints 22%, inadequate staff to offer the services 17%, and 7% for training.

iii. Adoption measures taken to have a positive outcome from farmer support services

The farmers adopted the following measures to ensure that they benefited from the support services: 57% implemented what was learnt, 20% engaged private sectors to provide more services to them, 8% joined groups that would enable them benefit in farming, 7% Consulted with other farmers and 4% kept farming records.

iv. Form of Agricultural Training Undertaken

The respondents' agricultural training was as follows: 28% had no training, with the rest having trained on animal feeds preparation, animal husbandry and general farm management. The trainings were either from farmer extension field days, or from organized workshop and seminars. The organization of training was mainly done by the Ministry of Agriculture, Ministry of Livestock Development, dairy co operative societies, NGOs and pharmaceutical companies.

v. Consultation with other farmers before making decisions/Explanation

96% of the farmers consulted amongst themselves before making any decision. The consultation was mainly in the following areas: Feed quality and cost 25%, sharing of ideas and past experiences 23%, Disease control, veterinary services and A.I 13%, credit 12%, Feed preparation 11%, Milk market price and rejection 9%, and Animal husbandry 7%.

vi. Frequency of Visits by Support Service providers to the farmers

The service providers visited the farmers as follows: 7% when contacted by the farmers e.g. during an outbreak, 48%, during a field day, 28% twice per month, 8% monthly, 6% rarely and 3% regularly (weekly).

vii.   Membership to Farmers Unions: Costs and Benefits

76% of the respondents were members of a farmer's organization mainly dairy societies. The farmers incurred the following costs as a result of being union members: Registration cost, monthly contribution, Group maintenance of the association, and market limitation as one must deliver the produce there. There was also a transaction cost for adhering to the already laid down procedures and controls. The benefits were credit access, availability of animal feeds and other inputs, milk market and trainings.

Support services are not only important in agricultural development but also in credit. Through support services farmers learn better credit management and also get more credit information which assist them chose the credit source to patronize. Through support services farmers are trained on how to improve their production levels.

4.1.6   Marketing

i.   Marketing Channels used by farmer

Majority of the farmers sell their milk to the agents (dairy societies) 86%, followed by local markets (neighbors) 9%. Direct sale to Nairobi market (shops and hotels) was 5%.

ii.   Access to contracts with reliable markets

86% of the respondents had a contract with a marketing body. Only 14% did not have an established contract.

iii.   Mode of Commodity Sale

The sale was done in both cash and credit. Credit sale awaiting payment at the end of the month accounted for 93%, with cash sales being only 7%.

iv.   Market Information Access

Most respondents (90%) had access to market information; only 10% are not able to access market information.

v. Marketing Problems

The farmers mainly encountered the following problems while marketing their produce: Low and fluctuating milk prices 29%, Milk rejection 23%, Transportation problem coupled with unfriendly time of milk collection 22%, High input cost 12%, Dairy society and management politics that affect/dictate milk prices 9%, and delay in milk payment 5%.

It is important to point out that marketing is vital in credit choice as it influences loan repayment. Farmers are able to pay off their loans if they can market their produce and get better returns.

4.2 Evaluation of the study findings

This study aimed at determining the factors that influenced small holder dairy farmers' choice of a specific agricultural credit source.

Descriptive results as outlined in Table 2 indicate that 20% of the respondents had no credit. Of those who had credit, the sources were as follows: 5% from community owned organizations, 6% from Donor led rural finance, 35% from managed Sacco ,23% from government led rural finance, 11% from private commercial banks and 1% from employed workers' Sacco. From the above results, it is evident that most farmers (64%) borrowed from the informal sector, while the rest borrowed from either commercial banks or government led rural finance. One significant characteristic of the informal finance is its high interest rate. The fact that most farmers borrowed from the informal finance, despite its high interest rate, is a clear indicator that the farmers consider factors other than interest rate in their choice of credit source.

This study had hypothesized the following factors as influencing farmers' choice of credit source: (i) credit attributes, such as credit rationing, repayment period, interest rate, repayment flexibility, loan period, and collateral; (ii) Farmer characteristics, such as farmer age, past loan experience, farm size, and education level. Most farmers had taken loans from managed Sacco, mainly because, apart from the high interest rate charged, the Sacco processed at a particular time and the loan amount applied is not reduced, while payment amount and period are pegged on milk proceeds and collateral is either guarantors or title deed. The Sacco gives not only agricultural credit but also other loan products, such as school fees and food stuffs.

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Timeliness of the loan is an important factor to the farmers since they carry out farming activities that require farm inputs to be procured at a particular time to march a specific production period. For instance, planting can only be done at particular time of the year unless it is under irrigation. Repayment flexibility is of importance to dairy farmers since their production is not continuous as the cows experience some dry period. Credit rationing affects project implementation and impacts negatively on the returns that determine repayment capacity. Farm size determines the production levels and hence repayment and it could also act as collateral. Farmers have other needs (heterogeneity), and offering them a variety of credit products increases their credit productivity (Credit marginal productivity).

Several farmer characteristics and credit attributes affected stallholder dairy farmers' choice of credit source. The choice was negatively affected by credit rationing, interest rate, repayment flexibility, loan review period and collateral (i.e., higher credit rationing discouraged farmers from accessing credit), farm size and gender also affected choice of credit source.

The results suggest that agricultural credit source choices are complex phenomena involving a consideration of several factors. Lending institutions need to take into account these complexities when devising financial products and instruments. It was concluded that the informal credit sector is still the dominant sector for smallholder dairy farmers in the area studied. More importantly, factors other than the interest rate affected smallholder dairy farmers' credit source choice. Thus, lending policies and instruments of formal and semiformal financial sectors (This is a financial sector that operates with procedures that are similar to both formal and informal financial sector at the same time) need to be more compatible with farm households' borrowing characteristics.

Based on the study results, the objectives of the research were thus met since from the descriptive statistics, as hypothesized, credit attributes and farmers' characteristics were found to influence farmers' choice of credit source, except for the education level.

CHAPTER FIVE: SUMMARY, CONCLUSION AND RECOMMENDATION

5.1 Summary of the findings

As indicated in section 1.3 of this thesis, the objectives of the study were to determine the various factors that influence the farmers to make decisions on which credit sources to patronize. The Study also aimed at ranking the various factors that influenced farmers' choice of credit source. Understanding what determines smallholder dairy farmers' choice of agricultural credit sources is important as it may help policy makers and financial institutions in various ways. For instance, it may help financial institutions to repackage their loans to suit the needs of the farmers and thus achieve a higher credit impact. This may also help in understanding why the smallholder dairy farmers produce the most milk yet, they receive the least credit, which is estimated to be 1/3 of the total agricultural credit given out in Kenya.

The financial service providers in Githunguri Division were classified into five credit form models borrowing from Kibaara, (2006) as follows: Community Owned Rural Finance (Self help groups, e.g. powdep); Donor led rural finance (K.W.F.T); Managed SACCO (GITHUNGURI SACCO); Government led rural finance (AFC); Private commercial banks (Family bank, Equity, Barclays and KCB); and Employed workers SACCO (for the people in formal employment).

The results on investigation of the farmers' choice of credit source were as follows:

Community Owned Rural Finance	5%
Donor Led Rural Finance	5%
Employed Workers SACCO	1%
Government Led Rural Finance	23%
Managed Sacco	35%
Private Commercial Bank	11%
No choice of credit source	19%

The following credit attributes were found to determine the farmers' choice of agricultural credit source ranked according to the order of importance: interest rate, Credit rationing, repayment flexibility, Loan Processing Period, Repayment period, and collateral. On

farmers' characteristics' the following were of importance to them in choosing credit source ranked according to the order of importance: loan experience, farm size, gender, age and education level.

Despite seventy nine (79) % of the interviewed farmers having credit, only twenty five (25) % were satisfied with their financier, the seventy five (75) % being dissatisfied with the following issues, among others: Rigidity in loan repayment twenty seven (27%), Long loan processing period seven (7%), Credit rationing twenty (20%), Collateral rigidity sixteen (16%), Products unsuitable for farmers three (3%), and "other" eleven (11%) (for those who cited problems related to processing cost and documentation.) This shows that there is need to repackage the loan products being offered to the farmers to make them better suited to their circumstances.

5.2 Conclusion

Most farmers had credit from the informal financial sector. One of the outstanding characteristics of the informal sector is its high level of the interest rate charged. The fact that most farmers chose it suggests that factors other than the interest rate (namely credit rationing, repayment flexibility, loan review period, collateral, gender, farm size and past loan experience) are more important in influencing the smallholder farmers' choice of agricultural credit source.

Product development need to be guided by both the farmer characteristics as well as the credit attributes. This is because all these attributes were found to be important to the farmers in making decision regarding their agricultural credit sources. This concurs with Freeman et al., (1998) who concluded that borrowers are not homogeneous in terms of their need for credit and marginal productivity for credit differs with different borrowers. There is need to develop an agricultural credit product that is suitable for the smallholder farmers. This is because unavailability of suitable credit to the farmers, especially for smallholder livestock farmers, continues to hold the performance of this sector (Economic Recovery Strategy, 2006). Further, the smallholder dairy farmers have poor access to credit. (Nyangito et al., 2004) concluded that though the smallholder dairy farmers produce most of the milk, they only receive 1/3 of the total agricultural credit given out. The repackaging of credit products to produce a suitable credit

scheme and enhance the smallholder dairy farmers' access to credit to a level that is proportional to their high production level and number is needed.

In order to raise the level of credit access (the process of farmers receiving credit) of smallholder dairy farmers to an acceptable level, the financial institutions need to repackage their loan products to suit the needs of the farmers. A suitable product is one that takes into consideration both the credit attributes as well as the farmers' characteristics as they all jointly affected the farmers' choice of credit source.

Smallholder dairy farmers need a credit product that will not only address their farming needs but that will also address their consumption, health and education needs. This was clearly shown by the fact that most people had credit from Githunguri Sacco which also gave credit on food stuffs and other non farming products.

5.3   Recommendations and Implications

(i) Interest rate and credit rationing were found to greatly influence farmers' choice of credit source, but the farmers ranked credit rationing as number one. Therefore, financial institutions ought to balance between interest rate and credit rationing while developing products targeting smallholder dairy farmers.

(ii) Given the nature of farming activities as a project which follows a natural season, financial institutions ought to be timely in decision making on loan request and processing as any delay in giving out loans would jeopardise project implementation, leading to poor loan repayment.

 (iii) The farmers preferred Managed Sacco as it offered them a variety of loan products, such as school fees and food, among others. Lending policies and instruments of financial institutions need to be compatible with the borrowing behaviours of the smallholder dairy farmers, by addressing consumption credit demand, such as need to meet education and health care costs that is compatible with smallholder farmers' ability and willingness to pay for the credit. In the absence of this, there is need for public policy to lower education and health care costs for the smallholder dairy farmers since such costs lower their productive capacity.

(iv) Financial institutions ought to embrace collateral other than land title deed as smallholder farmers preferred a credit source that used collaterals other than title deed.

(v) Farmers' needs were not homogeneous and could vary based on several factors, such as time and income sources. There is need for financial institutions to continuously carry out market research to generate information that can inform on farmer characteristics and their preferred credit attributes.

5.4 Limitations of the study and recommendations for further studies

This study was based on the evaluation of data obtained in a cross-sectional survey of smallholder dairy farmers in Githunguri Division of Kiambu County. Therefore, study findings are pertinent mainly to the study area, but they may also be extended to other areas with similar agroecological and socioeconomic characteristics. However, there can be heterogeneity among farmers in even slightly varying socioeconomic and agroecological settings, and more similar studies in other areas would allow for developing comprehensive policy recommendations.

The study focused on credit attributes and farmer characteristics that influence smallholder dairy farmers' choice of credit source. Due to time and financial constraints, the study could not collect adequate longitudinal and panel datasets. Studies using such richer datasets could give more elaborate results. Most independent variables in the study lacked variability, and this forced the researcher to use descriptive statistics in the evaluation of the factors that influenced smallholder dairy farmers' choice of agricultural credit source as opposed to the use of Multi Nominal Logit which was initially preferred for the study. Hence there is need to conduct further studies using Multi nominal logit analysis and compare the findings. The study interviewed only the farmers, thus limiting the scope of coverage. For more conclusive results, further studies could be done with an aim of interviewing both the farmers as well as the financial institutions. This would make it possible to compare and authenticate what the farmers and the financial institutions consider important in the provision of financial services.

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APPENDIX 1- QUESTIONNAIRE

DATA COLLECTION QUESTIONNAIRE FOR GATHERING INFORMATION FROM FARMERS' IN GITHUNGURI DIVISION IN KIAMBU DISTRICT KENYA ON FACTORS INFLUENCING SMALL HOLDER DAIRY FARMERS CHOICE OF AGRICULTURAL CREDIT SOURCES

INSTRUCTION

All information obtained will be treated as with confidentiality and will be used for learning purpose; no name will appear on the form. Please tick (√) where applicable

Date: ……………………………………..

PART 1: SOCIAL DEMOGRAPHIC INFORMATION

1) SEX: MALE _____ FEMALE _____
2) AGE
   a. 18-30 ☐
   b. 31-40 ☐
   c. 41-50 ☐
   d. 51-60 ☐
3) LEVEL OF EDUCATION
   a. Primary ☐
   b. Secondary ☐
   c. College ☐
   d. University ☐
   e. Adult education ☐
   f. None ☐
4) MARITAL STATUS
   a. Married ☐
   b. Divorced ☐
   c. Widowed ☐

d. Single ☐

5) FAMILY SIZE

    a. Monogamy ☐

    b. Polygamy ☐

6) DEPENDANTS

    a. Immediate family ☐

    b. Extended family ☐

    c. Others ☐

7) NUMBER OF INCOME SOURCES

    a. Farm income ☐

    b. Other Business income ☐

    c. Employment ☐

PART II: FARM CHARACTERISTICS

8) SIZE ARABLE LAND

    a. Small-up to one acre ☐

    b. Medium-one to five acres ☐

    c. Large-over five acres ☐

9) LAND TENURE SYSTEM

    a. Freehold tenure ☐

    b. Communal/family tenure ☐

    c. Lease State Land ☐

    d. Other (specify) ☐

10) OWNERSHIP OF TITLE DEED

    a. Yes ☐

    b. No ☐

11) What is your source of labour?

    a. Family ☐

    b. Hired labour ☐

    c. Both ☐

12) TYPE OF FARM IMPLEMENTS-Possible Loan Security

a. Tractor ☐

b. Vehicle ☐

c. Processing Machinery ☐

d. Hand implements ☐

e. Hired machinery ☐

13) TYPES OF CATTLE BREEDS

    a. Hybrids-

        i. Ayrshire ☐

        ii. Friesian ☐

        iii. Guernsey ☐

        iv. Jersey ☐

    b. Cross Breeds ☐

    c. Local breeds ☐

14) TIME ON THE FARM

    a. Full time ☐

    b. Part-time ☐

PART III: CREDIT INFORMATION

15) Do you have access to credit information?

    a. Yes ☐

    b. No ☐

16) Do you have credit

    a. Yes ☐

    b. No ☐

17) Who is your financier……………………………………………………………

18) Have you taken another loan in the past

    a. Yes ☐

    b. No ☐

19) Was it from the same financier

    a. Yes ☐

    b. No ☐

20) If no please give reason of change of financier

………..

………

………

21) Which of the following credit attributes made you chose your financier?

    a. Repayment period   ☐

    b. Repayment Period   ☐

    c. Interest rate   ☐

    d. Repayment flexibility   ☐

    e. Loan review period   ☐

    f. Collateral   ☐

22) Give a brief explanation on how the above credit attributes affected your choice of financier……………………………………………………………………………………………………

………………………………………………………………………….……………………………………

23) What are the main problems you encounter in getting the credit?

………

………

24) How would you rank the importance of above attributes on choice of credit source on a scale of 1 -5

    c. Repayment period   1   ☐ 2   ☐ 3   ☐ 4   ☐ 5   ☐

    d. Repayment Period   1   ☐ 2   ☐ 3   ☐ 4   ☐ 5   ☐

    e. Interest rate   1   ☐ 2   ☐ 3   ☐ 4   ☐ 5   ☐

    f. Repayment flexibility 1   ☐ 2   ☐ 3   ☐ 4   ☐ 5   ☐

    g. Loan review period 1   ☐ 2   ☐ 3   ☐ 4   ☐ 5   ☐

    h. Collateral   1   ☐ 2   ☐ 3   ☐ 4   ☐ 5   ☐

25) Are you satisfied with the services you are currently receiving from your financier?

    a. Yes   ☐

    b. No   ☐

Briefly explain……………………………………………………………………………………………...

………

PART IV: FARMER INFORMATION

26) In your own opinion do you think your characteristics affect choice of agricultural credit source

    a. Yes   ☐

    b. No   ☐

Briefly explain…………………………………………………………………………...

……………………………………………………………………………………………

27) Which of the following own characteristics made you chose your financier?

a. Age   1   ☐ 2   ☐ 3   ☐ 4   ☐ 5   ☐

b. Gender   1   ☐ 2   ☐ 3   ☐ 4   ☐ 5   ☐

c. Past Loan Experience 1   ☐ 2   ☐ 3   ☐ 4   ☐ 5   ☐

d. Farm size   1   ☐ 2   ☐ 3   ☐ 4   ☐ 5   ☐

e. Education Level   1   ☐ 2   ☐ 3   ☐ 4   ☐ 5   ☐

28) Give a brief explanation on how the above own characteristics affected your choice of financier…………………………………………………………………………………

……………………………………………………………………………………………

29) How would you rank the importance of above characteristics on choice of credit source on a scale of 1 -5

    a. Age   1   ☐ 2   ☐ 3   ☐ 4   ☐ 5   ☐

    b. Gender   1   ☐ 2   ☐ 3   ☐ 4   ☐ 5   ☐

    c. Past Loan Experience 1   ☐ 2   ☐ 3   ☐ 4   ☐ 5   ☐

    d. Farm size   1   ☐ 2   ☐ 3   ☐ 4   ☐ 5   ☐

    e. Education Level   1   ☐ 2   ☐ 3   ☐ 4   ☐ 5   ☐

PART V: SUPPORT SERVICES

30) Do you have access to any farmer support services?

    a. Yes   ☐

    b. No   ☐

31) If yes, what type of support services do you have?

……………………………………………………………………………………………

……………………………………………………………………………………………

32) If yes, who provides these support services?

    a) Government   ☐

    b) Local Associations   ☐

    c) NGOs   ☐

    d) Other (specify)…………………………………

33) What main problems do you encounter in getting any farmer support services?

....

....

....

34) What measures do you take to ensure that you have a positive outcome from farmer support services?

………………………………………………………………………………………………

………………………………………………………………………………………………

………………………………………………………………………………………………

………………………………………………………………………………………………

35) What form of agricultural training do you have? …………………………………….......

………………………………………………………………………………………………..

36) Do you consult with other farmers before making decisions?

    a. Yes   ☐

    b. No   ☐

    Explain...

    ………………………………………………………………………………………………

    ………………………………………………………………………………………………

    ………………………………………………………………………………………………

37) How often do support officers visit you?

    a. Once a week   ☐

    b. Once a month   ☐

    c. Twice a month   ☐

    d. Never   ☐

    e. Other (specify) …………………………………………………..

38) Are you a member of any farmers union?

a. Yes ☐

b. No ☐

39) What are the benefits and costs of being in a farmers union?

a. Costs…………………………………………………………………………………

……………………………………………………………………………..

b. Benefits………………………………………………………………………………

…………………………………………………………………………………

40) Do you hold any position of authority in the farmers union?

    a. Yes ☐

    b. No ☐

If yes, specify the position

………………………………………………………………………………

PART VI: MARKETING

41) Where do you market your farm produce?

    a. Farm gate ☐

    b. Transported to the local market ☐

    c. Agents ☐

    d. Other (specify) ☐

42) Are you in a contract with any reliable market?

    a. Yes ☐

    b. No ☐

43) If Yes, Specify

…………………………………………………………………………………

44) What is your method of selling?

    a. Cash ☐

    b. Credit ☐

    c. Both ☐

    d. Other (Specify) ☐

………………………………………………………………………....

45) Do you have access to marketing information?

    a. Yes   ☐

    b. No   ☐

46) What are the main problems you encounter when marketing and selling your produce?……………………………………………………………………………………

…………………………………………………………………………………………

………………………………………………………………………………………