INFLUENCE OF MICROFINANCE PARTICIPATION AND SOCIO-ECONOMIC FACTORS ON DAIRY COMMERCIALIZATION: THE CASE OF SMALLHOLDER FARMERS IN BOMET COUNTY, KENYA

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DECLARATION AND APPROVAL

DECLARATION

This thesis is my original work and to the best of my knowledge has not been presented for the award of any degree in this or any other university.

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DEDICATION

I dedicate this work to my wife Janeth, My son Damian, My parents Mr. and Mrs. koskey and my classmates for their sincere support during my project period. May God bless you all.

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ABSTRACT

Dairy commercialization is constrained by several factors including lack of funds. Access to financial services such as credit and savings were identified as important instruments to curb these financial challenges. Microfinance institutions (MFIs) have been found to play a critical role amongst smallholder farmers in enhancing their access to finance. This study sought to investigate factors influencing credit access and the extent of credit access and how microfinance participation and socio economic factors influences dairy farming performance amongst smallholder farmers in contributing towards dairy farming commercialization. MFIs were found to positively influence commercialization . This study was conducted in Sotik sub-county, Bomet County and a multistage sampling method used to obtain the sample of 150 dairy farmers for interview using structured questionnaires. Descriptive statistics was used to characterize socio-economic attributes of the smallholder dairy farmers. Heckman-two stage model was used to determine the factors that influenced credit access and the extent of credit access among smallholder dairy farmers. Tobit model was used to determine the influence of microfinance participation and socio-economic factors on smallholder dairy farming commercialization. Seven factors; gender, age, household size, occupation, distance, off farm income and output level were found to significantly influence the farmers' access to credit. The extent of commercialization of milk by smallholder farmers was significantly determined by membership to groups, off-farm income, gender, age, years of education, household size, years of experience, microfinance institution access, access to credit, applicable interest rates and acquisition of savings account. This study recommends that farmers be encouraged to engage in off farm employment that buffers household income and make them more credit worthy for greater extent of credit access, farmers should also be trained on the importance of collective action through farmer groups.

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ACRONYMS AND ABBREVIATIONS

AI   -   Artificial Insemination

CGAP   -   Consultative Group to Assist the Poor

KCC   -   Kenya Creameries Corporation

KES   -   Kenya Shilling

MFI   -   Microfinance Institution

SDP   -   Smallholder Dairy Project

SME   -   Small and Medium Enterprises

SSMV   -   Small-Scale Milk Vendors

SPSS   -   Statistical packages for social sciences

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

Kenya has since the early 1910 developed a dairy industry that ranks among the largest in the Sub Saharan Africa (Ngigi, 2004). It is estimated that currently 800,000 smallholder households depend on dairy for their livelihoods in Kenya and the dairy sector employs over 350,000 people in milk collection, transportation, processing and sales (SDP, 2005). The demand for milk and milk products has also risen in Kenya where the annual per capita consumption is now estimated at 145 Litres, more than five times higher than milk consumption in the East African countries. With arable land and grazing fields becoming smaller in Kenya due to population pressure and land sub-division, zero grazing has grown to be a famous venture among small-scale farmers who face land constraints.

Market access has continued to be the main constraint facing smallholder commercialization of agriculture (Poulton *et al.,* 2006), making smallholder farmers to produce mainly for subsistence. According to Jaleta *et al*. (2009), agricultural commercialization technically entails a shift from subsistence production to a more complex market-based production and consumption system leading to strengthening of the linkages between input and output sides of the market. Despite the various success stories in the Kenya dairy sub-sector, there is still a big gap between actual yield and attainable potential yield in the dairy sub-sector (Karanja, 2003). This is mainly due to the fact that milk production by the smallholder farmers is constrained by a number of factors; animal genetics, increased reliance on purchased feeds, diseases and insufficient financing (Staal *et al.*, 1997).

The liberalization of the milk market in Kenya to include the Small-Scale Milk Vendors (SSMVs) has positively led to the growth of the dairy sub-sector (Wambugu *et al.*, 2011). This liberalization led to the emergence of new institutional arrangements in milk collection, marketing and processing. The success of the dairy sub-sector is also attributable to the fact that milk provides a continuous stream of cash throughout the year for households growing other cash crops whose income is realized only once or twice a year. Milk production in Kenya is mainly by small scale farmers who own one to three dairy animals, and producing up to 80% of the country's milk (Wambugu *et al.*, 2011).

Small scale and commercial dairy farming is widely practiced in Bomet County, managed at family level. The dairy farming in the County ranges from natural pasture free grazing, to zero grazing (stall-fed cut-and-dry systems, supplemented with concentrate feeds). Most of the smallholder farmers however, operate below fund secure levels to help them in meeting their production needs. The low credit supply therefore limits productivity and the expansion of the sub-sector (Diagne and zeller, 2001; Akanni, 2007). According to Akanni (2007), the agriculture sector depends more on credit than any other sector of the economy because of its seasonal variation in the returns and the changing trend from subsistence to commercial farming.

Since most smallholder farmers do not have collaterals to access bank loans, microfinance institutions has gained considerable recognition in providing financial services to these low-income farmers. Through microfinance institutions (MFIs), the poor can access collateral-free loans at relatively low interest rates and use the money to expand their dairy farming and thus increasing their incomes. Access to microfinance services is assumed to be leading to increased productivity among dairy farmers since they are able to acquire quality breeds for high productivity, purchase of quality feeds, proper milk storage facilities and marketing of milk. Access to microfinance therefore, has the potential of assisting the poor in earning incomes from improved dairy production. According to Thuita *et al.* (2013), improved household incomes are one of the pathways through which microfinance services are presumed to affect increased household welfare.

A FAO study on Dairy development in Kenya points out that smallholder dairy farmers dominate the industry at the production level (Mukundi *et al* 2013), with more than 1 million smallholder dairy farmers (SDP, 2005). According to Mukundi *et al* (2013), smallholder dairy farming contributes more than 70 percent of gross marketed production from farms. Generally, smallholder farmers in Kenya have 3 to 5 acres (1.2 to 2.0 ha) of land and about two to five head of cattle yielding about 5 kg of milk per cow per day. In Kenya, the dairy production is undertaken under three main production systems (Karanja, 2003). These systems in order of their production intensity and occurrence are, smallholder open grazing, smallholder zero grazing and large-scale open grazing. Exotic breeds and their crosses collectively referred to as dairy cattle including Friesians, Aryshire, Guernsey, Jersey and their crosses among others are kept by the smallholder farmers either on zero grazing or open grazing.

The potential for increasing dairy performance in Kenya and especially smallholder dairy remains great, however, productivity per animal has continued to be low. This has been due to low farm gate prices, unreliable market outlets, expensive feed as well as limited access to Artificial Insemination (AI). Since the AI services were privatized in 1992, the use of the service has continued to decline because of high prices (Karanja, 2003). Access to finance is therefore crucial in enhancing productivity of dairy animals and thus increasing the incomes of smallholder farmers. This study therefore seeks to fill the knowledge gap in identifying the role and the influence of microfinance on dairy sub-sector commercialization among smallholder dairy farmers in Bomet County.

1.2 Statement of the Problem

Micro-credit and micro-finance institutions have existed in Kenya since early to mid 1990s. The emergence of these institutions provided alternative institutions that offer financial services to majority of Kenyans who did not have access to regular commercial banks. Bomet county being among the 47 counties in Kenya is housing a number of MFIs in which small scale dairy farmers participate in microfinance, it was expected that participation in microfinance may lead to improved commercialization of dairy farming which would benefit the smallholder farmers by increasing their income levels in the county. However, the performance of dairy farming was considerably below average. With access to commercial banks finances becoming a challenge to most smallholder farmers due to the lack of collaterals, microfinance institutions were increasingly becoming popular in the county. In spite of this, the extent of access to microfinance from these MFI's by the smallholder dairy farmers was not clear. Though there existed a number of microfinance institutions in the county, little has been documented concerning the influence of microfinance participation on dairy sector commercialization. This study attempted to fill these knowledge gaps, in addition to this, other factors influencing the decision to join microfinance institutions needed also to be understood.

1.3 General Objective

To investigate the influence of microfinance services access and socio economic factors on dairy farming performance amongst smallholder farmers in contributing towards dairy farming commercialization and increased incomes.

1.3.1 Specific Objectives

(a) To characterize socio-economic attributes of the smallholder dairy farmers, participants and non-participants with regard to microfinance services access in Bomet County.

(b) To determine the factors influencing credit access and the extent of credit access (participation) among smallholder dairy farmers in Bomet county

(c) To determine the influence of microfinance participation and socio economic attributes on smallholder dairy farming commercialization in Bomet county

1.4 Research Questions

a) What are the socio-economic attributes of the smallholder dairy farmers' participants and non-participants with regard to microfinance services access in Bomet County?

b) What are the factors influencing credit access and the extent of credit access among smallholder dairy farmers in Bomet county?

c) What is the influence of microfinance participation and socio economic attributes on smallholder dairy farming commercialization in Bomet county?

1.5 Justification of the Study

The emergence of MFI's and the accessibility of their services with less stringent conditions as opposed to the commercial institutions had enhanced outreach and accessibility of financial services to the rural households. With this regard, most of the smallholder farmers now have access to financial services which help to improve their productivity and consequently welfare. Microfinance had gained considerable success among smallholder farmers in Bomet County, therefore, characterizing farmers with regards to microfinance services will help the stakeholders to be more aware about the services which farmers go for and those which are less accessed. This would promote improving the services and marketing of the less accessed services towards ensuring greater depth of outreach. The extent of access to microfinance services would also enable the stakeholders in the financial service sector to device on the best model of reaching dairy farmers. This would improve outreach, access and consequently better the welfare of the smallholder dairy farmers.

1.6 Scope and Limitations of the study

The study was confined to Sotik Sub-county within Bomet County. This was a case study involving only dairy farmers' participants and non-participants in microfinance. The study mainly focused on the MFI services accessed by the smallholder dairy farmers and its implication on dairy commercialization. Microfinance is however, a broad field and therefore not all issues were explored like insurance and money transfer. The results therefore can only find limited applications to other dairy farmers especially those with similar socio-economic characteristics as Bomet County.

1.7 Definition of Terms

Commercialization - The process of increasing the proportion of milk sold by small scale dairy farmers. It is measured in terms of the amount of milk sold compared to amount of milk produced.

Commercialized farmer- A farmer who engage in dairy farming by producing and selling milk

Collaterals-Something pledged as security for loan repayment.

Cottage industries- Business or manufacturing activity carried on in a person's home.

Microfinance institution (MFI) - These are institutions offering small loans and other financial services with little or no collaterals at all.

Milk bar- a snack bar selling milk drinks and light refreshments like ice creams.

Smallholder dairy farmers -Are dairy farmers who are characterized by land holding less than five acres and rearing less than five dairy cows.

Participant- A parson who can borrow from a source of credit.

Microfinance - These are small loans.

Microfinance access- Able to choose a particular source of credit and able to borrow though may choose not to borrow.

CHAPTER TWO

LITERATURE REVIEW

This chapter links the research to previous studies that have been conducted on the influence of microfinance on various agricultural activities, it summarizes on the state of micro finance in Kenya, emergence of micro finance, determinants of credit access and influence of micro finance on dairy commercialization.

2.1 Dairy Production in Kenya

India is the current largest dairy producer in the world (Salasya *et al.*, 2006). In the sub-Saharan Africa, Kenya has the largest dairy industries (Wambugu *et al.*, 2011). The SDP survey report affirms that there are estimated 6.7 million dairy cattle in Kenya (SDP, 2005). This makes Kenya the only country after South Africa in the sub-Saharan Africa to be self-sufficient for both domestic consumption and export, producing approximately 3.5 billion litres, against the 3 billion litres consumption level (Wambugu *et al.*, 2011). The growth of this sector is mainly attributed to the dairy liberalization of 1992 enhancing the informal milk market participation. However the informal milk market was not recognized until the policy change of 2004 which legalized it.

Before the liberalization, Kenya Creameries Corporation (KCC) was the only milk processor in Kenya enjoying greater monopoly, but its market share slowly decreased between 1993 and 1996 (Olok-Asobasi and Sserunjogi, 2001) as many private processors including Brookside Dairy Limited and Githunguri Dairy Farmers and Processors joined the business(Wambugu *et al.*, 2011). The statistics by the Kenya Dairy Board of 2010 estimates that there are 27 processors , 64 mini dairies, 78 cottage industries and 1138 milk bars. According to Omore *et al.*, (2004), the informal milk markets in Kenya accounts for about 86% of the total milk supplies. The actors in the chain include small-scale producers, mobile milk traders, milk bar operators and milk transporters (Salasya *et al.*, 2006).

Though the dairy sector contributes significantly to food security, national and household income, its ability to participate in the domestic and regional market competitively is faced by several constraints including technical, economic and institutional factors in milk production, processing and marketing (Karanja, 2003). Poor access to breeding, animal health and credit

services and high cost of AI service are other constraining factors adding to the common challenge of poor infrastructure (Wambugu *et al.*, 2011).

According to (Wambugu *et al.*, 2011), the long term government plan is to create a Dairy Development Fund which will provide resources necessary for interventions in the dairy sector including marketing, surveillance, product development and compliance to standards. Improving market infrastructure is also an important government goal. According to Shiferaw *et al.* (2006) the lack of market infrastructure and geographical isolation due to distance, poor roads or poor communication restricts market development.

The productivity per animal among smallholder dairy farmers remain low (Karanja, 2003), even though their dairy production contributes over 70% and 56% of total and marketed milk production, respectively (Omore et al, 1999). Karanja (2003), points out that the average yield per cow in smallholder farms is as low as 1,300litres per year as compared to the best world practice of 4000-6000 litres. The smallholder farmers in Kenya sell their milk through various marketing channels including processors, hawkers, brokers, self-help groups as well as neighbors and business establishments like hotels (Karanja, 2003; Omore *et al.,* 2004; Salasya *et al.,* 2006; Muriuki, 2011) With increasing demand for milk, opportunities of improving their production and sale are presented to farmers. However, there are concerns among policy -makers over the ability of the smallholder milk producers to survive growing competition with intensive large -scale livestock producers in the urban and peri-urban areas (Omiti *et al.,* 2006).

2.2 Emergence and Definition of Microfinance

Emergence of microfinance was inspired by successes of the Grameen Bank in Bangladesh through the mechanism of group-lending and its replications around the world (Nguyen, 2007).In Kenya, micro finance became prominent in mid nineties when microfinance institutions were allowed to formally operate, initially only commercial institutions like Kenya commercial bank, Barclays bank and other well established and controlled banks were in the market. As explained by Christen *et al.,* (2003), "microfinance" means the provision of banking services to lower-income people, especially the poor and the very poor. It emerged in response to the failures and recognizing that traditional commercial banks typically had no interest in lending to poor rural households because of their lack of viable collateral and the high transaction costs associated with the small loans that are best suited to them (Diagne and Zeller, 2001).

Microfinance institutions (MFI's) therefore initiated innovative credit delivery systems as a more efficient way of improving rural households' access to formal credit. Thus, the ideal candidates for microcredit are poor people who work in stable or growing economies, and have demonstrated an ability to undertake a proposed activity and are committed to repaying their debts (Nahil, 2011).

Through MFI, the poor can obtain collateral-free loans at relatively low interest rates. The money acquired is used for creating microenterprises, acquisition of farm inputs, funding children's education, and improving homes, among others (Electrin *et al*., 2013). These services provide an enormous potential to support the economic activities of the poor and thus contribute to poverty alleviation. Many of them are group-based lending programs relying on joint liability and peer pressure as substitutes for collateral, along with community-based delivery systems. The mechanism of group-lending offers peer monitoring with dynamic incentives such as threatening to ban further credit incase a member defaults (Nguyen, 2007).This lending method helps MFI's overcome problems of adverse selection and moral hazard.

With the severe increase in land constraints, most smallholder farmers have shifted their production techniques where most of them are practicing zero grazing. The changes in the production and consumption strategies of households require capital in order to improve their productivity and welfare (Diagne and Zella, 2001).However, Owuor and Shem (2012) observed that accessing loans from formal credit institutions proved almost impossible for small and resource poor farmers leading to reliance on the least regulated informal credit sources that is MFIs that peg lending to memberships in social networks such as groups. The main MFI's in Kenya include; Kenya Rural Enterprise Program (K-REP), Faulu Kenya, Kenya Women Finance Trust (KWFT), Women Enterprise Fund, Uwezo Fund and Equity Bank, among others (AMFI, 2013).

2.3 Services Offered by MFI's

Microfinance embraces not only a range of credit products (for business purposes, for consumption smoothing, to fund social obligations, for emergencies and others), but also savings, money transfers, and insurance (CGAP, 2012). As explained by World Bank (2005), improved access to savings product can help households achieve higher returns on their savings and smoother cash flows, and can reduce vulnerability to external shocks and that insurance

indemnifies low-income households and small businesses against specific risks in exchange for regular premium payments. This greater depth of outreach to the poor and low income earners to financial services access improves the ability of producers and consumers to access product markets which contributes to monetizing the values of their products and services (World Bank, 2013). According to CGAP (2012), "microcredit" /"microloan" has four important dimensions: First a microloan is typically much smaller than a conventional bank loan, although there is no universally agreed maximum, secondly the loan typically has either no collateral or unconventional collateral (which frequently is not sufficient to cover the lender's loss in the case of a payment default),thirdly the borrower is typically self-employed or informally employed (i.e., not salaried by a formal employer), and lastly the lender typically uses the common micro lending methodology: Group lending, or individual lending based on an analysis of the borrowers.

2.4 Determinants of Credit access and the Extent of Credit access Among Smallholder Dairy Farmers

Access to credit is determined by the ability of households to borrow from a particular source whether formal or informal. The extent of access to credit is measured by the maximum amount a household can borrow, its credit limit (Diagne and Zeller, 2001). As stated by Owuor and Shem (2012), credit is an important instrument among resource poor farmers in developing economies noting that participation in micro-credit influence increase in purchased factor utilization and consequently significant effect on output. Diagne and Zeller (2001) stated that a household has access to a particular source of credit if it is able to borrow from that source, although the household may choose not to. Consequently a household is said to be participating if it is borrowing from a source of credit. A household is credit constrained when it lacks access to credit or cannot borrow as much as it wants.

Participation and the amount of credit borrowed by households could therefore be influenced by various factors. These factors vary from socio-economic characteristics of the households to institutional factors. The socioeconomic factors such as age, gender, education level, income level and available resources could significantly influence the participation and extent of participation in microcredit. Studies have suggested that market participation is predominantly determined by the resource base of a household whereby, size of land owned is a

fundamental factor (Boughton *et al*., 2007, Mukundi *et al.,* 2013). This indicates that smallholder dairy farmers with large herds of cattle or large volume of milk may need credit to facilitate production activities. This may lead them to participation in microcredit. Similarly, Lapar *et al*.2003) explains that income derived from livestock enterprises can have a positive impact on participation and selling and therefore credit worthy to access microcredit services. In analyzing farm productivity and household market participation, Rios *et al*. (2009) established that households with higher productivity have greater participation in agricultural markets and hence the need of credit for facilitation.

Age and gender of the borrower may significantly influence access and the extent of access to credit from the MFI's. In his analysis of credit group borrowing, Kangogo *et al*. (2013) established that age of the borrower positively influenced the extent of borrowing. This observation was attributed to the fact that an increase in age is a proxy of accumulated experience, practical and professional wisdom of the household to increase its income generating capability. In this view, they demanded more credit to explore capabilities or to spend on consumption and can be trusted with huge borrowings.

Gender of the borrower may have a positive relationship to micro-credit group participation because female mostly embrace group membership and still in terms of collateral are disadvantaged compared to the male. Empirical evidence from the stated by Doan *et al*. (2010) explains that gender does not really matter in credit participation although it plays a critical role in explaining loan size. The results of their study showed that male-headed households received lower amounts of loans than female headed households. Education is a key factor in making informed decisions (Apind *et al.*, 2015), and therefore can influence participation in credit market. However, Zaman (1996) found out from his study that the level of educational, measured by the average years of schooling did not have any influence on the depth of participation in micro-credit programs. A study by Awunyo-vitor *et al*. (2012) revealed that an increase in years of schooling is associated with female participation in microcredit. This implies that education of the borrower in years only influence female participation in microcredit.

Institutional factors such as access to microfinance, information, extension services, membership to a group and access to credit also affect participation in microcredit. In analyzing the role of collective action, Mukundi *et al.* (2013) found out supportive evidence that

participation in collective action has the potential to strengthen market participation among the poor and marginalized smallholder producers. With the model of group lending, smallholder dairy farmers who belong to farmer groups would have an upper hand of participating in microcredit from MFI's since they can easily access it through the group. This is in line with the findings of Korir *et al.* (2015) which stated that an increase in the initial social capital endowment by one person leads to an increase in the level of commercialization by 8%. Olwande and Mathenge (2012) also affirm that membership in farmer organization play significant roles in enhancing market participation for poor household, and similarly can enhance participation in microcredit services.

Providing improved agricultural market information helps to link farmers to markets, a process that improves their welfare, and moves them to more efficient market outcomes (Kizito *et al*., 2012). He further explains that information diffusion is focused in areas with potentially high supply response. Information about microcredit services and the terms of access may empower farmers on the MFI's leading to participation to acquire services offered. Apind *et al*. (2015) elaborates that market information empowers farmers on the prevailing market prices, market opportunities and market demand. While examining market information sources found out that the source of market information had a positive and significant influence on the extent of market participation by 0.026. This implies that MFI's which have reached farmers and educated farmers on their services will have more farmers participating in microcredit and other services offered.

Government programs such as temporary government subsidies to the least cost-effective producers causes tipping toward full participation (Wang and Hennessy, 2012). This alludes that programs like youth empowerment funds and women funds offers a great opportunity to farmers to access microcredit services hence enhanced participation in microfinance. Farmer education through extension services is one of the major sources of information to farmers. The coefficient of extension services is positive and significantly influenced the extent of market participation among the rice farmers. Access to extension services increases the extent of market participation by 0.030 among the rice farmers (Apind *et al*., 2015) and similarly, this can be experienced with the extent of participation in microcredit.

Market factors that could possibly affect participation in microfinance include access to MFI's, interest rates, labour market among others. Market orientation translates strongly into market participation implies that interventions aimed at promoting market orientation of households at production level is likely to have significant effect on commercial transformation of households (Gebremedhin and Jaleta, 2013). Further to this, household labor supply is positively associated with market orientation and hence positive association between household human capital and market participation. Therefore, farmers who hire labour to work on farm may need access to microcredit in order to settle wages. As stated by Rutto *et al.* (2013), Credit is a production enhancing input which boosts productivity and therefore a necessity to smallholder farmers.

Interest rate is one of the factors that can influence the extent of smallholder farmers' participation in microfinance. Khanh (2011) stated that interest rate is of great concern in determining both the participation and level of participation in credit groups, implying that favorable interest rates my attract smallholder farmers to participation.

2.5 Influence of Microfinance Services on Smallholder Dairy Farming Commercialization.

Participation in milk markets can be examined in terms of commercialization, measured by the percentage of value of output sold to the total farm production (Haddad and Bouis, 1990).Agricultural commercialization according to Pradhan *et al.* (2010) refers to the process of increasing the proportion of agricultural production that is sold by farmers. Credit has been identified as the only engine that propels agricultural development, Dairy farming in Kenya is affected by credit to a large extent. Feeding, Medication and proper milk handling is a product of credit and good management practices (Pradhan *et al.* 2010). Martey *et al.* (2012) adds that commercialization in agriculture involves a transition from subsistence-oriented to market-oriented patterns of production and input use.

Increasing agricultural production and productivity and ensuring food security are key objectives of development of the Kenyan government based on the Vision 2030 blueprint. However, farmers especially the smallholder farmers have limited internal capacity or resources to purchase additional farm inputs such as improved seeds, chemicals, breeding services and farm-related long term investments (Amha, 2008). In order for dairy farmers to improve their commercialization, more resources are required for the procurement of inputs such as feeds, AI

services, storage and transportation facilities, construction of zero grazing units, and even insuring their animals. Therefore, for an enhanced better dairy farming performance, an adequate and timely financial service helps farmers beyond the insecure zone.

Provision of financial services such as credit, savings and money transfer to smallholder farmers is considered as an instrument able to break the vicious cycle of poverty and ensuring food security (Amha, 2008).In most developing countries, microfinance has often been identified as a powerful instrument creating more income opportunities for the low income population and fighting poverty. Therefore, to promote sustainable commercialization of smallholder dairy production, the producers should have timely and cost-effective access to finance, inputs and support services.

A study by (Wadud, 2013) on the impact of microcredit on agricultural farm performance and food security in Bangladesh using propensity score matching (PSM) model revealed that microcredit contributes significantly to output and income generation. The study further shows that experienced and educated farmers with microcredit access are more likely to operate efficiently in farming activities. The study corroborates that of Javed *et al*. (2006) who evaluated the impact of microcredit on productivity of wheat and sugarcane in Faisalabad, Pakistan and found that microcredit was effective in increasing crop production and improving the living standards of the farmers.

Several studies have been conducted on the effect of microfinance on Micro and Small Enterprise's (MSE) performance. Rahmat and Maulana (2006) found that microfinance has positive impact on MSE performance indicated by sales. However, they found that doubling loan amount has a negative impact on performance. The finding also agrees with that of (Babagana, 2010)on the impact assessment of microfinance banks in promoting SME's growth in Nigeria, he found in his research on the role of microfinance in entrepreneurship development, that there was a significant difference in the number of entrepreneurs who used microfinance and those who do not.

Age of the farmer is a proxy for his experience. Commercial dairy farming in Kenya started before the 1960 by the European settlers (Omiti *et al.*, 2009). It is therefore expected that the dairy household heads are more experienced and thus age positively influencing commercialization. Korir *et al.*, (2015) while using the Tobit found age of the household head to

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be positively influencing commercialization of French beans in Kenya up to a point where a further increase in age by one year reduces the household commercialization.

2.6 Theoretical Framework

This study was built on the framework of utility theory, where the decisions to either participate in a MFI or not is dichotomous. This depends on whether accessing microfinance services give the household higher utility than the non-participants. According to Mercer and Pattanayak (2003), participation studies normally involve two stages: The decision to either participate or not and in the second stage, the extent of participation. A binary choice model has been identified as appropriate for the estimation of the decision to participate or not since it is dichotomous.

The expected net utility derived from participation in a MFI or not given household's characteristics is determined as follows:

$$EU_iP = f(W_i) + e_i \text{.. (1)}$$

$$EU_iN = f(X_i) + e_i \text{.. (2)}$$

Where, EU_iP, is the expected net utility of household i from participating in a microfinance

EU_iN, is the expected net utility of household i from non participation in microfinance

P, denotes microfinance participation while N denotes non participation.

X_i and W_i, are vectors of independent variables denoting microfinance, farm, institutional and household characteristics and e_i is an error term.

The expected net utility from each of the decisions will then be compared. To compare, Y_i will be used as an indicator of whether household i participates in micro-credit group or not, so that Y_i=1 if participates and Y_i= 0 if not, as indicated in equation (3) below

$$\begin{cases} Y_i = 1 \ if \ EU_iP - EU_iN > 0 \\ Y_i = 0 \ if \ EU_iP - EU_iN < 0 \end{cases} \text{.. (3)}$$

Equation (3) implies that the probability that the household i participates in a MFI is given by the probability that the expected net utility derived from participation is greater than the expected net utility derived from nonparticipation. While the probability that the household i does not participate is given by the probability that the expected net utility derived from participation is less than the net utility derived from nonparticipation.

2.7 Conceptual Framework

This study was based on the idea that the decision to participate in microfinance or not is assumed to be determined by institutional and socio-economic factors. It was assumed that these factors together with the moderating factors influenced the decision of a household to either participate in microfinance or not and the level of participation. Therefore, households who participate in microfinance are expected to benefit from access to credit without collaterals.

Socio-economic factors
-Age
-Gender
-Education
-Household size
-Experience
-Farm size
-Occupation
- Off-farm Income
-Income

Institutional factors
-Membership to groups
- Market/Information access
-Extension services access
-Distance to collection/marketing point.
-Land tenure
-Prices(Selling)
-Transport
-Loan amount

moderating variables
-Government policy
-Advertisement campaigns
-Promotional services

Extent of participation

MFI Participation

-Savings
-Credit access
-Access frequency
-Interest rates
-Membership to MFI
-Repayment period

Outcome
-Improved commercialization
-Increased household incomes

Figure 1: Conceptual Framework of determinants of microfinance participation and extent.

Author's Conceptualization.

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CHAPTER THREE

RESEARCH METHODOLOGY

This chapter summarizes on the study area, sample size determination, sampling procedure, method of data collection, data analysis and analytical frameworks of the research, it gives brief descriptions of those variables, This section of the study links the introductory part and the results of the study.

3.1 The Study Area

The study was conducted in Sotik Sub-County, Bomet County. The County lies between Latitudes 0° 29' and 1° 03' South and Longitudes 35° 05' and 35°35' East. It is located in the southern rift valley region of Kenya, 300km North West of Nairobi. The County occupies a total area of 1997.9 km^2 and inhabited by the Kipsigis sub-group of the Kalenjin community. Bomet County borders Kericho County to the North, Nyamira to the West, Narok to the South East and Nakuru to the North East. The County has five electoral constituencies: Sotik, Bomet Central, Bomet East, Chepalungu and Konoin constituencies. It lies in the mid-altitude range of 1489 to 2000 metres above the sea level. The county has an estimated population of 730,129 persons (2009 census)with a density of 367 per square kilometers (GoK, 2009). Bomet is divided into three agro-ecological zones depending on the rainfall levels and soil types (red volcanic soils, black cotton soils, loam soils and sandy soils). Most of the area is covered by the red volcanic soils suitable for maize production which is the main economic activity in the area. The annual temperature is between 12°C and 26°C, averaging 20°C. Apart from November and December, the monthly precipitation is between 1100mm to 1500mm with two rainy seasons- long rains (March to May) and short rains (August to October). Most prevalent crops in the county are tea, maize, beans, bananas and various types of fruits and vegetables, while the animals kept are cattle, goats, sheep and poultry.

3.2 Sample Size Determination

The required sample size was determined by proportionate to size sampling methodology (Anderson *et al.*, 2007).

$$n = \frac{p\,q\,Z^2}{E^2}$$ .... (1)

Where n = sample size, p = proportion of the population containing the major interest in the study, q = 1-p, z= confidence level (α = 0.073), E = acceptable/allowable error. Since the proportion of the population was not known, p=0.5, q = 1-0.5= 0.5, Z = 1.793 and E = 0.073. This resulted to a sample population of 150 respondents.
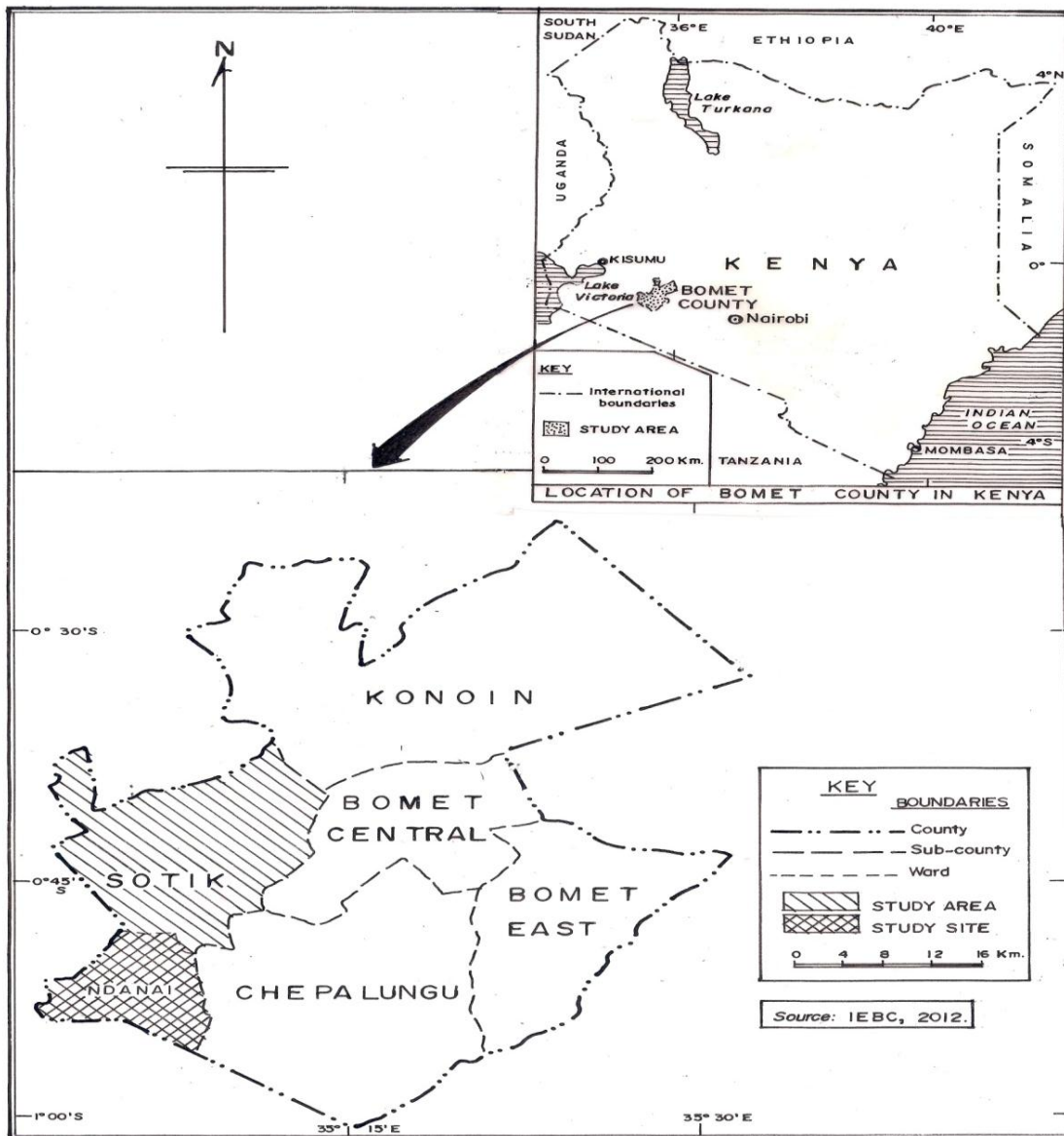
Figure 2: Map of the Study Area

Source: IEBC (2012).

3.3 Sampling Procedure

The target population was small scale dairy farmers (Both participants and non participants in microfinance) within Sotik Sub-County, Bomet County. Multi-stage sampling method was used to obtain appropriate sample size. Sotik Sub-County was purposively selected because of its dairy potential and the presence of many MFIs operating in the area. Using list of credit borrowers obtained from existing MFIs for participants and simple random sampling for non participants, stratified random sampling approach was used whereby the population was purposively divided into two strata: microfinance participants and non-participants. A list was prepared for each stratum using serially numbered names of the farmers. From each MFI, farmers were selected proportionate to the size of the microfinance using a systematic random sampling procedure to give a total sample of 150 farmers (100 microfinance participants and 50 non participants). Data on socio-economic, technical and institutional factors was collected.

3.4 Methods of Data Collection

A cross sectional data set used was collected from a sample of small-scale dairy farmers. The methods for data collection included observations, interviews, and formal questionnaires. Respondents interviewed were the household head who are the decision makers. Primary data on Age, gender, education level, household size, farm size, occupation, income, membership to groups, membership requirements, information access, extension services and land tenure systems were collected through the administration of semi- structured questionnaire to the 150 respondents in the study area. The pre tested questionnaire was administered to the farmers by team of trained enumerators.

3.5 Methods of Data Analysis

Data from the field was edited, coded, cleaned to ensure consistency, uniformity, and accuracy, and then entered into computer software for analysis. Both qualitative and quantitative techniques were used to analyze the data collected. Objective one was analyzed using descriptive statistics such as mean, percentage, standard deviation, tabulation, ratio and frequency distribution, while objective two and three utilized quantitative models. Both SPSS and STATA computer programs were used to process the data.

3.6 Analytical framework

3.6.1 Objective 1: Socio-economic Attributes of the Smallholder Dairy Farmers.

The first objective was analyzed using descriptive statistics. These captured the quantitative and qualitative variables that are important in understanding the socioeconomic characteristics of small scale dairy farmers. The graphs, percentages, means, modes, standard deviations and medians of various variables were obtained. The *t-test* and *Chi*-square tests were used to compare the selected household and farm characteristics between the two categories of farmers (participants and non-participants).

3.6.2 Objective 2: Factors Influencing Credit Access And Extent of Credit Access among Smallholder Dairy Farmers

The decision to either acquire credit in a MFI or not and extent of credit access are dependent variables and therefore were estimated independently. Heckman two-step procedure was identified and used for such independent estimation. Heckman two-step model involved estimation of two equations: Selection equation in the first step and outcome equation in the second step (Heckman, 1979).

First was whether a household accessed microfinance services or not (participated) then second the extent of participation (amount of loans accessed). The amount of loan is conditional on the decision to participate in a MFI. Previous studies show that, estimation of such relationships is normally problematic due to sample selection bias.

The two-steps included; first a Probit model for participation or selection equation is estimated. This step estimates the probability of participation as shown in the equation (2) below

$$P_i = \delta\, Z_i + \varepsilon_i, \quad E(\varepsilon_i\, / Z) = 0 \quad\text{... (2)}$$

Where, P_i is a dummy for participation in micro-credit group while Z_i is a vector of variables that affect participation decision. The next equation is to explain the extent of participation.

$$Y_i = \beta X_i + \mu_i, \quad E(\mu_i / X) = 0 \quad\text{.. (3)}$$

Y_i indicates the extent of participation measured in terms of amount of loan by a borrower.

X_i is a vector of variables that explain the levels of participation,

ε_i and μ_i are the error terms.

The model assumes that Z and X are observable exogenous variables and X is a subset of Z.

If the correlation between ε_i and μ_i is not zero it brings about the selection bias problem.

After estimating the selection equation a non selection bias is computed using equation 4 below,

$$E(\varepsilon_i / P_i, Z_i) \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots \text{(4)}$$

Which is called Inverse Mills Ratio (IMR) $\lambda(\delta Z_i)$ when $P_i=1$ (Wooldridge, 2002).

Then the new lambda is used in the selection equation (3) as an explanatory variable. The new equation for the second stage regression is therefore:

$$E(yi/zi, P_i = 1) = \beta X_i + \rho \lambda(\delta Z_i) \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots \text{(5)}$$

Equation (5) gives the expected amount of loans Y_i given vectors of observable factors Z_i and given that the household has already made the decision to participate in a MFI. This can be explained by vector of observable characteristics X_i and the Inverse Mills Ratio evaluated as, $\lambda(\delta Z_i)$

If $P_i=0$ then there is no evidence of the selection bias and the regression reverts to OLS. But if $P_i \neq 0$ then there were omitted variables in the initial model correlated with X_i which is corrected by including IMR in the second regression.

The weakness to this model is the assumption that a variable affecting the decision to participate in micro-credit group can sequentially lead to reduced level of participation to zero number of loans.

Heckman Two-Stage Model Specification.

Step 1. (Selection equation)

The probit model identifies the probability of microfinance participation and consequently identifies the factors which influences participation specified as shown below,

$$P_i(0,1) = \beta_0+\beta_1 X_1+\beta_2 X_2+ \dots\dots\dots +\beta_n X_n+\varepsilon \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots \text{(6)}$$

$$P_i(0,1)=\beta_0+\beta_1 age+\beta_2 gender+\beta_3 educ+\beta_4 H/Hsize+\beta_5 FmSize+\beta_6 Offincm+\beta_7 incom+\beta_8 Occup+\beta_9 Ext+\beta_{10} Selln+\beta_{11} Trnp+\beta_{12} Dstnc+\beta_{13} Pers+\beta_{14} LdTenure\beta_{15} Mktinf+\varepsilon \dots\dots\dots\dots \text{(7)}$$

Step 2. (Outcome equation)

$$Y_i=\beta_0+\beta_1 X_1 +\beta_2 X_2+\dots\dots\dots+\beta_n X_n + \beta_n \lambda_n+\varepsilon \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots \text{(8)}$$

Amt of loan

$$Y_i=\beta_0+\beta_1 age+\beta_2 gender+\beta_3 educ+\beta_4 H/Hsize+\beta_5 FmSize+\beta_6 Offincm+\beta_7 incom+\beta_8 Occup+\beta_9 Ext+\beta_{10} Selln+\beta_{11} Trnp+\beta_{12} Dstnc+\beta_{13} Pers+\beta_{14} LdTenure+\beta_{15} Mktinf+\varepsilon \dots \dots\dots\dots\dots \dots\dots \text{(9)}$$

Table 1: Description of Variables and the Expected Signs used in Heckman Two Stage Model.

Variable Code	Variable	Measurement of the variables	Expected sign
Dependent variable			
TypHshold	Type of household (participant/non-participant)	Dependent variable for selection equation. (Dummy), participant=1 otherwise=0	+/-
Extntofpart	Extent of participation(amount of loans)	Dependent variable for outcome equation	+/-
Independent variables			
Age	Age in years	Age of the borrower (continuous)	+/-
Gender	Gender	Gender of the borrower(Dummy 1 =Male, 0= Female)	+/-
Educ	Education	Education level of the borrower (years in education)	+
H/Hsize	Household size	Size of the household (continuous)	+
FmSize	Farm size	Size of the farm available in Ha. (Continuous)	+
Offincm	Off farm income		+/-
Incm	Income	Amount of off farm income in KES (continuous) Amount of income in KES	-
Occup	Occupation	Formal/informal	+/-
Ext	Extension	Extension services	+/-
Sellng	Selling	Selling price in KES	+/-
Trn	Transport	Transport cost in KES	+/-
Distnc	Distance to the collection point	Distance to the collection point or market (Km)	-
Percep	Perception	Household perception towards MFIs scheme. (1= Yes 2=No)	+/-
LdTenure	Land Tenure	Form of land ownership, (Dummy 1= owned, 0 = Leased)	+/-
Mktinfo	Market information	Access to market information(Dummy 1=access 0 = otherwise)	+

3.6.3 Objective 3 Factors Influencing Smallholder Dairy Farming Commercialization.

The level of dairy commercialization was used as a dependent variable in the Tobit model showing the mean level of commercialization. The level of commercialization was determined by the mean value of milk sold divided by the mean value of milk produced by the smallholder farmers. The commercialization level helps to show the extent of market access. Tobit model is based on the maximum likelihood technique (Gujarati, 2004).

The structure of the Tobit model is given as;

$$Y_i^* = \beta' X_i + \varepsilon_i \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots \quad (10)$$

Where; Y_i^* is a vector of the latent variable that is not observed for values less than zero and greater than one.

X_i, represent vectors of the independent variables,

β is vector of the unknown parameters,

ε_i is vector of the error terms that are distributed normally with mean 0 and variance σ^2

i=1, 2, 3. . .n represents the number of observations.

If Y_i is the observed variable representing the proportion of milk commercialized, its value will be censored from below at L= 0 and from above at U= 1. Thus, giving rise to equation 11

$$\left\{ \begin{array}{l} Y_i = 0 \; if Y_i^* \leq L \\ Yi = Y_i^* if L \leq Y_i^* \leq U \\ Yi = 1 \; if Y_i^* = U \end{array} \right\} \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots \quad (11)$$

The expected value of the latent variable Y_i^* is given by equation (10) is;

$$E(Y_i^*/X) = \beta' X \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots \quad (12)$$

The change in probability of accessing the market and proportion of milk sold as an explanatory variable changes by a unit is given by equation (12)

$$\frac{\partial E(Y_i^*/X)}{\partial X_i} = \beta_i \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots \quad (13)$$

As the values of the proportion of commercialized milk Y is truncated from below at 0 and from above at 1, its conditional expected value is given by;

$$E\left(^{Y}/_{X}, L < Y^* < U\right) = \beta X + \sigma \frac{\emptyset(z_L) - \emptyset(z_U)}{\phi(z_U) - \phi(z_L)} \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\text{(14)}$$

Where, $Z_L = (L - \beta X)/\sigma$ and $Z_U = (U - \beta X)/\sigma$,

$\emptyset(\cdot)$ and $\phi(\cdot)$ are the density function and cumulative distribution of a standard normal variable respectively. In the absence of the limits, $Z = (\beta X)/\sigma$.

The Tobit coefficients however, do not directly give the marginal effects of the independent variables on the dependent variable. But their signs show the direction of change in probability and intensity of commercialization as the respective explanatory variable change (Amemiya, 1984; Maddala, 1985; Goodwin, 1992).

Tobit Model Specification

The Tobit model was used to determine the influence of microfinance participation and other factors on the performance of the dairy sector in terms of milk commercialization. The Tobit model is specified as,

$$Y_i^* = \alpha + \beta_0 X_1 + \beta_1 X_2 + \beta_2 X_3 + \beta_3 X_4 + \dots\dots\dots\dots + \beta_n X_n + \varepsilon \dots\dots\dots\dots\dots\dots\dots\dots \text{(15)}$$

$$Commercialization(Y_i^*) = \alpha + \beta_1 age + \beta_2 gender + \beta_3 Educ + \beta_4 Exprnc + \beta_5 H/Hsize + \beta_6 FmSize + \beta_7 Offin$$
$$cm + \beta_8 Savings + \beta_9 Creditacc + \beta_{10} MbrGrp + \beta_{11} IntrRate + \beta_{12} Selln + \beta_{13} Trnp + \beta_{14} Dstnc$$
$$+\varepsilon\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots \text{(16)}$$

Table 2: Description of Variables and the Expected Signs used in the Tobit Model.

Variable Code	Variable	Measurement of the variable	Sign
Age	Age of the household head	Years (continuous)	+/-
Gender	Gender of the household head	1 =Male, 0= Female (Dummy)	+/-
Educ	Education level	Number of years in formal education (continuous)	+
Exprnc	Experience	Experience in dairy farming in yrs (continuous)	+/-
Ext	Extention	Frequency of visit	+
H/Hsize	Household size	Number ofH/H members (continuous)	-
Transprtcost	Transport cost	Cost of transport in KES (continuous)	-
Yield	Milk yield	Milk output in litres (continuous)	+
Fmsize	Farm size	Land size in Ha.	+
Sellngpric	Selling price	Selling price of the milk KES (continuous)	+
Offincm	Off farm income	Amount of off farm income in KES (continuous)	+/-
Creditaccs	Credit access	Access to MFI credit (dummy)	+
Dstnc	Distance	Distance to collection point in kms	-
MbrGrp	Membership To Group	Group participation	+
Intrstrate	Interest rates	MFI interest rates	-
Savings	Savings	Amount of savings in MFI	+/-

CHAPTER FOUR

RESULTS AND DISCUSSION

4.1 Introduction

This chapter presents findings of the study and includes detailed discussions of the results. The chapter has been organized into three sections to address the three specific objectives of the study including characterization of the socio economic attributes of the farmers, Factors influencing credit access and the extent of access and the influence of micro finance participation and socio economic attributes on commercialization. A sample size of 150 small scale dairy farmers was used. Appropriate methods of analysis were used and the results presented in tables and figures.

4.2 Characterization of Smallholder dairy farmers

This section is mainly concerned with the descriptive analysis of the results of the survey data and interpretation of the analytical findings. Inferential statistics were employed to analyze households and group characteristics.

4.2.1 Socio-economic characterization of participants and non participants

Gender of the household heads is shown in Table 3. The results indicate that a large proportion of farmers who participated in microfinance were males (54%) while females constituted 46%. However, females were 28%, while males were 72% among non participants.

Table 3: Frequency distribution table of Gender According to Participation.

		Participants		Non participants			
Variables		**Frequency**	**%**	**Frequency**	**%**	**Chi^2**	**Pr**
Gender	Female	46	46.00	14	28.00	4.500	0.032
	Male	54	54.00	36	72.00		
	Total	100	100	50	100		

Significant at 5%

Source: Survey data(2015)

The chi square test indicates that gender was statistically significant at 5% implying a significant difference between the participants and non participants. These findings are supported

by Awunyo *et al* (2012) that male headed households in Bomet district participate more than female headed in credit programs.

The results on the age of the household head are as shown in Figure 3. The survey on this major demographic factor, measured in years, provides a clue on working ages of households. The aggregate mean age was 42 years, while that of participants was about 41 years. The microfinance non participants had slightly higher age than the participants at 43 years. The difference in age was however not significant.
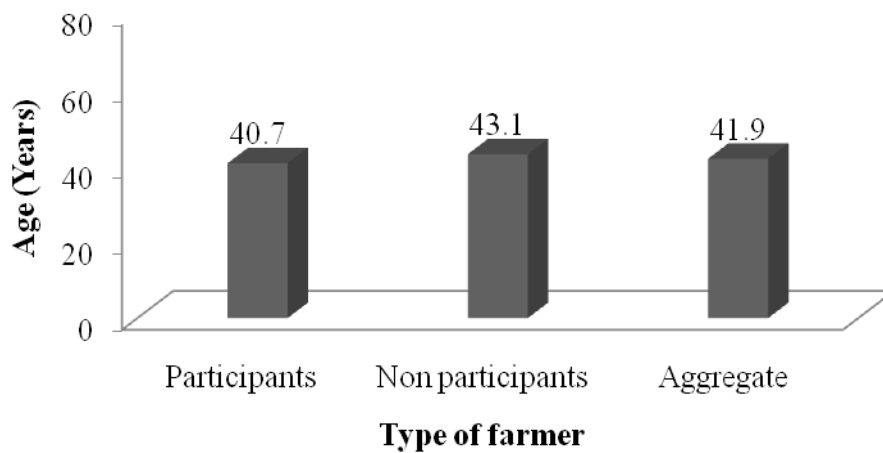
Figure 3: Age of the household head (in years)

The dairy farming households in the county can therefore be regarded as young belonging to economically active group (Martey *et al.*, 2012).

The results on the education level given in Table 4 reveal that an almost equal number of participants and non participants had tertiary education at 23% and 22% respectively. A slightly higher percentage of participants (38%) had high school education compared to 26% non participants. However, the non participants had more than half (52%) of the farmers having only primary level of education, compared to 38% of the participants. The chi square test indicate that education level was significant at 10%.

The results on the marital status in Table 4 show that majority of the household heads among the participants (93%) and non participants (90%) were married. Lower percentages of participants were either single or divorced at 2% and 5% respectively, while the non participants

were 4% and 6% respectively, this can be attributed to land tenure that single mothers don't own land and single men live in towns mostly. The difference was however, not statistically significant.

Table 4: Frequency Distribution of Education Level, Marital Status and Occupation

Variables		Participants		Non participants		Chi^2	pr
		Frequency	%	Frequency	%		
Education level	Tertiary education	23	23.00	11	22.00	3.811	0.054
	High school	38	38.00	13	26.00		
	Primary school	38	38.00	26	52.00		
	No formal education	1	1.00	0	0.00		
Marital status	Single/Never married	2	2.00	2	4.00	0.595	0.112
	Married	93	93.00	45	90.00		
	Widowed	5	5.00	3	6.00		
	Divorced	0	0.00	0	0.00		
Occupation	Farming	71	71.00	37	74.00	5.268	0.220
	Business	8	8.00	2	4.00		
	Salaried Employee	17	17.00	5	10.00		
	Casual labour	3	3.00	5	10.00		
	Other	1	1.00	1	2.00		

Source: Survey data(2015)

The type of occupation in Table 4 show a large proportion (71%) of participants and 74% of non participants derived their livelihoods from farming. The results also indicated that 8% of farmers who participated in microfinance engaged in business activities compared to 4% of non participants. A higher percentage of participants (17%) were employed on permanent jobs compared to 10% of non participant farmers. However, the chi square test reveals that these differences were not significant.

The aggregate mean household size was 5 persons as indicated in Table 5. However, the mean household size of participants and non participants was 6 and 5 persons respectively. The *t*-test results at 5% indicate that there was significant difference between participants and non participants in terms of the mean household size. The household size have an influence on the level of participation.

Table 5: Household characteristics by farmer type (continuous variables)

	Participants		Non participants		Aggregate	t-test
Variable	**Mean**	**Std.dev**	**Mean**	**Std.dev**	**Mean**	
Household size	5.77	2.12	4.90	2.24	5.34	-2.326**
Years of education	11.10	3.75	9.84	3.70	10.47	-1.947*
Experience(years)	12.28	9.60	11.54	12.50	11.91	-0.401
Land size (acres)	3.05	3.65	2.89	3.38	2.97	-0.269
Distance to market(Km)	1.28	2.79	1.57	3.00	1.42	0.564
No. of cows	2.63	1.28	2.84	1.72	2.74	0.843
Selling Price (KES)	31.88	3.36	30.70	3.35	31.29	-2.027**
Quantity produced(ltrs/wk)	50.40	31.57	38.92	34.09	44.66	-2.044**
Quantity sold(ltrs/wk)	33.12	24.44	24.93	27.12	29.03	-1.863*
Quantity consumed (ltrs/wk)	15.75	9.81	12.84	9.87	14.30	-1.709*
Farm Income	69205.00	57735.69	65538.00	57387.22	67371.00	-0.367
Off-farm Income	78646.67	113741.4	90078.57	89859.12	84362.62	0.633

*, **, ***: significant at 10%, 5% and 1% level respectively.

Source: Survey data (2015)

Years of education as indicated in the results (Table 5) shows that the mean number of years spent by the household head in school was 11.1 for the participants, while the non

participants spent less (9.8 years). The aggregate number was 10.47 years. This indicates that most people in the study area had primary education. The *t*-test results indicate that the difference between the years spent in school by the participants and non participants was significant at 10% level. This implies that the number of years spent schooling, have an impact on the level of microfinance participation.

Years of experience shows that the aggregate mean in dairy farming was 11.91 years. Farmers participating in microfinance had more years of experience (12.28 years) in dairy farming, while the non participant farmers had experience of 11.54 years on average. The *t*-test results however revealed that the difference in years of experience was not significant between the two categories of farmers. According to Abay (2007), farmers' experience increases the marketable surplus of the produce.

The findings on table 5 showed that aggregate land size measured in acres was 2.97. The non participants had a land size of 2.89 acres, while the participants had a slightly more land size of 3.05 acres, The *t*-test results however indicate that the difference in land holding was not significant. The results in Table 5 also indicated that the distance to the market or milk collection point, though not significant showed that farmers engaged in microfinance activities travelled a shorter distance (1.28 km) on average to sell their milk, while the non participants had an average of 1.57 km to cover.

The number of dairy cows owned by a household is crucial in determining the amount of milk produced and thus the commercialization level. The findings revealed that both categories of farmers had almost equal number (3 cows) on average. The chi square test shows that there was no significant difference between the participants and non participants in terms of the number of dairy cows owned.

The amount of milk produced by participants of microfinance was an average of 50.4 litres per week, about 11 litres higher than the amount produced by non participants (38.92 litres). The *t*-test confirms that there was a significant difference between the two categories of farmers in terms of the quantity of milk produced at 5% level of significance. The aggregate amount of milk produce was 44.66 litres. The results also show that the participants had higher quantities of milk sold and consumed at 33.12 litres and 15.75 litres respectively than the non participants who sold 24.93 litres and consumed 12.84 litres. The difference in these quantities

was significant at 10% level. The implication here is that the participants not only had higher commercialization level (ratio of milk sold to milk produced), but also consumed more milk per week than the non participants.

The results of the selling price show that the aggregate milk selling price was KES 31.29 per litre. The microfinance members sold their produce at a higher price of KES 31.88 per litre, while the non participant farmers sold at KES 30.70 per litre. The *t*-test result at 5% level confirmed that there was strong significant difference between the two categories of farmers in terms of the milk selling price.

Farm income as expected was high among the participants (KES 69,205) given the higher outputs and prices. The non participants on the other hand, had a lower mean annual farm income of KES 65,538. However, the non participants had more off-farm income per year than the participants at KES 90,078.57 and KES78, 646.67 respectively. Off- farm income comprised of annual average income from business, employment and other incomes apart from the farm income.
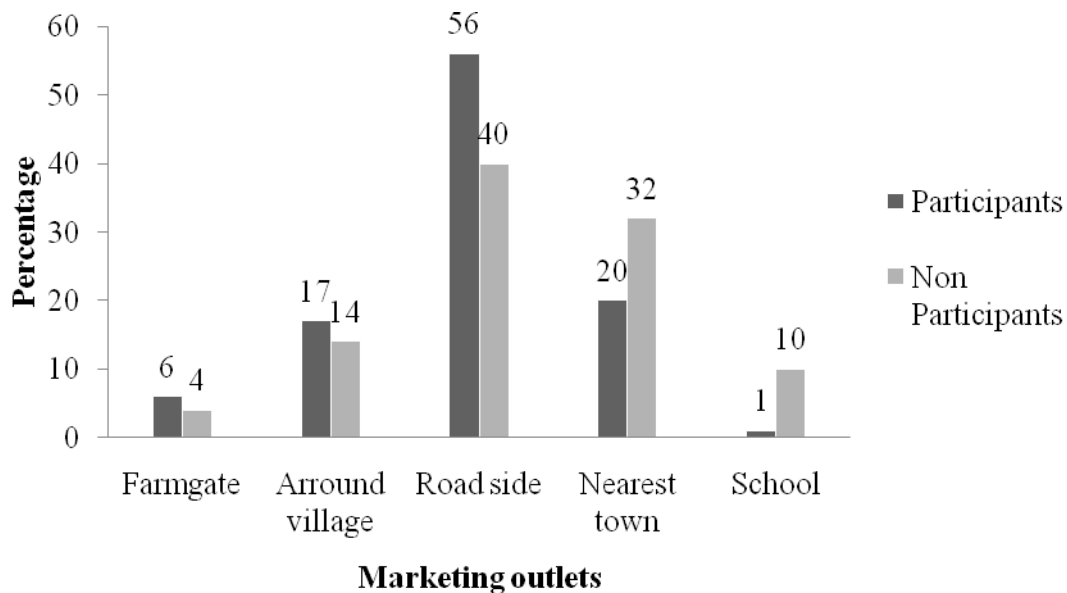

Figure 4: Distribution of microfinance participants and non participants in relation to marketing outlets.

Source: Survey data (2015)

The results in Figure 4 show the distribution of participants and non participants of microfinance services in relation to the milk marketing outlets. The findings depicts that 6%, 17%, 56%, 20% and 1% of the microfinance participants used farm gate, around the village, road side, nearest towns and schools respectively as a choice of the market outlets. On the other hand, 4%, 14%, 40%, 32% and 10% of the microfinance non participants used farm gate, around the village, road side, nearest towns and schools as a choice of the market outlets, respectively. Using the major outlet, Road side, the difference among the participants and non participants was significant at 10% level. This shows that majority of both microfinance participants and non participants used road side as a milk marketing outlet. Road side serve a major milk collection point for the dairy farmers as they take their milk making it accessible to buyers.

4.2.2: Institutional characteristics in relation to access to microfinance services.

Table 6: Institutional characteristics in relation to access to microfinance services.

Variables		Participants		Non participants			
		Freq	%	Freq	%	Chi^2	pr
Land tenure	Communal	7	7.0	0	0.0	4.787	0.063
	Privately owned	91	91.0	100	100.0		
	Rented/Leased	2	2.0	0	0.00		
Market information	No	2	2.0	2	4.0	0.514	0.203
	Yes	98	98.0	48	96.0		
Farmer group	No	29	29.0	27	54.0	8.905	0.023
	Yes	71	71.0	23	46.0		
Extension access	No	15	15.0	16	32.0	5.876	0.030
	Yes	85	85.0	34	68.0		
Saving account	No	12	12.0	32	64.0	4.482	0.006
	Yes	88	88.0	18	36.0		

significant at 10%, 5% and 1% level respectively.

Source: Survey data (2015).

The results of the land tenure system as presented in Table 6 indicates that majority of the farmers privately owned their land, with 91% being participants and 100% non participants.

Only 7% of the participants were in communal lands while 2% leased or rented their lands. The chi square results indicate that the land tenure system among the participant and non participants was statistically significant at 10%.

The results in Table 6 indicate that both categories of farmers had higher access to market information at 98% for the participants and 96% for the non participants. This information affects the marketing choices (where, when, to whom and what price to sell) and quantity sold (Doan *et al.*, 2010). These results imply that dairy farmers have more information on dairy farming ranging from the prices, quality and market outlets. Farmers access information through farmer groups, radio, cell phones, middlemen and extension officers. The chi square result reveals that the difference in market information access between the two categories was not statistically significant.

Access to extension services is a source of skills and knowledge to the farmers. From the results in Table 6, it is evident that microfinance participants had more chances with 85% of them accessing extension services while it was 68 % for the non participant farmers, this can be attributed to cost associated to procuring the services. The chi square result at 5% level confirms that there was a significant difference in the level of extension services access between microfinance participants and non participants.

The study also sought to determine whether the dairy farmers had saving accounts with banks, MFIs or other financial institutions. The findings revealed that 88% of microfinance participants had savings accounts either within the same MFI or other financial institutions with only 12% not having a savings account. The non participants on the other hand, had only 36% with savings accounts, while the majority (64%) did not have any savings account, the difference may be because of mandatory requirement that participants should have a savings account through which finance can be remitted. The chi square result confirms the statistical significance at 1% level in the difference between the two categories of farmers in terms of possession of savings account.
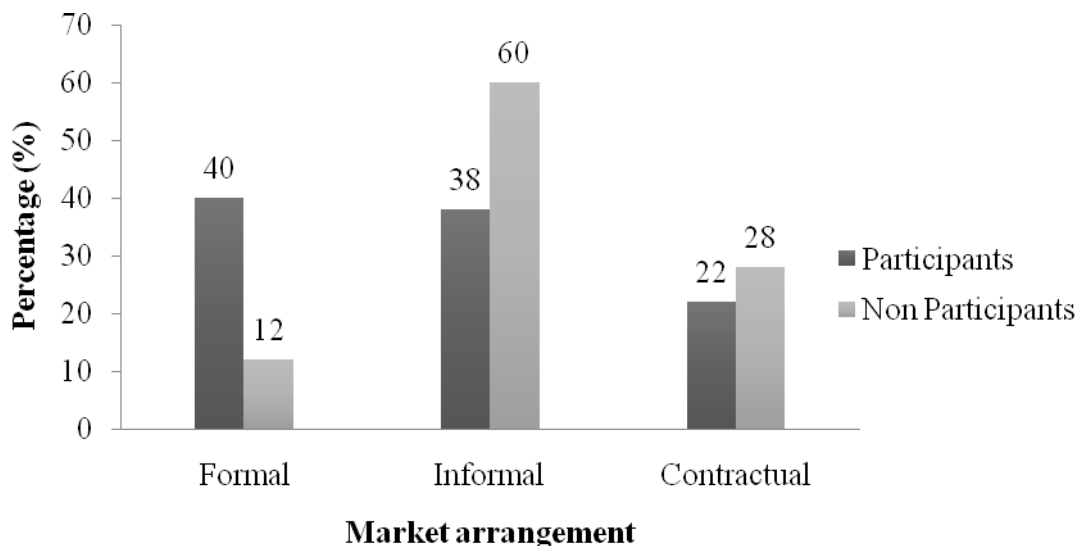
Figure 5: Market arrangement in relation to access to microfinance

Source: Survey data, (2015)

The results in Figure 5 depict the characterization of the dairy farmers in terms of marketing arrangements. Majority (40%) of microfinance participants used the formal market arrangements. On the other hand, 60% of the non participants used the informal channels where they sold through middlemen or around the village without any proper arrangement or agreement. Contractual arrangement is where the farmer supplies milk to a buyer with payments made after a certain period of time or before. A slightly higher proportion (28%) of non participants used contractual arrangements while 22% of those who participated in microfinance used it, this can be because non participants majorly relies on milk sales as their only source of income to undertake various projects unlike the participants who may borrow.

4.3 Factors Influencing Credit Access and the Extent of Access
4.3.1: Factors Influencing Credit Access

To determine the factors that influence credit access by dairy farmers in Bomet County, a Probit model was estimated in the first step of the Heckman selection equation. The results presented in Table 7 indicated five variables (gender, age, household size, occupation and distance to MFI) that significantly influenced the farmers' access to credit. The correlation coefficient between the unobservable that determine credit access and the unobservable that determine the extent of credit access is given by rho= 0.951.

Table 7: The Heckman Two-step Selection Regression Results

Variable	δy/δx	Std. Err	Z	P>|z|
Gender	- 0.184	0.415	-0.44	0.004
Age	0.013	0.006	2.17	0.063
HHSize	0.044	0.020	2.20	0.026
EducYrs	0.008	0.012	0.67	0.947
Occupation	0.116	0.065	1.78	0.075
OffFm Incom	- 0.052	0.046	-1.13	0.256
Farm Incom	0.062	0.060	1.03	0.298
Land Tenure	- 0.077	0.137	-0.56	0.573
Extension	0.173	0.119	1.45	0.145
Amt of loan	-0.183	0.194	-0.94	0.243
Distnc MFI	-0.014	0.007	-2.00	0.054
Mills lambda	0.0685	0.024	2.85	0.029
Rho	0.951			
Sigma	0.0720			

Note: Significant at 10% level, 5% level and 1% level.

Source: Survey data 2015.

Rho is positive, indicating that unobservable are positively correlated with one another. The Mills Lambda term was significant and positive, which suggest that the error term in the selection and primary equation is positively correlated. The marginal effects were used to interpret the results.

Gender of the household head had a negative and significant influence on credit access with marginal effect (ME) of negative 0.184. This indicates that male headed households are 18.4% less likely to have access to micro credit as compared to the female headed households. This could be attributed to the fact that most micro credit institutions embrace group lending and group membership has been more associated with female. This contradicts an empirical study in Zimbabwe which observed a positive relation stating that male headed families are more risk taking than female families (Chitungo and Munongo, 2013).

Age significantly influenced access to credit positively (ME = 0.013). This implied that a one year increase in age increased the probability of access to credit by 1.3% among the dairy farmers. As age increases, responsibilities also increases and need for more credit arises. Contrary to this, Chitungo and Munongo (2013) observed a negative influence between ages squared and credit access alluding that as people get older the returns to experience vanish, they become less productive and their demands for loans fall.

The average amount of loan was 22,500 with a marginal effect of -0.183, this means that for every unit increase in loan amount, there was a 18.3% decrease in the ability to further access subsequent loan, However the loan amount was significant at 5%.This was supported by Sebatta *et al*. (2014) who found out that loan amount affect micro credit access to a great extent.

Household size positively (ME = 0.044) influenced household access to credit. Therefore, a one person increase in the household size increased access to credit by 4.4%. Households with more members need more credit due to many responsibilities to take care. The results concurs with Chitungo and Munongo (2013) who found a positive relationship and stated that the size of the family incentives the household to increase its productivity. In contrast to this observation, Sebatta *et al*. (2014) found out that household size had a negative influence credit access decision in Zimbabwe. The study noted that farmers instead tended to become subsistence and use the little resources at their disposal rather than seek for credit that will add to their burden already at hand.

Access to credit was significantly influenced by the occupation of the household head positively (ME = 0.116). Farmers who had extra form of employment were 11.6% more likely to have access to credit than those who engaged only in farming. This could be attributed to extra forms of employment guarantees extra income and hence ability to repay the loan. Distance to micro finance institution negatively (ME = -0.014) and significantly influenced the access to credit by the farmers. This implies that a one kilometer increase in distance to micro finance institution decreased the probability of access to credit by 1.4% as distance reduces accessibility and outreach.

4.3.2 Factors influencing the extent of credit access

To determine the factors influencing the extent of credit access among the dairy farmers, OLS regression was estimated in the second step of Heckman outcome equation. The results presented in Table 8 indicated four variables (gender, occupation, off farm income and output level) that significantly influenced the extent of credit access.

Gender of the household head had a significant and negative influence on the extent of credit accessed. As compared to female headed households, a male headed household decreases the proportion of credit accessed by 0.099. This implies that female household heads are more likely to receive a larger proportion of the applied credit from the MFI's. The observation can be as a result of females embracing the model of group borrowing which is more common with the MFI's and hence to build trust with. This result concurs with the findings of Doan *et al.,* (2010) who stated that even though gender does not really matter in credit participation it plays a critical role in explaining the loan size.

Table 8: **The Heckman two-step outcome Regression results**

Variable	Coef.	Std. Err.	Z	P>|z|
Gender	-0.099	0.044	-2.25	0.029
Age	-0.002	0.003	-0.67	0.393
HHSize	0.014	0.010	1.40	0.185
EducYrs	-0.002	0.006	-0.33	0.815
Occupation	0.048	0.028	1.71	0.090
OffFmIncom	0.016	0.006	2.67	0.018
FarmIncom	0.035	0.031	1.13	0.268
LandTenure	0.056	0.065	0.86	0.390
Extension	-0.011	0.051	-0.22	0.824
DistancMFI	-0.042	0.033	-1.27	0.120
OutputLevel	0.005	0.002	2.50	0.058
LandSize	0.007	0.006	1.17	0.332

Note: *: significant at 10% level; **: significant at 5% level; ***: significant at 1% level.

Source: Survey data 2015.

Occupation of the household head significantly and positively influenced the extent of credit accessed among the smallholder dairy farmers. The extent of credit accessed by farmers who had other off farm employment was more likely to be higher by 0.048 than for those who engaged in farming only. Off farm employment buffers household income and make them more credit worthy as this serves as collateral for the household.

Off farm income level among the households also had a significant and positive influence on the extent of credit accessed. As the households level of off farm income increases, the extent of credit accessed also increases by 0.016 compared to farmers with no off farm income. Off farm income may help farmers pay off their debts and therefore makes them more credit worthy than those with no off farm income.

Level of milk output had a significant and positive influence on the dairy farmers' extent of credit accessed. Therefore, a unit increase in milk produced would lead to an increase in extent of credit accessed by 0.005. Level of output is a proxy of the level of on farm income. As farm output level increases, profit margins may also increase and consequently profitable enterprises to pay off debts. Rios *et al*. (2009) established that households with higher productivity have greater participation in agricultural markets and hence the need of credit for facilitation.

4.4 Factors Influencing Smallholder Dairy Farming Commercialization.

Tobit regression analysis results in Table 9 were utilized to determine the influence of microfinance participation on smallholder dairy farming commercialization. The marginal effects outcome reveals that the extent of commercialization of milk by smallholder farmers is significantly determined by microfinance access, credit access, interest rates, savings account, gender, age of household head, education level, quantity of milk produced, off-farm income and membership to farmer groups. The P-values of these variables were significantly different at 0.1, 0.05 and 0.01 levels of significance.

Access to microfinance as indicated in Table 9 positively influenced dairy commercialization of the farmers at 10% significance level. Access to microfinance services increase the probability of dairy commercialization by 3.3%. This implies that as the access to services offered by MFIs (credit, savings and insurance) increase; dairy farmers would be highly motivated since they can access inputs and capital easily from the MFIs.

Credit access defined by Diagne and Zeller (2001) as the ability of a household to borrow from a source or not had a positive and significant influence on dairy commercialization. The results show that access to credit increased the probability of commercialization by 6%. This result is in line with that of (Javed *et al* .,2006), who found that access to credit, has a significant positive influence on technology adoption.

Table 9: Tobit marginal effects (δy/δx) regression outcome on influence of microfinance on dairy farming commercialization

Variables	δy/δx	Std. Error	Z	P>/z/
Gender	-0.001	0.004	-0.25	0.010
Agehh	0.038	0.016	2.38	0.019
Land size (acres)	-0.535	0.597	-0.90	0.370
Household size	-0.028	0.634	-0.04	0.095
Education level(Years)	0.071	0.039	1.82	0.077
Experience (Years)	0.057	0.034	1.68	0.087
Quantity of milk produced (Litres)	0.143	0.074	1.93	0.054
Distance to market (Km)	-0.197	0.468	-0.42	0.674
Selling price	0.528	0.397	1.33	0.183
Off Farm income	0.005	0.003	1.67	0.080
MFI Access	0.033	0.048	0.69	0.038
Access to credit	0.061	0.035	1.74	0.089
Loan amount	0.006	0.005	1.20	0.239
Interest rate	-0.039	0.029	-1.34	0.081
Saving account	0.054	0.018	3.00	0.002
Farmer group	0.096	0.048	2.00	0.047
Extension Access	0.477	0.206	2.32	0.882
Number of observations	150	Wald chi^2(18)	37.54	
Log likelihood	-257.217	Prob>chi^2	0.0000	
		Pseudo R^2	0. 0690	

(*) δy/δx is for discrete change of dummy variable from 0 to 1

*, **, ***: significant at 10%, 5% and 1% level respectively.

Source: Survey data (2015).

Agricultural credit plays an important role in agricultural commercialization and food security (Wanga and Hennessy, 2012). Through provision of credit, microfinance institutions help to improve the liquidity of the farm and therefore enhancing improved adoption of dairy technology and household incomes. Diagne and Zeller (2001) however found a negative influence of microcredit on household incomes.

Interest rate had a negative significant influence on commercialization. The results indicate that a 1% increase in interest rates leads to a 4% decline in commercialization. The implication is that an increase in the cost of credit has a negative effect on the agricultural commercialization. The lack of capital coupled with high interest rates by some microfinance therefore, places dairy industry profitability and productivity at stake. Hussain and Thapa (2012) found that expensive credit exploits the smallholder farmers' profitability, resulting into reliance on informal credit than the formal credit. According to the Meyer (2007), the affordability of high interest rates, even if the clients are willing, is questionable since it generates lower profits to rural smallholder farmers than the large-scale farmers.

Possession of savings account also had a positive and significant effect on the level of milk commercialization. At 1% level of significance, having a savings account led to increased milk commercialization by 5.4%, implying that opening a savings account increases the probability of higher milk sale. This finding is supported by Osoro and Muturi (2013) who found that SMEs increased their profit margin after opening savings account with MFIs. According to Donkor and Duah (2013), savings has a positive influence on the demand for credit.

Furthermore, to examine the influence of rural microfinance on dairy commercialization, this study used a set of socio economic variables like gender, age of the household head, years of education, household size, quantity of milk produced, years of experience, off-farm income and membership to farmer groups that are theoretically linked to dairy commercialization.

Membership to farmer groups as expected was positive and statistically at 5% influenced commercialization of dairy farming. The results indicates that membership to a producer group increases the probability of participating and commercializing dairy farming by 9.6%.This implies that belonging to a producer group increases the likelihood of a household to improve milk commercialization. The findings are consistent with Mukundi *et al.* (2013), Jagwe *et al.* (2010) and Mukundi *et al.* (2013) who argue that producer groups can be good platforms for

social capital formation and through which smallholders can obtain market information at a lower cost hence lowering the transaction costs of market participation. Fiscer and Qaim (2011) also support the findings.

Households with higher proportion of off farm income are more probable to increase the sale of milk. The level of milk commercialization increases by 0.5% for each additional unit of farm income. The result implies that households that have higher farm income engage much in dairy farming. The result is also consistent with the findings by Agwu and Ibeabuchi (2011) who stated that high income leads to increased amount of produce traded and expansion of enterprise because of reduced dependence on agricultural produce.

Gender as indicated in Table 9 shows a significant influence on dairy farming commercialization. Gender of the household head significantly and positively influences market participation. Being male-headed household decreases the probability of participating in dairy market by 1%, all other factors held constant. This suggests that the female-headed households are more market oriented than male, hence they participate more in dairy farming and marketing. Female headed household have relatively higher chance of joining farmer groups and MFIs (Mukundi *et al.,* 2013) and therefore access funds to purchase dairy animals. This is however, contrary to Cunningham *et al*. (2008) who argued that men are likely to sell more due to their acumen in bargaining, negotiating and enforcing contracts.

Age of the household head significantly and positively influenced dairy commercialization. An increase in the age of household head by one year increased the probability of increasing the milk sales by 3.8%, all other factors held constant. The aggregate mean age of the sample was 42 years (Figure 3), implying that the younger people are more enthusiastic to participate in dairy farming. Barret *et al*. (2007) stated that younger people participated more in the market because they are more receptive to new ideas and are less risk averse than the older people. The finding concurs with that of Chalwe (2011), who found younger people to participate more than older people in marketing of beans in Zambia.

Years of education as expected positively influenced dairy farming commercialization. A unit increase in the year of education of the household heads leads to increased commercialization of milk produced by 7.1%.This can be explained by the fact that as an individual access more education he/she is empowered with skills and knowledge on production

and marketing and thus enhancing more participation in dairy farming and marketing. Simonyan *et al.* (2010) also found education to be significant in augmenting farmers' ability in making important decisions. This is also in line with Astewel (2010) who illustrated that if paddy producer gets educated, the amount of paddy supplied to the market increases. This suggests that education improves level of sales and thus affecting the marketable surplus.

As hypothesized, household size was negatively related with the dependent variable (significant at 1%). As the household size increases by one person, the commercialization of dairy products decreases by 2.8%. Mathenge *et al.* (2010) and Alene *at al.* (2008), argue that household size accounts for the supply of family labour and household consumption level. This implies that as household grows in size, the amount of milk for sale decreases due to increased home consumption.

Years of experience are a proxy of human capital. Production experience positively and significantly influences the extent of dairy commercialization at 10% level. An increase in a farmer's marketing experience by one year increase the proportion of milk sale by 5.7%. This implies that farmers with more years in dairy production and milk marketing have higher ability to sell more quantities of milk in the market. The finding concur with that of Abay (2007) who found an increase in farmer's experience resulted in the increases of tomato being supplied to the market in South Gonder. The finding is also in line with Martey *et al.* (2012) that experienced household heads have greater contacts and thus allowing trade opportunities to be discovered at lower costs.

Quantity of milk produced significantly and positively influences commercialization. An increase milk yield by one litre increases the probability of participating in the dairy market and thus commercializing milk by 14.3%, all other factors held constant. This implies that as the milk production increases, commercialization also increases since the farmers have enough milk to meet consumption and surplus for sale. This is in line with the findings of Abay (2007) who found that an increase in amount of tomato and papaya yield augmenting the marketable supply of these commodities significantly.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATION

5.1 Introduction

This chapter summarizes the thesis as per the objectives and the methods that was used to achieve the objectives, it also gives conclusions and provide policy options and recommends areas for further research.

5.2 Summary

This study was conducted in Sotik sub-county in Bomet county ,Kenya and the main topic was; Influence of socio economic factors and micro finance participation on small scale dairy farming commercialization, in it was captured the socio economic attributes of the farmers, factors that influence credit access and the extent of credit access of the participants. Descriptive statistics was used to analyze socio economic attributes of the farmers, Heckman two-step procedure was used to analyze the factors influencing credit access and extent of credit access, Tobit model was used to analyze factors influencing commercialization.

5.3 Conclusions

The first objective of this study was characterization of the socio economic attributes of small scale dairy farmers participants and non participants, Different socio-demographic characteristics of farmers (microfinance participants and non-microfinance participants) were determined. Gender was significantly different between the two categories of farmers and male headed household were the majority in both. Aggregate age of 41.9 also depicted that majority of the dairy farmers were young. Household size, years of education, selling price, membership to farmer groups, possession of active savings account and access to extension were found to be significantly different. Quantity of milk produced, sold and consumed was significantly different between the two categories with microfinance participants producing, selling and consuming more milk than the non participants. Both categories also used roadsides and nearest towns as their most preferred market outlets. Microfinance participants had more farm incomes than the non participants who on the other hand had more off-farm incomes.

The second objective was to examine factors influencing credit access and the extent of access among small holder dairy farmers. This study found that access to microcredit was

positively influenced by age, household size and occupation while negatively influenced by gender and distance to the MFI. Similarly, the extent of credit access was positively influenced by occupation, off farm income and output level while negatively influenced by gender.

The third objective of this study was to determine the influence of socio economic factors and microfinance participation on dairy commercialization and was found that eight socio economic factors were significant in influencing the extent of commercialization. Membership to group, Off farm income, Gender, Age, Years of education, Household size, Years of experience, Quantity of milk produced, and four microfinance participation factors influenced dairy farming commercialization, access to MFI had influence on the proportion of milk sales, Access to credit, Interest rates and Savings account also had an influence on commercialization. Gender had a negative influence on milk sales. Female-headed household have a higher probability of participating in dairy market since they tend to be more of market oriented than male household heads. Age and education level was positive and significant. This can be explained by the fact that as an individual gets more educated, marketing skills and knowledge also increases. Household size had a negative influence which can be explained by the fact that as the size of household increases more milk is reserved for consumption rather than sale. Membership to groups was found to be having positive influence on milk commercialization because groups enable farmers to pull their resources together and take advantage of economies of scale, apart from market information sharing in groups. Access to MFIs was also associated with higher commercialization since farmers are able to access micro-credits and micro-savings.

Interest rates as hypothesized had a negative influence on dairy commercialization, an increase in interest deter people from borrowing and hence reduced inputs and low productivity respectively. Maintaining a saving account had a positive influence on the level of commercialization, savings account is associated with credit, this may increase variety of baskets of food hence the amount milk sold increases translating to improved commercialization.

5.4 Recommendations

From the findings, distance to the MFI's influences access to credit that is, as distance to MFIs increases level of participation reduces and therefore need to make MFI's easily accessible to the farmers for greater depth of outreach. Farmers should also be encouraged to engage in off farm employment that buffers household income and make them more credit worthy for greater

extent of credit access. Further, membership to farmer groups had a positive effect on dairy commercialization. Therefore, dairy farmers should be encouraged to join farmer groups which improve their collective action and thus increasing their bargaining power in the milk market. The government further should put in place measures to curb imposition of interest rates by MFIs since it negatively influences the level of commercialization.

5.5 Area for Further Research

The main objective of the study was to determine the influence of micro finance participation and socio economic factors on small scale dairy farming commercialization, it also determined the factors influencing credit access and the extent of access, However, This study did not examine the influence of other institutional factors, in regard to this study, it is recommended that a further research be conducted to determine the influence of other institutional factors like marketing, Information, Extension and other factors on small scale dairy commercialization.

A publication on the influence of micro finance participation and socio economic factors on dairy commercialization published from this thesis can be referred when undertaking further research.

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APPENDIX 1

QUESTIONNAIRE

This study is conducted to establish how access to microfinance services influences dairy farming participation amongst smallholder farmers in Bomet County. Your participation in the study is voluntary and the information you give will be treated as confidential and will be combined together with responses from other 150 households for scientific analysis.

QUESTIONNAIRE IDENTIFICATION   Date ………/………/2015

Name of Enumerator: …………………………………… Questionnaire Number ☐

Name of Farmer: ….…………………………………………………………………………..

A. SOCIO-ECONOMIC CHARATERISTICS OF THE REPONDENT

A.1 Gender of the household head:

1. Male ☐   2. Female ☐

A.2 What is the age of the household head in years..............................?

A.3 What is the marital status of the head(*Please tick as appropriate?)*

1. Married ☐
2. Single (Never Married) ☐
3. Divorced ☐
4. Windowed ☐

A.4 Household size (*number of people living and eating together*) ……………………

A.5 What is the highest educational or professional qualification of the HH head?(*Please tick as appropriate*)

1. University ☐
2. College ☐
3. High school ☐
4. Primary school ☐

A.6 What is the level of education of the household head in years? …………………….. Years

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A.7 What is the main occupation of the household head?(*Please tick as appropriate*)

1. Farming ☐
2. Business person (kiosk) ☐
3. Salaried employee ☐
4. Casual laborer ☐
5. Others, Specify…………………………………………………………..

A.8 What was the estimated amount of income for the year (*in KES*)?

1. From farm production KES ………………………………….
2. From off-farm KES ………………………………………..

A.9.Indicate the number of employees who assist with farm work

Type of employee	Full-time employees	Part-time employees	Family member	TOTAL
Number				

A.10. Indicate the land tenure system in use(*Please tick as appropriate*).

1. Communal ☐
2. Privately owned ☐
3. Rent/leased ☐

A.11. what is the size of your farm in hectares?...Ha.

A.12. How long have you been engaged in dairy farming? ………………….. Years.

B.   **MILK PRODUCTION AND MARKETING**

B.1. How many heads of dairy cows do you have? …………………………….

B.2. What quantity of milk do you produce on average per week? ………..…….. litres.

B.3 What quantity of milk do you sell and consume per week?

Use	Quantity in Liters
Sale	
Household Consumption	
Give out to Relatives and Friends	

B.4 What is the selling price of your milk per litre sold? KES………………………………….

B.5 Where do you sell most of your milk produced?

Place	*Tick where appropriate*	Reason
Farm gate		
Around the village		
Road side		
Nearest town		

B.6 What marketing arrangement do you use for selling your milk?(*Please tick as appropriate*)

Market	Reason
Formal market	
Informal market	
Contractual	

B.7 Do you always find ready market for milk produced? 1. Yes ☐ No ☐

B.8 If No, what happen to unsold milk produced? (*Tick where appropriate*)

lost to spoilage	Consume (family & friends)	Sell at low price	Store and sold later

B.9 How is your produce moved to the market point? (*tick where appropriate*)

	Type of transport				
	Bicycle	Motorbike	Truck	Nissan	Other (specify)
Own transport					
Hired vehicle (individual)					
Hired vehicle (group)					
Public transport					
Buyer transport					
Provided by Cooperative					

B.10 How far is marketing point from your farm? .... Kms

B.11 How much do you pay for single trip to the market? KES ……………..……per trip

C. MICRO FINANCE ACCESS AND SERVICES

C.1 Do you have access to microfinance services?   Yes ☐   2. No ☐

C.2 Which Microfinance institutions (MFI) do you majorly acquire these services?

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

C.3. List any other MFI from which you have acquired credit in the last 12 months.

1. ……………………………………………………………………………………………

2. ……………………………………………………………………………………………

C.4. Which services do you access from the MFI?(*Please tick as appropriate*)

1. Credit   ☐

2. Insurance   ☐

3. Savings   ☐

4. Money transfer   ☐

C.5. In the last 12 months, did you acquire any credit in cash from the microfinance institution?

          1. Yes ☐   2. No ☐

C.6. How much loans in cash did you acquire from the MFI in the past 12 months?

 KESs………………………………………….

C.7. How much money did you apply for/wanted to borrow?

KESs…………………………………………….

C.8. How much did you actually /finally get from the MFI?

KESs…………………………………………….

C.9. How much interest rate are you charged for the loan?

KESs…………………………………………….

C.10. Has the loan been repaid? 1. Yes ☐   2. No ☐

C.11. How long did it take you to repay the loan in months? …………………………. months

C.12 How many times have you borrowed from the MFI's in the last 12 months? ……………..

C.13. If borrowed, what was the main purpose of borrowing the money?

  1. Subsistence needs ☐
  2. School fees ☐
  3. Purchase of land ☐
  4. Purchase of inputs ☐
  5. Purchase of dairy cows ☐
  6. Construction of a zero grazing unit ☐
  7. Others……………………………………………………………………………………….

C.14. Do you have a savings account with the microfinance institution?

    1. Yes ☐   2. No ☐

C.15. If yes how much savings do you have with the institution? KES……………………………

C.16. How often do you save?

  1. Daily ☐
  2. Weekly ☐
  3. After two week ☐
  4. Monthly ☐
  5. Annually ☐

C.17. Do you belong to a micro-credit farmer group in the community?

    1.Yes ☐   2. No ☐

C.18. Do you access microfinance services as an individual or through a farmer group?

1. Individual ☐   2. Group ☐

C.19. How did you get first information about the MFI's borrowing scheme?

1. Media advertisement ☐
2. Self-initiative ☐
3. Friends ☐
4. Loan officer ☐

C.20. What is the distance from your residence to the nearest MFI? ……………….. kms

C.21. In your own opinion is MFI services important in helping small holder farmers access financial assistance? 1.Yes ☐   2.No ☐

D. INFORMATION ACCESS

D.1. Do you have access to information about MFI's services?

1. Yes ☐   2. No ☐

D.2. What are your sources of information?

1. Microfinance Institution ☐

2. Public administration ☐

3. Extension Officers ☐

4. Friends ☐

5. Co-farmers ☐

6. Media ☐

7. Others……………………………………………………………

D.3. How often do you receive the information?

Daily	Weekly	Monthly	Annually	Others (specify)

D.4 How would you prefer the information to be delivered?

Through media	Through cell phone	Through extension officer	Through farmers group	Specify (others)

D.5. In which language is the information delivered? …………………………………

D.6. Is the language used to deliver information favorable? Yes. ☐ Or No. ☐

D.7. Do you consult other farmer, before making decision? Yes ☐ or No ☐

D.8. What do you normally consult others farmers about?

1. Interest rates

2. About MFI's available

3. Services offered by the MFI's

E. EXTENSION SERVICE

E.1. Do you have contact with extension officers?

1. Yes ☐   2. No ☐

E.2. If yes, what services are provided by extension officers?

Advice on Production	Advice on processing	Advice on marketing	Credit

E.3. Are the extension officers always available when you need help?

Never available	Sometime available	Always available

THANK YOU FOR YOUR PRECIOUS TIME AND PARTICIPATION