CHALLENGES FACING WOMEN IN THE ZERO – GRAZING LIVESTOCK PRODUCTION SYSTEM IN KENYA: A CASE OF KARURI LOCATION, KIAMBU COUNTY

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DECLARATION

This Research Project is my original work and has not been presented for examination at any other university or institution.

Signature: _____ Date: _____

KAREN MWANGI

The Research Project is hereby duly approved by university Supervisor

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ISAAC WERE

DEDICATION

I dedicate this book in memory of my late mother, Joyce Wanjiku Mwangi who was a source of inspiration while I was growing up.

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ABSTRACT

Smallholder dairy production provides self-employment for most of the rural population in the Kenyan highlands. Zero-grazing dairy livestock production has continued to grow over the years as the preferred dairy production system due to such factors as land size. Women participation in dairy production is significant given their role in agricultural production. The study sought to examine the challenges facing women participation in zero-grazing livestock production in Karuri sub-location. The study objectives were to identify factors affecting women participation in the zero – grazing dairy production system in Karuri location, and to establish the level of empowerment of women practicing zero – grazing dairy production system in Karuri location. The study conducted a literature review which included the challenges facing women in zero-grazing dairy livestock production, factors constraining their participation in zero-grazing dairy livestock production and initiatives promoting women participation in zero-grazing dairy livestock production. This also included the theoretical framework on which the study was premised which was the women empowerment framework. The study adopted a descriptive research design. The study adopted the convenience and purposive sampling techniques to identify the respondents of the study. The respondents were 51 women and women leaders and livestock production officers as key informants of the study. The primary tools for data collection were the survey technique, key informant interviews and the Focus Group Discussion. The study found that women are overburdened by productive roles of zero-grazing dairy production and this may have a negative impact on their health status and on their effective participation in reproductive and community roles Access to credit was the major constraining factor among the respondents. Women's lack of control over resources such as land and dairy cattle, cultural attitude towards dairy farming perception that dairy farming is for those who are not well-educated and that it is a lay man's activity due to its intensive nature are all challenges. In regard to measures to improve women participation in zero-grazing dairy farming, majority of the respondents indicated that they were not aware of initiatives to support women participation in zero-grazing dairy production system. The

government and the Kiambaa Dairy Cooperative Society were the most prominent supporters of women efforts in zero-grazing. These included services such as marketing services for the milk produced, value addition processes and education and training in effective dairy production. The study recommends that women should be supported to have enough dairy animals so as to participate in zero-grazing dairy as a full time employment with sufficient income generated on a regular basis. Men should be encouraged to incorporate their spouses on empowerment matters e.g. registration at the cooperatives, allow them to make decisions, etc. There should be efforts to strengthen small business organizations that are farmer (women) owned and managed, facilitate and coordinate investments in livestock and dairy sectors and there should be concerted efforts towards value addition in dairy production.

LIST OF ACRONYMS AND ABBREVIATIONS

ASAL	Arid and Semi – Arid Lands
ASDS	Agricultural Development Sector Strategy
CBOs	Community Based Organisations
CDF	Constituency Development Fund
DFIs	Decentralized Financial Institutions
GDP	Gross Domestic Product
GoK	Government of Kenya
FAO	United Nations Food and Agricultural Organization
IFAD	International Food and Agricultural Development
KARI	Kenya Agricultural Research Institute
MTP	Medium Term Plan
NGOs	Non-Governmental Organisations
UNDP	United Nations Development Programme
SBOs	Small Business Organisation
SPSS	Statistical Package for Social Sciences
SSMVs	Small-Scale Milk Vendors
WEF	Women Enterprise Fund

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Agricultural production in developing countries remains the most significant contributor to employment and economic participation of the population. The role of women in agricultural production plays an important role, which has however been overlooked and often ignored. Women produce over 50 % of the food that is grown worldwide, more in most developing countries. In Sub-Saharan Africa, women produce around 80 percent of food, both for household consumption and for sale (Abebe & Galmessa, 2011). Women contribute 60 – 80 % of labour in household and reproductive activities and in agricultural production.

Developing countries are characterized by the majority of residents being in rural areas and are predominantly involved in the agricultural economy, which comprises of activities such as livestock keeping, growing crops and fish rearing. The Vision 2030 Medium Term Plan (MTP) 2008 – 2012 acknowledges the sector as one of the major employers of rural people; an estimated 3.8 million Kenyans are directly employed in farm, livestock production, and fishing while another 4.5 million are employed in off - farm informal sector activities. Livestock keeping is one of the key sectors in the country with great potential for growth. It contributes 14 percent of agricultural GDP and 3.5 percent of total GDP (Government of Kenya, 2008). According to the Food and Agricultural Organisation (FAO) more than 200 million smallholder farmers in Asia, Africa, and Latin America rely on livestock as the main source of income (FAO, 2006).

Kenya's dairy industry, the single largest livestock production sub-sector, plays an important role in food security, employment creation, income generation, and enhances the livelihoods of dairy farmers, traders, processors and all participants engaged in the entire milk supply chain. The total dairy herd estimated at 3.4 million heads produces about 3.1 billion litres of milk annually (Kenya National Bureau of Statistics (KNBS) 2010; Ministry of Livestock and Fisheries Development (MoL&FD) 2003). Dairy production is dominated by smallholders who own about 98% of the total dairy herd

(Peeler and Omore 1997). Smallholder dairying households estimated to number over 1.5 million households, account for more than 85% of the annual total milk production and 80% of the 1.8 billion litres of milk marketed annually (MoL&FD 2003; Staal S.J., 2002).

Over the years, significant changes in the traditional dairying have occurred resulting in a major shift towards market-oriented smallholder production. This has been possible mainly due to the suitable climatic conditions, significantly improved fodder technology and dairy cattle breeds, high urban population and incomes and the high consumption of milk and dairy products. In addition to the economic importance of milk, cattle manure is used to improve soil fertility resulting in increased pasture/fodder production on smallholder farms.

The country is generally self-sufficient in milk and dairy products. However, the demand for milk and dairy products in developing countries is estimated to increase by 25% by 2025 (Delgado et al 1999), mainly due to human population growth, further urbanization, increased disposable income, greater diversity of food products to meet nutritional needs, and increased opportunities for domestic and external trade. Indeed, dairy imports in developing countries may reach 38.9 billion litres of milk equivalent by 2030 (Food and Agriculture Organization (FAO) and International Dairy Federation (IDF) 2004).
The largest single milk processor in Kenya is the New Kenya Cooperative Creameries. There are also several medium- sized milk processing plants found in Nairobi, Kiambu, Nakuru, Eldoret and elsewhere. Milk production and processing of its by-products such as yoghurt, butter, cheese and ghee, as well as powdered milk has increased significantly over the last few years. The revival of the Kenya Cooperative Creameries as New Kenya Cooperative Creameries in 2003– the largest milk processor – has fuelled growth in the sector.

Globally, livestock management is an essential sector of agricultural production. It not only serves as a source to provide food and income (Carletto, 1998) but also the main source of protein, which is a basic element of nutrition. In Kenya, livestock production is

practiced in all parts of the country either under the pastoral extensive system in the Arid and Semi-Arid areas (ASALs) or under intensive, as large-scale and smallholder systems. Livestock production in the ASAL accounts for nearly 90 % of the employment opportunities and nearly 95 % of the family incomes. It also accounts for 30 % of the farm gate value for agricultural commodities.

There are several issues that characterize the relationship between gender and livestock production and this include the ownership and control of resources. For instance, in the pastoralist livestock systems of Tanga and Morogoro, children and women mostly own smaller livestock such as poultry and rabbits. Women can only control those cows allocated to them by their husbands, as well as decide upon different milk usage and produce (Links, 2003). Access to land, water, livestock has a direct influence on whether one is capable of forging a life – enhancing livelihood strategies. For instance, land ownership is often required to establish access to other inputs such as credit, an often-essential ingredient for improving livestock productivity and food security and livelihood improvement. Smallholder dairy producers increase milk production base of the country, improve household nutrition, empower women and youth in income generation ventures and agricultural development, (Ngongoni et al. 2006).

Division of labour is also another issue with gender and livestock production where among pastoralists communities women are left at the homestead and are not allowed to cater for the livestock, which is left, to the men and young boys. Women are responsible for preparing the daily feeds, milking cows twice a day, and looking after the young animals, which have to be brought to their mothers twice a day and separated from them again. In the pastoral society, despite their considerable labour input in the care and maintenance of the herd, women are excluded from major decision-making. This is in spite that women often devote more time from 16 – 18 hours against 8 – 10 hours by men to these tasks (McCorckle, 1987). According to the United Nations Development Programme (UNDP), the rural female participation rate in agriculture and livestock production is higher at 79.4 % as compared to rural men 60.8 % (UNDP, 1997). Hence, identifying and supporting women's role as livestock owners, processors and users of livestock products while strengthening their decision-making power and capabilities, are

key aspects in promoting women's economic and social empowerment and consequently provides a way to enable rural women to break the cycle of poverty.

1.2 Statement of the Problem

Before independence in 1964, commercial dairy production was the sole preserve of white farmers and small-scale Kenyan farmers were not allowed to own dairy cattle. When Kenya attained independence, the Kenyans bought the farms from white farmers, mostly in groups, as individuals could not afford to purchase them solely. They could then subdivide the land amongst themselves, according to share contribution. The period after independence in 1964 was marked by a large drop in cattle population and in large-scale farms, and a significant increase of smallholder farmers. This was because of the large transformation in the land acquisition, division and redistribution, shifting from the large-scale "white settlers" farms to much smaller portions. Initially, dairy cattle on small-scale farms were grazed, but as farm sizes decreased and grazing land was less readily obtained, cultivated forages were adopted.

Zero-grazing system of dairy production was introduced by KARI Naivasha in the late 1960's, by establishing model farms in the KARI station which they sensitized the Agricultural officers (AO) through training (Omore A. et al, 1999). The AO then trained farmers in their respective areas of operation and the system was readily adopted, especially in areas with small pieces of land. Further, in the face of sub-division of family farms as land passes from generation to generation, adopting dairying and owning a dairy cow (most households own only one or two) is, therefore, a means of survival for many smallholder families in Kenya (Muriuki, 2002). Zero – grazing for dairy production is widespread in the Kenya highlands where land holdings due to intergenerational sub-division of farms driven by the rapid growth in human population (C.B.S., 2001).

Research (Muriuki 2002; Omiti 2002; Tsehay 2002) indicates that most smallholders practicing dairying were poor and struggled to acquire their first cow. Dairying was a means to escape poverty and to sustain their families, with particular benefits accruing to women and children. Many smallholder dairy farmers in Kenya are embracing the zero

grazing model of dairy production because of the many benefits accruing from it. Problems such as shortage of grazing land, low productivity of dairy cows, low quality fodder, prevalence of diseases and poverty are dealt with, in this system of dairy production. The popularity of the zero grazing systems is that it results in higher milk yields per cow (15-30) litres/cow (GoK 2012).

Over the years, dairy production has grown impressively as manifested by an increase in milk production, from 2.8 billion litres in 2002 to 3.8 billion litres in 2006, representing a growth of 36 %. The milk intake by processors also increased from 143 million litres to 362 million litres during the same period representing a growth of 153 %, while milk prices increased from a low of Kshs 8 per litre to a high of Kshs 18 per litre. In the year 2006, Kenya exported about 14 million litres of milk worth Kshs 700 million compared to less than one million litres that used to be exported prior to 2003. Njoroge (2002) estimated that more than 600,000 rural households in middle and high agricultural potential areas of Kenya keep between 2 and 6 dairy cows under zero grazing. This is also supported by Muriuki (2002) that central region of Kenya is where smallholder dairy production is a major part of the farming system and is mostly carried out by women.

Despite these tremendous improvements, studies (Omore, *et al.,* 1996; Lanyasunya *et al.,* 2002) indicate that performance of animals in the zero - grazing systems in the Kenya is still far below average. For instance, growth among calves and heifers is less than 0.25 kg day as compared to standard of 1kg per day, mortalities among cows, heifers and calves range from 10 to 30% and standard is less than 10%, age at first calving is about 3 years instead of 18-24 months and calving rate is about 0.60 instead of 1. This poor performance could be attributed to lack of adequate and nutritious fodder for animals due to the limited access to land by women hence a negative effect on the productivity and sustainability of the zero – grazing dairy production system. Present estimates, based on farm size, land allocation and ecological potential; indicate that smallholder dairy farmers can only produce 70 % of the feed required from their own resources. The balance has to be fetched from other farms and this is the responsibility of women.

A number of challenges face the livestock sector, including ensuring food, resource, and livelihood security for poor smallholder producers and processors. These challenges are specific to both genders and have different effects on each of the gender and there is therefore a need to undertake research to establish how these challenges are specific to women through a "gender lens" in order to determine the best approaches for addressing these challenges to improve women participation in zero – grazing dairy production. For instance, studies in the Kenyan highlands have indicated that, with increasing commercialization, the control of income from milk sales shifts from women to men, in a similar manner to income from horticulture and other traditional female enterprises (Huss-Ashmore & Curry, 1992). There is very limited information available about the role of rural women regarding the participation in various livestock management activities. The purpose of the study therefore is to assess the challenges faced by women as theyk participate in the zero – grazing dairy production system in Karuri Location, Kiambu County in Kenya and suggest possible solutions to these problems.

1.3 Research Objectives

1.3.1 The overall objective

The overall objective of the study is to explore challenges facing women in the zero – grazing dairy production system in Karuri location, Kiambu County.

1.3.2 Specific objectives

1. To identify factors affecting women participation in the zero – grazing dairy production system in Karuri location, Kiambu County
2. To establish the level of empowerment of women practicing zero – grazing dairy production system in Karuri location, Kiambu County

1.4 Research Questions

The study sought to answer the following research questions;

1. What are the factors affecting participation of women in zero – grazing dairy production system in Karuri location, Kiambu County?

2. What is the level of empowerment of women practicing zero – grazing dairy production system in Karuri location, Kiambu County?

1.5 Justification of the Study

Livestock production remains the most significant source of income for rural populations especially women, which is also a source of food for the household. It is therefore imperative to identify challenges that women face in dairy production in order to improve their participation given the important role that they play in the household and the national economy. The Agricultural Development Sector Strategy (ASDS) 2010-2020 reiterates the government's commitment to developing a gender policy to ensure women's empowerment and gender mainstream the needs and concerns of women, men, girls and boys in all sectors so that they can participate and benefit equally from development initiatives. The study will therefore contribute to knowledge that will and can be used to mainstream gender concerns in livestock production

1.6 Scope and Limitation of the Study

The study limited its investigation to smallholder households practicing zero-grazing dairy production system in Karuri Location, Kiambu County. The researcher specifically targeted a female (spouse) of the households that were sampled for the study. The study targeted villages from Karuri Location and focused on zero-grazing dairy production although the area residents are predominantly involved in agro – pastoral systems of production which combine both crop and animal production, using outputs from one to feed into the other, e.g. manure for crops, fodder for livestock. Although there is a plethora of information on women participation in livestock production, there is less of it on women participation in the zero- grazing livestock production system.

1.7 Significance of the Study

First, the study will be of importance in contributing information on gender issues in livestock production and provide areas of further research to enhance women's role in livestock management activities. Secondly, the study will provide background information for other researchers on the relationship between women and zero – grazing dairy production system and generate other areas of further research to address issues and

opportunities in the sector. Thirdly, the study will be of importance to the agricultural sector policy makers and planners to design and implement strategies to improve women participation in livestock production. Lastly, the study will be significant to smallholder livestock farmers to increase their productivity and improve their livelihoods especially women who participate in dairy production.

1.8 Definitions of terms

Agricultural Production – Refers to the economic activity which involves crop management, livestock keeping or fishing which is a feature of rural communities

Livestock Production – Refers to the rearing and keeping of livestock for household sustenance such as provision of meat, milk, etc., and economic gain by sale of milk and other dairy products.

Dairy Production – This refers to keeping of dairy cattle for milk production

Zero – grazing – Refers to the system of livestock production system, which is characterized by keeping of livestock in a structure where feeds and water are provided to them.

Calving Rate – It is a measure of reproductive performance of a cow**.** It is the rate at which a cow gets a calf: the expectation is a calf every year

Calving Interval- It is the period between one calving and the next for a dairy cow

CHAPTER TWO

LITERATURE REVIEW AND THEORETICAL FRAMEWORK

2.1 Introduction

This section of the study highlights and reviews available literature on gender participation and challenges in livestock management in the zero – grazing system. The chapter will also present the theoretical framework on which the study is premised. The chapter also includes the hypotheses / assumptions of the study.

2.2 Challenges facing Women in Livestock Management

Women play an important role in livestock management, processing and marketing, acting as care providers, feed gatherers, and birth attendants. They are also involved in milk production, although not all women control the sale of milk and its products The UNDP (1997) reports women between the ages of 25 and 55 spend 30 % of their total labour in agricultural self – employment on livestock maintenance compared to 20 % for men. Bekure *et al* (1991) estimates that women spend an average 2.5 hours per day caring for livestock compared to six hours performing domestic chores. The rural female participation rate in livestock production is higher at 79.4 % as compared to rural men 60.8 % of rural men (UNDP, 1997). There are several challenges that women face in the zero – grazing system which are highlighted in this section.

2.2.1 Lack of Rewards

Work performed by women in livestock production is not viewed as payable work as they are deemed to be menial to the men's work. Stevens (1990) notes that women in dairy production account for 93 % of total employment by performing tasks such as fodder cutting, cleaning the sheds, taking care of lactating animals and milking. Paudel *et al* (2009) study on gender aspects in livestock farming found that it was perceived that women are supposed to work in most of the difficult tasks like forage collection and transportation, cleaning the shed and feeding animals whereas men are involved relatively in easier and attractive tasks of the livestock activities such as milking animals and selling of milk. Kinambuga (2010) found that women are involved in the daily management of the cattle by feeding and milking. This notwithstanding, they are

restrained in terms of making major decisions like the type of breeds, system of rearing, number of cows to be kept and the marketing channel among other critical decisions.

2.2.2 Access to Market

Livestock production today has moved from subsistence to being more commercially based and this has also negatively affected women participation in dairy production. Although they may perform activities towards their zero – grazing system in the household they are still alienated from the commercial aspect the production. Earlier, women were able to sell their milk produce at traditional rural markets. These are not only places to shop or sell but also places to exchange information. Women's involvement in rural markets is little understood and inadequately researched, particularly in terms of the facilities that women use, their price responsiveness and their dependence on barter or cash. There are signs that women's role in the marketing of livestock produce may be eroding, for instance, Whalen (1984) found that in Latin America and the Middle East, as commercialization increases, women are less familiar with modern markets and feel powerless to influence them. They are hampered by cultural norms, and the lack of access to information on new technology, prices and demand. Men are the ones registered at the cooperatives. Although women still sell processed dairy products, the sale of fresh milk has now been taken over by men (Salih, 1985).

Women in smallholder dairy production are still involved in the informal market, which involves selling directly to the consumers who demand fresh milk. In Ethiopia, Tsehay (2002) found that butter was the predominant traded commodity; however, consumers in East and Southern Africa demand fresh liquid milk and its marketing is dominated by traditional (the so called 'informal') markets, with only small proportions of total production being marketed through a cold-chain, pasteurized process (the so called 'formal' market). For example, in Ethiopia the proportion of total marketed milk sold formally is very small (Tsehay, 2002); in Tanzania and Uganda it is estimated at <5% (Omiti & Staal, 1996; Kurwijila, 2002) and in Kenya it is about 15% (Omore *et al.* 1999). Approximately 30–35% of production is consumed on farm (by the family and calves), with the balance (generally four to six litres) marketed. According to the Kenya Dairy

Board (2009) the informal milk market controls an estimated 70 percent of the total milk marketed.

2.2.3 Animal Diseases

Closed management system, in which no animals are brought into the herd from outside sources, greatly reduces the likelihood of infection by many diseases, and viral and bacterial infections that are spread by contact can be prevented. This offers an alternative to the strict use of vaccines and usually protects the herd from the severe effects of such diseases as infectious bovine East-Coast Fever disease, Salmonellosis, etc. Such persistent conditions as brucellosis and tuberculosis can be controlled by a combination of eliminating infected animals and maintaining a closed herd, (Nicoletti, 1984). Muriuki and Thorpe (2001) acknowledge that in much of East and Sothern Africa, the lack of adequate feed (particularly in the mono-modal rainfall areas) and disease challenge, interacting with a lack of veterinary services, expensive veterinary services due to privatization inhibit the adoption of dairying by women smallholders.

2.2.4 Access to Technology

In their study, Baltenweck and Staal (2000) who found that female-headed households were more likely to have less access to information on new dairy technologies. Analyzing data nationwide representative panel household data between 2000 and 2010 Wambugu *et al.* (2011) also found that over the years, a higher percentage of male-headed households kept improved cows compared to their female counterparts. On the other hand, more female-headed households kept local animals, indicating that they had less access to improved dairy breeds and perhaps dairy technologies in general.

2.2.5 Lack of fodder

Kiambu is in the intensive central highlands, where land sizes are small average of 0.25 ha per household), so farmers keep two to three high-grade dairy cattle. Because the land is not able to provide adequate animal nutrition, farmers purchase some fodder and concentrate feeds. Lack of monetary capability would otherwise suggest that this would pose a challenge for women in obtaining fodder from external sources due to their limited ability to access finance. Abebe and Galmessa (2011) study on the gender role in peri

urban dairy production system, women cited that poor feed resources, feed shortage, climatic change, lack of income, capital, diseases and parasites, lack of awareness and culture. However, 85 percent indicated that shortage of land and high cost of feed hindered having high numbers of dairy cattle. Similarly, Samuel *et al* (2009) reported that the major constraints to livestock production among smallholder dairy farmers were feed shortage, land shortage especially unavailability of grazing land, and genetically low productivity of the local animal breeds, in their decreasing order of priority.

2.3 Factors Constraining Women Participation in Livestock Management

Although women face a myriad of challenges in zero – grazing livestock production some of these are influenced by factors, which can be attributed to their gender roles in the society and also in the household, the social, political and economic environmental aspects can have a negative impact on the zero – grazing livestock management. Tarfa and Ogunwale (1998) further identify factors such as low literacy level, gender stereotyping of roles and socio-cultural factors, e.g. early marriages, seclusion, childcare and other reproductive chores obstruct women from getting access to productive resources.

2.3.1 Lack of Capital and Access to Institutional Credit

Lack of capital has been identified as a constraint for economic empowerment more so in developing countries. Small and medium enterprises in livestock production are a major source of employment and livelihood among the rural poor. Saghir *et al* (2005) acknowledge that women have limited bank credit facility; both the bank staff and our society discourage them if some of them try, and the complicated banking process and high rate of interest are other constraints. Many loaning institutions require rural credit applicants including women to visit their branches head offices to sign documents and complete other formalities. All these create a troublesome situation for the women to get a loan.

Tangka *et al*. (2000) indicate that women farmers are particularly constrained in raising animals due to lack of capital and access to institutional credit. Potential borrowers in Ethiopia, Uganda and Kenya are required to show existing infrastructure for livestock operations before loans can be approved. Creditworthiness of potential borrowers determined by observable characteristics such as wealth or social standing is also used in place of collateral security (Freeman *et al*., 1998). Lack of credit limits women participation in livestock production. In Kiambu County, over 70 percent of the county‘s population depends on agriculture as their source of livelihoods. However, the cost of farm inputs has been on an upward trend making them unaffordable for the majority of the farmers (GoK, 2013).

2.3.2 Workload

Research (Berhanu *et al*., 2006) indicates that women are actively involved in livestock and crop production. Most activities related to livestock production seem to be unfairly shared among the household members, women undertaking the bulk of work. The whole analysis depicts that women are operating under a heavy workload as they are assumed to perform most of the routine and laborious livestock management activities. These activities include fetching water, cutting fodder, transporting the fodder and concentrates, cleaning the shed, spraying livestock against tick-borne diseases, milking, transporting milk to the market, caring for the calves, etc. Quisumbing (1994) observes that women in Africa have been observed to spend up to 2 hours a day on childcare, 3 hours on food preparation and 2 hours fetching water. In rural Asia, food-processing activities take 2–3 hours a day.

In Bangladesh, women may spend about 6 hours fetching water (McGuire & Popkin, 1990, cited in Quisumbing, 1994). Pregnancy and cultural seclusion may also limit the participation of women in livestock and other activities outside the home. Livestock development increases milk yields and cash flows, it also requires better attention and additional labour in carrying out new tasks such as stall feeding, barn cleaning and fodder collection – jobs in which women contribute significant amounts of labour. This leaves women with little time to participate in extension and training to improve their

knowledge and skills (Tangka *et al*., 2000). According to Xuto and Bell (1992) women are a stable work force in agriculture, lacking only opportunities to improve their operational skills. The de facto female-headed farm is a typical situation where women are overworked, both in on- and off-farm wage activities to increase household income.

2.3.3 Lack of Technical Skills and Access to Extension Services

The extent to which farmers and farm workers have access to extension services enhances the agricultural productivity. In Kenya, livestock production officers provide extension services on technologies that could enhance livestock productivity at the community level. Cloud (1985) shows positive effects of training on technology adoption and agricultural productivity. Women are rarely targeted for livestock-related training and extension services. Information and training programmes are generally directed to men. In Ethiopia, Whalen (1984) found that one – third of women acknowledged that they had received training and extension services while the remaining two – thirds had never received any skill demonstration or programme. The main source of information received was from their husbands and this was inadequate to improve dairy productivity and expressed interest in acquiring more knowledge in disease management and feeding. Maarse (1998) study among Kenyan dairy farmers, 69% of those first exposed to information regarding the zero-grazing technology were men, while only 19% were women, yet women undertake most of the dairy operations.

Many women are unaware of most of the advanced livestock technologies due to lack of training facilities and lack of resources. Siva, Kumar and Trikha (2002) found that women have no access to technical information source related to balanced diet, healthcare and sanitation, care of pregnant animals and new born calf and correct procedures of milking and feeding, and least access to veterinary services, true breed survival and artificial insemination techniques. As services and access to information are increasingly privatized, women face severe challenges as their access to markets, services, technologies, information and credit schemes is lowered even further, thereby decreasing their ability to improve productivity and benefit from a growing livestock sector.

According to Owango *et al*. (1998) the 1980s and 1990s saw most Sub-Saharan Africa countries experience the collapse of some and the decline of the remainder of government input services (veterinary, artificial insemination (AI) and extension advisory services) for smallholders, with an increased reliance for service delivery on the private sector, including community-based organisations (CBOs) and co-operatives. Tambi *et al.* (1997) attribute this low participation of women to the privatization of clinical and preventive veterinary services.

2.3.4 Poor Land Tenure Systems

According to the International Food and Agriculture Development (2007) apart from private ownership, security of land tenure can take a variety of forms such as leased public land or user rights to communal property. Limitations on access to or use of land inhibit agricultural productivity and consequently affect rural women's income. Women are most vulnerable to insecurity related to land ownership and this has affected their involvement and productivity in zero – grazing livestock management system. Moreover, land tenure is often required to establish access to other inputs such as credit, an often essential ingredient for improving livestock productivity and food security and livelihood improvement (IFAD, 2005). A case in point is that, only 3 per cent of Kenyan women own title deeds thereby, minimizing their opportunities to access credit (GoK, 2008).

2.4 Initiatives Promoting Women Participation in Livestock Management

There are several initiatives that have been undertaken by governments, development partners and non – governmental organisations to assist women in participation in smallholder dairy production, which the study seeks to discuss in this section.

2.4.1 Macro – Economic Policies

Macro – economic reforms implemented or being implemented in Eastern and Southern Africa, have increased the competition for marketing functions (such as collection, transportation, processing and distribution / retailing) and have resulted in increased income and employment opportunities, especially for small-scale milk traders (Omiti & Muma, 2000). Regulation of the dairy sector would offer opportunities for women engaged in zero –grazing dairy production system as it would provide a neutral ground

and offer incentives for increased productivity. Karanja (2003) traces the liberalization of the dairy sector in 1992, which led to new institutional arrangements that were to enhance the collection, processing and marketing of milk through hawkers, brokers, self-help groups, neighbours and business establishments like hotels.

Presently, the Dairy Policy clearly acknowledges the role of small-scale milk vendors (SSMVs) and contains specific measures to support them. These include development of low-cost appropriate technologies, training on safe milk handling, provision of incentives for improved milk collection and handling systems, and establishment of a supportive certification system (Leksmono *et al.*, 2006).

2.4.2 Subsidized Loans

Currently, the penetration level of the banking services is limited especially in rural areas and does not link with production activities in agriculture. Decentralized Finance Institutions (DFIs) exist to help finance those sectors not catered for by private banks and other financial institutions, especially in rural areas. This includes development and seasonal loans for agriculture. Initiatives in this sector include the Women Enterprise Fund (WEF) which is poised to provide women with access to alternative financial services. The fund was introduced in the 2007/08 financial year, for disbursement through the constituencies with an initial allocation of Kshs 1 billion and will be gradually increased. Since commercial banks have borrowing conditions that are not favourable to women, this fund was to fill the gap by providing more easily accessible credit for investment by women. It is expected that the loans women will access as a result of the establishment of the fund will have a positive impact on family welfare (GoK, 2008).

2.4.3 Regulation of Land Ownership

In an attempt to alter the gender disparity in Kenya over land ownership, the Government seeks to develop and implement policy, legal and institutional reforms on security of land tenure, land use and development, and on sustainable conservation of the environment. The national land policy has been approved to address land administration and management problems. It provides a framework and defines key measures required to

address the critical issues of land administration, access, and land – use planning, restitution of historical injustices, environmental degradation, conflicts, proliferation of informal settlements, outdated legal framework, institutional framework and information management. In the constitution of Kenya, 2010, Article 60 (1f) talks of elimination of gender discrimination in law, customs and practices related to land and property in land. This will assist in removing barriers facing women in land ownership. Women can now freely own land through inheritance from spouses or parents and through purchasing. Land ownership is an important element in promoting empowerment of women. They can also freely purchase land without any fear of discrimination.

2.4.4 Strengthening Co-operatives

Agricultural marketing cooperatives constitute 49 percent of all cooperatives with over 4 million members out of the entire membership of 7 million countrywide. Cooperatives face many challenges that affect service delivery. These challenges and constraints, both internal and external, include governance and management, adding value to produce, and poor access to market information. Lack of market and product research has led to limited product development and market penetration. Most cooperatives have not embraced value addition and processing including packaging and branding, and thus lose out on potential returns and benefits to their members or producers. The government is involved in several interventions to improve value addition processing, enhancing access to agricultural credit, and improving capacity for marketing agricultural inputs and produce and promotion of internal and external trade (GoK, 2010).

2.5 Theoretical Framework to guide the Study

The study adopted the women empowerment framework by Sara Hlupekile Longwe to guide the researcher in the course of the research and is explained and discussed in this section of the study.

2.5.1 Women Empowerment Framework

The Women Empowerment Framework was developed by Sara Hlupekile Longwe in 1991. It argues that to achieve empowerment, women need to be enabled to achieve equal

control over the factors of production and participate equally in the development process. The model is explicitly political, arguing that women's poverty is the consequence of oppression and exploitation (rather than lack of productivity), and that to reduce poverty, women must be empowered. In the Longwe framework, development means enabling people to take charge of their own lives, and escape from poverty; poverty is seen as arising not from lack of productivity, but from oppression and exploitation.
Longwe conceptualizes five progressive levels of equality, arranged in hierarchical order, with each higher level denoting a higher level of empowerment. These are the basis to assess the extent of women's empowerment in any area of social or economic life. These levels include Welfare, Access, Conscientisation, Participation and Control.

Welfare: Longwe defines this as the level of women's material welfare, relative to men. The research will endevour to find out whether women practicing zero-grazing dairy production have equal material welfare to the available resources such income from the milk sales, with men.

Access: This is defined as women's access to the factors of production on an equal basis with men; equal access to land, labour, credit, extension services and training, marketing facilities, and all public services and benefits. Longwe points out that equality of access is obtained by applying the principle of equality of opportunity, which typically entails the reform of the law and administrative practice to remove all forms of discrimination against women. The research seeks to identify the accessibility of opportunities and resources for women engaged in zero – grazing dairy production such as do women have the access to training and access to credit facilities on an equal level with men?

Conscientisation: This refers to as a conscious understanding of the difference between sex and gender, and the awareness that gender roles are cultural and can be changed. 'Conscientisation' also involves a belief that the sexual division of labour should be fair and agreeable to both sides, and not involve the economic or political domination of one sex by the other. A belief in sexual equality is the basis of gender awareness, and of collective participation in the process of women's development. The model argues that cultural definitions of roles are discriminative against women participation in access and

management of resources within the household. The model suggests that the roles of both genders in the management of livestock should be equal to each other where both gender members feel that they receive what they worked towards. This study therefore seeks to find out whether the women engaged in zero-grazing dairy production system are aware of what they need in order to be empowered and be at the same level of empowerment as the men.

Participation: Longwe defines this as women's equal participation in the decision-making process, in policy-making, planning, and administration. It is a particularly important aspect of development projects, where participation means involvement in needs-assessment, project formulation, implementation, and evaluation. Equality of participation means involving women in making the decisions by which their community will be affected, in a proportion, which matches their proportion in the wider community. The study seeks to answer to whether women have the power to make decisions regarding livestock production such as how to dispose of livestock, what portion of the income should go towards improvement of dairy production, deciding which breeds to keep, usage of income from milk, etc.

Control: This term denotes women's control over the decision-making process through ownerships. This is essential as it helps to achieve equality of control over the factors of production and the distribution of benefits. Equality of control means a balance of control between men and women, so that neither side dominates. The literature identified that women have poor control over the resources that sustain the zero – grazing dairy production system such as land, cattle, income from milk, etc which men have greater control over. The study seeks to identify the extent to which women have control over these resources.

2.5.2 Relevance of the Theory to the Study

By evaluating the five stages of women's empowerment theory i.e. control, participation, Conscientisation, access and welfare, they will depict the level of empowerment of a particular individual. The theory therefore guided in identifying the level of empowerment of women involved in zero-grazing dairy production system in Karuri

location. It helped identify the challenges facing women in the sector that prevent them from being at the same empowerment level as the men. One of the strengths of the approach to this study is that it was used to explain the different factors that limit effective women participation in zero – grazing dairy production system. Another advantage is that the approach was used to address gender differences by taking a holistic approach across different sectors such as agriculture. The holistic approach proposed by the study may assist in upgrading women development initiatives using the positive, neutral and negative level of development as envisaged by Llongwe.

2.6 Assumptions

1. There are challenges facing women practicing zero-grazing dairy production system in Karuri Location, Kiambu County

2. Women practicing zero – grazing dairy production system in Karuri Location in Kiambu County are yet to attain full empowerment relative to men

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter describes the research techniques used in the study. These include the research design, research site, study population, sample population, sampling procedures, data collection methods, data processing and analysis and ethical considerations.

3.2 Research Design

The study adopted the Descriptive Research Design. Descriptive research includes surveys and fact-finding enquiries of different kinds. The major purpose of descriptive research is description of the state of affairs, as they exist at present. Descriptive research is used to obtain information concerning the current status of the phenomena and to describe, “what exists" with respect to variables or conditions in a situation. Gilham (2000) had the opinion that descriptive studies are good at giving a detailed investigation of the answers to a specific question. In order to identify the challenges facing women in zero – grazing dairy production, the researcher sought to use the descriptive research design, as it allowed the use of several data collection techniques and analysis.

3.3 Research Site

The research was undertaken in Karuri Location in Kiambu County. The location is within Kiambaa constituency that borders Kiambu Township constituency to the northeast, Kabete constituency to the south, Limuru constituency to the west and Nairobi County to the east. There are four sub-locations within Karuri location. These include Muchatha, Njoro, Karuri and Banana- hill. It is eighteen kilometers northwest of Nairobi and twelve kilometers south of Kiambu town. The soil types are loam and clay loam. Their fertility is conducive for growing pastures for livestock as well as crop production. The main livestock kept are dairy cattle, poultry and pigs. There are also various cash and food crops grown here such as coffee, horticultural crops (tomatoes, brinjals, courgettes, onions, flowers, etc), vegetables (cabbages, kales,), maize, beans, peas and potatoes. Other physical features include steep slopes, valleys and rivers.

The 2009 Population and Housing census indicates that Karuri location having a population of 107,716. The number of households in the location is 33,792. The predominant dairy farming system is Zero grazing. Approximately 75% of farmers practice dairy farming. This is approximately 25,344 households. The approximate number of households practicing zero-grazing dairy farming is 7,315 in Muchatha, 4,092 in Njoro, 8,530 in Karuri and 5,407 in Banana- hill (Republic of Kenya, 2013). However, the study was undertaken in one of the sub-locations, which is Karuri with approximately 8,530 households. The composition of the county population is a sex ratio of male to female is 1:1.02. The high population in the urban centers and proximity to Nairobi city provides a ready market for dairy products for smallholder dairy farmers in Karuri Location. The co-operative movement in the county is well established with societies covering several sectors including the dairy sector.

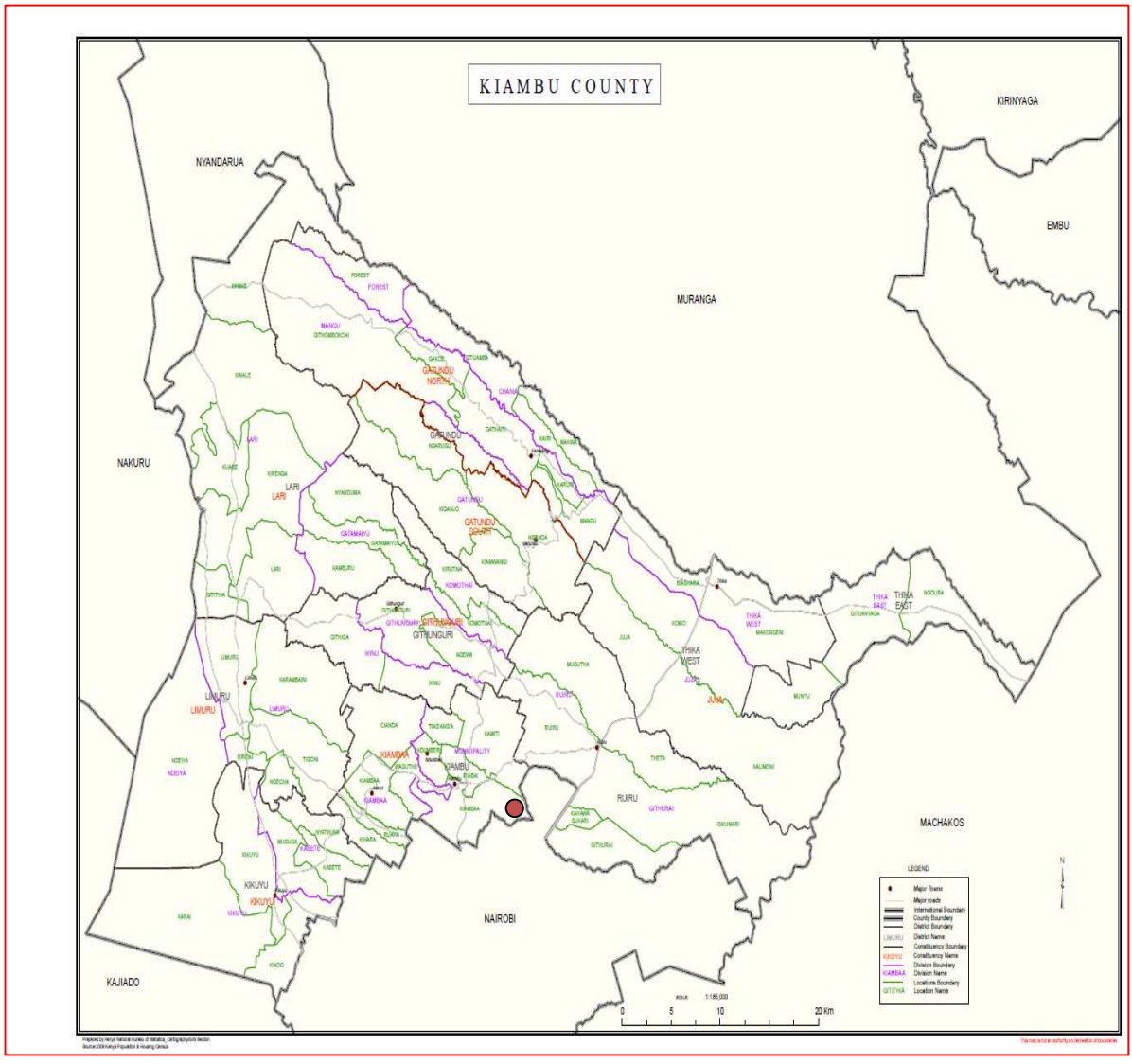
3.3.1 Dairy Production Profile of the Area

The dairy farmers in Karuri location sell their milk through formal and informal channels. Formal channels include delivery of milk to Kiambaa Dairy Cooperative Society, which in turn sells to new Kenya Cooperative Creameries. Informal channels are sales made to local institutions e.g. hotels, schools, etc, neigbours, etc. the average production of milk per cow is eight liters per day.

In the year 2010, the county produced 267.5 million kg of milk valued at Kshs. 5.0 billion. Lack of ownership and control of productive assets such as land by women, discrimination against inheritance of wealth from parents and property ownership, inability to access credit facilities from banks due to lack of collateral have greatly contributed to poverty amongst women and in the county in general. In the county, men dominate access and they are the main decision makers (GoK, 2013).

Map 1: Map of Kiambu County Showing Karuri Location Administrative Areas.

Source: *Kenya National Bureau of Statistics, 2011*



This shade represents the study area i.e. Karuri Location

3.4 Study Population

The study targeted smallholder farmers in Karuri Location. The study specifically focused on the women who practice mixed farming. The units of analysis were the individual informants defined as a woman practicing zero-grazing livestock production system. The study also targeted Livestock Production Officers in Karuri Location and women leaders as key informants.

3.5 Sample Size

The target population for the study was smallholder farmers in the area who are involved in mixed farming activities. The household representative that the researcher targeted were the women as the study sought to identify challenges facing women in the zero – grazing system. The sample size of the study was 51 women from Karuri sub-location. The study also targeted two Livestock Production Officers in the Karuri Location and at the Kiambu County headquarters. In addition, two women leaders shall be interviewed.

3.6 Sampling Procedures

The research used two sampling techniques; convenience and purposive sampling. Convenient sampling is a type of non-probability sampling in which people are sampled simply because they are available sources of data for researchers. Convenient sampling procedure allows the researcher to interview respondents as they become available for participation. The subjects for the study were selected because of their convenient accessibility and proximity to the researcher. The women practicing zero grazing who were available at their homes when the researcher visited were the ones who were used in the study.

The second method was purposive sampling. Purposive sampling is a non-probability sampling technique too. It applies where the researcher uses their own judgment to identify respondents for the study. This method was used while selecting the key informants for the study. The key informants used for this study were the livestock production officers within the location as well as at the County headquarters at Kiambu Town. The other key informants were the area women leaders. These were two women living within the community and have been leaders by virtue of their participation in community development initiatives within the location. one was a retired leaders of a

women's groups, and the other was a contact farmer. They had specialized knowledge about the topic the researcher wished to understand.

3.7 Data Collection Methods

3.7.1 Secondary Sources of Data

Secondary data was collected from relevant published books, periodicals, official reports, journal articles, internet, dissertations, newspapers, government documents including policy documents and the constitution. These sources were used throughout the study.

3.7.2 Primary Sources of Data

3.7.2.1. Survey Technique

Data was collected using a structured questionnaire (Appendix 1) which had open and close-ended questions. Open – ended questions gave the respondents an opportunity to give further explanation of the information they wanted to share with the researcher. Close – ended questions on the other hand, limited the responses to categories, which they were required to highlight one or more response options. The data that was captured using this method was both quantitative and qualitative and included demographic characteristics of the study participants, challenges facing women participation in zero-grazing dairy production system, factors perceived to influence women participation in the zero-grazing dairy production system as well as suggestions and recommendations for improvement of women participation in the zero-grazing dairy production system in Karuri location in Kiambu county. A total of 51 respondents were interviewed using this method.

3.7.2.2 Key Informant Interviews

The researcher adopted Key Informant Interviews (KIIs) to gather information from two livestock production officers, one in Karuri Location and another at the County headquarters in Kiambu Town and two women leaders in Karuri Location. Key informant interviews were useful as respondents have access to detailed information on the subject under study. The researcher developed a key informant guide, which was administered to the livestock production officers (Appendix 2) and women leaders (Appendix 3) with

items that relate to the subject of the study. These interviews involved semi – structured, unstructured open-ended questions that were few in number but intended to elicit views and opinions from the livestock production officers as well as the women leaders. Information generated from the key informant interviews were used to compliment the data provided by the smallholder zero grazing women dairy farmers involved in the study. In key informant interviews, the researcher conducted face-to-face interviews with participants.

3.7.2.3 Focus Group Discussion

The study also adopted Focus Group Discussion (FGD) to gather information from women participating in zero –grazing dairy production system. FGD allowed the researcher to interact with the participants through a semi – structured guide ((Appendix 4) where participants were given an opportunity to give their views. The researcher undertook the FGD after collection of the questionnaire and key informant data with a group of 8–12 participants. FGD complimented the data collected as the participants shared the experiences with zero – grazing dairy production system. The approach has also been adopted by other researchers (Oluka *et al*., 2005) in examining women and livestock production. The method captures qualitative data.

3.8 Data Processing and Analysis

Qualitative data was analyzed thematically using descriptive approach**.** For quantitative data, the researcher used the Statistical Package for Social Scientists (SPSS) Version 16 to undertake the statistical analysis. The researcher used the descriptive statistics (Mean, Mode, Median and Standard Deviation) and data was presented in charts and in tabular format. The qualitative data applied concept analysis where the researcher analyzed the information collected under various themes, comprehensively. The presentation of data was complemented by the researchers own interpretation which addressed the implications of the observed trends in the summarized data.

3.9 Ethical Considerations

Social and business research often requires information from individuals who have their rights to participate or not participate in a study. The study addressed the informed consent and confidentiality and anonymity of the study. According to Piper and Simons (2005), informed consent implies that those interviewed or observed should give their permission in full knowledge of the purpose of the research and the consequences for them of taking part.

The researcher sought authority of undertaking the research from the National Council of Science and Technology (NCST) in Nairobi who are responsible for granting a research permit to researchers.

The researcher also sought authority from the County Livestock Production officer under the Ministry of Agriculture, Livestock and Fisheries Development in Kiambu County so that the Livestock Production Extension officers can participate. The researcher also sought the respondent's permission to indulge them in interviews through the administration of data collection tools. There was an introduction section in the data collection instrument to inform the study participants of the objectives and the purpose of the study and any other concern before the interview took off. Verbal consent was sought from the respondents/farmers. They were informed of their right to disqualify themselves from the study at any stage of the interview or FGD process. The researcher maintained confidentiality and anonymity of the interviewees.

CHAPTER FOUR

STUDY FINDINGS AND DISCUSSION

4.1 Introduction

This chapter comprises of the findings on challenges facing women in zero-grazing livestock production system in Karuri Location, Kiambu County and the interpretation of the findings. It starts with the presentation of the demographic characteristics of the informants which is presented in tables and charts and complemented by the researcher interpretation and discussions of the rest of the findings. .

4.2 Socio-Demographic Data

The researcher sought to examine the demographic characteristics of the respondents which included the age, education level and marital status.

4.2.1 Age

In this study, 62.7 per cent of the respondents were aged from 41 years and above, 21.5 per cent were aged between 36 and 40 years , 9.8 per cent were aged between 31 and 35 years, 2 per cent were aged between 26 and 30 years and 3.9 per cent were aged between 18 and 25 years, as summarised in the table 4.1 below. The findings therefore indicate that the youngest informant in the study was aged 18 years with majority of respondents aged above 41 years. This translates to the majority of women practicing zero- grazing dairy farming being 41 years and above. The majority of the respondents were older and this implies that zero-grazing dairy livestock production is common among relatively older women rather than younger women. The participation of older women also implies that younger women, who are aged 40 and below, are not enthusiastic in joining the sector due to the many challenges that older women face. The younger women may also have noticed that the men, who are less actively involved, are more empowered than the women who are the main participants in the zero-grazing livestock production system and therefore the younger women are not willing to join the sector. There are numerous constraints in the zero grazing dairy sector, which could be hindering the younger women from joining the enterprise.

Table 4.1: Age of Respondents

Age	Frequency	Percent
18-25	2	3.9
26-30	1	2.0
31-35	5	9.8
36-40	11	21.5
41 years and above	32	62.7
Total	**51**	**100.0**

4.2.2 Education level

The study sought to know the level of education of the respondents. This is important in assessing the highest level of educational achievement for women practicing zero-grazing livestock production system in Karuri Location in Kiambu County. In this regard, education level study findings in Table 4.2 show that 39.2 percent respondents had a primary level of education, 25.4 percent were secondary, 23.5 percent had no formal education and 9.8 percent were college graduates. The study found that majority of the respondents had the basic level of education (Primary and Secondary). Majority of the elderly women in the sample had no formal education as compared to the relatively younger women in the sample. This findings show that the majority of the respondents had basic education which would also indicate less exposure to livestock management aspects. This low level of literacy would also be a constraint to the informative relation between the smallholder farmers with extension officers and financial institutions. Chinogaramombe *et al.* (2008) agree that low education levels among women in smallholder dairy farming are disadvantaged as they are often not aware of opportunities to improve their livelihood from zero-grazing livestock production. The more educated an individual is, the more opportunities they are able to identify in their environment to enhance their participation in zero-grazing dairy production system. This lack of formal education by some women and others with basic education could act as a deterrent to the educated ones to start practicing zero grazing dairy production system.

Table 4.2: Education Level of Respondents

Education level	Frequency	Percent
None	12	23.5
Primary	20	39.2
Secondary	13	25.4
College	5	9.8
Missing Responses	1	2.0
Total	**51**	**100.0**

4.2.3 Marital Status

Among the respondents, the majority were married and were represented at 88.2 percent, 2.0 percent were single and 9.8 percent were widowed, as depicted in Table 4.3. Study findings show that majority of the respondents were married and were likely to have a family. Family size has been asserted as the most important determinant of labour investment for smallholder dairy farms (Hanyani-Mlambo, 2000). The marital status also influences the participation of women in zero-grazing and their empowerment in regard to ownership of resources (cattle, land) as they are owned by their spouses and their control is limited. This means that women as the majority of participants, experience most, if not all, the challenges in this sector. Men on the other hand are the decision-makers as they control the resources such as land, cattle, money from the sector, etc. Men, who are the owners of the resources, are therefore more empowered than the women in the zero-grazing dairy production sector.

Table 4.3: Marital Status of Respondents

Marital status	Frequency	Percent
Single	1	2.0
Married	45	88.2
Widow	5	9.8
Total	**51**	**100.0**

4.2.4 Zero – grazing Experience

The study sought to examine the number of years which the respondents had been involved in the zero-grazing dairy production system. As shown in table 4.4, the study found that 13.7 percent had been involved for 1-4 years, 11.8 percent for 5-8 years, 13.7 percent for 9-12 years and the majority who were 60.8 percent for more than 13 years. Majority of the respondents had practiced zero-grazing dairy production system for more than 13 years and this enhances the validity of the findings as this sample of the study would be aware of the factors affecting women participation in dairy production and the level of empowerment of women in zero-grazing dairy production system. The findings also show that majority of the sampled women practiced zero-grazing dairy production system as a major source of their income.

Table 4.4: Years of Zero-Grazing among Respondents

Number of years	Frequency	Percent
1-4 years	7	13.7
5-8 years	6	11.8
9-12 years	7	13.7
More than 13 years	31	60.8
Total	**51**	**100.0**

4.2.5 Number of Cattle

The study sought to establish the number of dairy cattle kept among the respondents. The study indicates that 86.3 percent had 1-2 cows, 9.8 percent 3-4 cows and 3.9 percent had more than four cows as shown in Table 4.5. Key informant interviews with the livestock production officers revealed that there are three levels of zero-grazing farmers based on the number of cattle they keep. Large-scale dairy farming where these farmers keep more than 10 mature dairy cows; Medium Scale dairy farmers who keep 5 - 10 mature dairy cows and small-scale dairy farmers who keep 1-4 mature dairy cows. These findings are similar to those of Tallam (2009) who found that the number of cattle kept among smallholder dairy farmers was between 1-2 cows in Baringo. The zero-grazing dairy production system is therefore practiced on a low scale among most farmers. this could

be an indication that there are numerous challenges facing women practicing zero grazing dairy production system that curtail them to keep many dairy cattle.

Table 4.5: Number of Cows kept by Respondents

Cows	Frequency	Percent
1-2	44	86.3
3-4	5	9.8
More than four	2	3.9
Total	**51**	**100.0**

4.2.6 Size of Land

The study sought to find out the size of land owned by the zero-grazing dairy producers. The study findings show that 58.8 percent of respondents had ¼ to ½ acre size of land, 33.4% had 1 to 2 acres of land, and 3.9 percent had less than ¼ acre and more than 3 acres respectively as illustrated in Table 4.6. The size of land influences the availability of fodder as majority of the respondents cultivate napier grass which is the predominant pasture for their animals. Although women have access to land, control over the use of land is limited due to land ownership which is a prestige of the men. Lack of ownership of land by majority of women curtails their empowerment. This finding supports Kamau (1994), who found that nationally, the average farm size is about 2.5 ha. The number of holdings is increasing fast due to the continued sub-division of both small- and large-scale holdings. The small land sizes is the main driving force to practice zero-grazing dairy production system. The size of land also determines the number of dairy cattle to rear. The smaller the size of land, the fewer the numbers of dairy cattle kept and hence less milk is available for sale and ultimately the income is less.

Table 4.6: Size of Land Owned among Respondents

Size of Land	Frequency	Percent
Less than ¼ Acre	2	3.9
1/4 acres to ½ Acre	30	58.8
1 Acre to 2 Acres	17	33.4
More than 3 acres	2	3.9
Total	**51**	**100.0**

4.2.7 Crops Cultivated

The study sought to establish the types of crops cultivated by the respondents of the study. As illustrated on table 4.7, 78.4 percent cultivated nappier grass only, 17.6 percent cultivated nappier grass and maize, and 2.0 percent cultivated nappier grass, maize, potatoes and beans and the other 2.0 percent cultivated nappier grass, maize and beans. Majority of the zero-grazing dairy producers have napier grass stands without mixed cropping . This means that zero-grazing dairy enterprise is an important sector to the respondents. The zero-grazing dairy production system is in some cases practiced along with crop cultivation among small scale farmers. This is referred to as mixed cropping. Those who practice mixed cropping also benefit from crop by-products to feed to the dairy cattle e.g. maize stovers, bean pods, etc. This may also be interpreted that land is inadequate for planting sufficient napier grass for the dairy animals and still have adequate land for food crops. Therefore mixed cropping is practised. In addition, maize, beans and potatoes are cultivated among the sample since they are the staple food in the study area.

Table 4.7: Crops Cultivated Among Respondents

Crops cultivated	Frequency	Percent
Nappier Grass	40	78.4
Nappier Grass, Maize	9	17.6
Nappier Grass, Potatoes, Maize, Beans	1	2.0
Nappier Grass, Beans, Maize	1	2.0
Total	**51**	**100.0**

4.3 Challenges Facing Women in Zero-Grazing Dairy Production System

The objective of the study was to identify the challenges facing women in zero-grazing dairy production systems in Karuri location, Kiambu County. The researcher first sought to identify the activities which women performed in the zero-grazing production system. This assisted the researcher to determine their level of engagement and the challenges that they face in undertaking their duties.

4.3.1 Activities Undertaken by Women in Zero-grazing

The rate of female participation in agricultural production is assumed to be higher than that of men. The study therefore sought to examine the activities that women undertake in the zero-grazing dairy production system. As shown in Table 4.8, majority of the respondents performed all the activities highlighted as response options and this accounted for 90.2 percent, 3.9 percent indicated performing the fodder cutting/transportation of fodder/offering fodder to animals/cleaning of sheds/offering water to the animals/milking/animal health treatment. 2.0 percent indicated fodder cutting/offering fodder to animals/ cleaning of sheds/ offering water to the animals/ animal health treatment; transportation of fodder/ animal health treatment and milking/animal health treatment respectively. The results are consistent with findings from (2002) that in most African communities, women are responsible for grazing, feeding and watering animals. Women perform most or all the tasks pertaining to zero-

grazing livestock production. The challenge here is the workload. Women are overworked more than the men.

Table 4.8: Women Activities in Zero-Grazing Dairy Production

Activities	Frequency	Percent
Fodder cutting/transportation of fodder/offering fodder to animals/cleaning of sheds/offering water to the animals/milking/animal health treatment	2	3.9
Fodder cutting/ offering fodder to animals/ cleaning of sheds/ offering water to the animals/ animal health treatment	1	2.0
Transportation of fodder/ animal health treatment	1	2.0
Milking/animal health treatment	1	2.0
All the above	46	90.2
Total	**51**	**100.0**

These findings indicate that women do indeed undertake most of the activities associated with zero-grazing dairy production system. This also implies that the small dairy production system is a means of livelihood for rural women. The finding further supports reports that women between the ages of 25 and 55 spend 30 % of their total labour in agricultural self – employment on livestock maintenance compared to 20 % for men and female participation rate in livestock production is higher at 79.4 % as compared to rural men 60.8 % of rural men (UNDP 1997; 2002).

Zero-grazing dairy production system is labour intensive which as the study findings show, majority of the activities are performed by the women. Women play important roles in milk production but limited access and control over the income derived from dairy activities across the milk sheds depending on the communities. It is important to note that none of the married respondents indicated that they did marketing of milk which shows that the sale of milk produced was done by men. This findings support

Niamir-Fuller (1994) that in many societies, women have access to milk and milk marketing when the quantities are small but when larger, men take control of marketing and decisions on how to utilize the income, thus depriving the women of income. Further, study findings show that women are involved in the daily routine of the labour for dairy animals. This limits their participation in other activities that would enhance their position in the smallholder dairy production system. Due to their workload, women do not attend education and awareness forums for smallholder dairy farmers which are facilitated by the local cooperative societies. As such, they lack technical knowhow to care for the animals for better management.

4.3.2 Challenges Facing Women in Zero-Grazing Dairy Production

The study sought to find out the specific challenges facing women in the zero-grazing dairy production system. There are several challenges facing women practicing zero-grazing dairy production system . Table 4.9 depicts the challenges highlighted among the respondents where animal diseases / lack of technology/ inadequate fodder/ extension services were indicated by the majority 27.5 percent, 13.7 percent responded animal diseases/lack of technology/inadequate fodder, 11.8 percent indicated lack of technology/ inadequate fodder/ extension services and animal diseases/extension services. Among the sample, 9.8 percent indicated facing all the challenges in the response options. Their lack of participation in such activities further alienates their efforts of improving their livelihood through zero-grazing dairy production. This implies that their level of empowerment of women in smallholder dairy production is further constrained to poor access to new technical knowhow and skills to deal with animal diseases, feeding management and access to markets.

Table 4.9: Challenges Facing Women in Zero-Grazing Dairy Production System

Challenges	Frequency	Percent
Animal diseases/lack of technology/inadequate fodder	7	13.7
Animal diseases/extension services	6	11.8
Lack of technology / death of cow during calving	4	7.8
Access to markets/ animal diseases/inadequate fodder	1	2.0
Access to markets/ animal diseases/ lack of technology/ inadequate fodder/ extension services	3	5.9
Animal diseases / lack of technology	5	9.8
Animal diseases / lack of technology/ inadequate fodder/ extension services	14	27.5
Lack of technology/ inadequate fodder/ extension services	6	11.8
All the above	5	9.8
Total	**51**	**100.0**

Access and availability of fodder was a major challenge to women dairy farmers. This is attributed to the small land sizes which may not provide adequate fodder for their dairy cows. As study findings show, most of the women owned less than ½ an acre. Key informant interviewee gave the following observation.

"There is scarcity of fodder due to small land sizes. This means that women move from place to place in search of fodder for their livestock. E.g. cutting grass on the road side"

Extension services are designed to bridge the gap between new technical knowledge and technology and farmers' practices. Access to extension services was also cited among the sample as a constraining factor for women participation in zero-grazing dairy production system. Tallam (2000) found that men had full access to extension services compared to women; Oniang'o (1999) indicates that generally, women have less access to extension services mainly due to men's strong position as heads of households and as well as community, with the general belief that information men receive through extension will trickle down to the women.

4.4 Factors Constraining Women in Zero-Grazing Dairy Production System

The study sought to investigate on the factors constraining women participation in zero-grazing production system. The respondents were asked to indicate to what extent they agreed or disagreed with the factors listed. Table 4.10 summarizes the frequencies for each of the responses along with the mean and the standard deviation. Lack of access to credit facilities (M=4.04; SD=1.148) was ranked as the most significant factor constraining women, the land tenure system was (M=3.63; SD=1.166), cultural attitude was observed at (M=3.10; SD=.671), access to extension services was (M=2.55; SD=1.205), workload was observed at (M=2.53; SD=1.286) and lack of technical skills (M=2.43; SD=1.253).

Access to credit facilities was ranked the most constraining factor on the participation of women. This factor is associated to the lack of control of resources among women which limits their ability to secure financial assistance. The resources associated with zero-grazing dairy farming that could assist women to secure loans are in most cases under the ownership of men. e.g. land, cattle, milk, etc. Lack of capital hinders smallholder dairy farmers to employ workers, purchase feed, drugs and equipment necessary for day to day running of a dairy farm (Hanyani-Mlambo, 2000). To acquire financial assistance from formal institutions one is required to give collateral which is predominantly on assets such as land. Madeley (2002) and Ochola (2002) that women have little access to credit facilities due to lack of collateral, cultural, traditional, institutional and sociological factors. FGDs with the women revealed that majority identified land and livestock ownership to the spouse. This is well presented by sentiments from a key informant.

"The patriarchal system allows men to own land either through inheritance or buying while women are supposed to inherit but do not. Those who do inherit are single parents and are only provided with space to build their small house. This makes men the sole decision makers over the land leaving women with no ability to make decisions like taking a loan, deciding the breeds to keep, the number of dairy animals to keep"

In the FGDs most respondents indicated that they would wish to access loans through formal institutions but they have no collateral under their name. FGD discussants said they had approached AFC and Equity bank but were required to submit a budget proposal and they had to persuade their spouses to guarantee them. And in some cases, the spouses would turn down such requests.

"I would wish to go for a loan to buy another cow but I have to ask my husband to act as my guarantor and he was not willing"

The study findings show that women performed the majority and tedious work in the zero-grazing dairy production system. According to a key informant the amount of work that the women perform is a constraining factor as it does not motivate them to engage in zero-grazing as a full time employment. Women workload in zero-grazing dairy production system also alienates their engagement in management activities such as the marketing of milk and developing their knowledge in feeding and disease management. Access to extension services is more available to men rather than women since they are engaged all day in performing duties. Due to lack of time to access initiatives provided by extension officers and cooperative societies in the study area women empowerment is further constrained and so is their participation in the zero-grazing dairy production system. below are some of the sentiments made by respondents during the FGD.

"Poor division of labour- men would hardly assist in searching for pastures making it a preserve of women. This demoralizes women"

"Dairy farming is labour intensive so women spend a lot of time searching for the fodder and feeding animals, cleaning the shed, spraying animals, watering, etc."

"Low Commitment towards dairy farming due to low morale as a result of low or lack of remuneration by spouses"

"I would like to participate in the forums arranged in the areas by extension officers and Kiambaa Cooperative Society but I do not have the time since I will be working all day to attend"

Cultural attitude was also ranked constraining factor among the respondents. Cultural attitude concept referred to the perception and attitude towards dairy farming. In regard to this, a key informant revealed that among the factors constraining women participation was the perception of dairy farming as a labour intensive venture mostly practiced by the less educated.

"A negative perception that dairy farming is a layman's work"

Table 4.10: Factors Constraining Respondents Participation in Zero-Grazing

Factors	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Mean	Std. Deviation
Lack of access to credit facilities	1	7	5	14	24	4.04	1.148
Workload	14	13	11	9	4	2.53	1.286
Lack of technical skills	17	10	10	13	1	2.43	1.253
Access to extension services	9	23	4	12	3	2.55	1.205
Land tenure systems	0	12	11	12	16	3.63	1.166
Cultural attitude	0	7	34	8	2	3.10	.671
Lack of improved breeds	17	0	3	31	0	2.94	1.406

Key informant interviews revealed that poor remuneration was also a constraining factor affecting women participation in zero-grazing livestock production. Due to financial constraints the empowerment of women in zero-grazing dairy production system is constrained as they are limited to practicing for sustenance and cannot improve earnings from dairy production.

"Cooperative societies pay poorly for the milk delivered as compared to the market prices. After the deductions for acquired inputs are made from the milk sales, then only a small amount remains that can hardly support a family"

4.5 Initiatives to Promote Women in Zero-Grazing Dairy Production System

The study sought to find out whether there were initiatives supporting women in zero-grazing dairy production system; majority of the respondents indicated 'no' and comprised of 66.7 percent compared to 33.3 percent who indicated 'yes' as depicted in Table 4.11. Initiatives are important in adding more knowledge on the subject matter. This would help to counter some of the challenges facing women practicing zero grazing dairy production system. This would greatly improve on the management of the dairy cattle.

Table 4.11: Initiatives Supporting Women in Zero-Grazing Dairy Production

Response	Frequency	Percent
Yes	17	33.3
No	34	66.7
Total	**51**	**100.0**

4.5.1 Source of Initiatives

The study sought to identify the facilitators of initiatives supporting women participation in zero-grazing dairy production system. Table 4.12 depicts the facilitators of the initiatives to the women in the sample. The majority who comprised of 9.8 percent indicated the government and also both the government and the Kiambaa Cooperative Society. Among the sample, 5.9 percent indicated the government, 3.9 percent were Community Based Organisations and 2.0 percent were Government, NGOs, CBOs, Kiambaa Cooperative Society and CBOs, Kiambaa Cooperative Society respectively. However, FGD with the 10 women revealed that majority of the women were not members of the cooperative society as membership was with their spouses while the 3 whom were registered were widows. Failure of most women to have been registered at the cooperative society translates to lack of empowerment. This means majority of women cannot make independent decisions towards the management of dairy animals

e.g. types of breeds to keep, number of dairy animals to keep, amount of money to spend on household necessities, etc. This may be attributed lack of access to income generated from milk sales, as women are not the recipient of the money.

Table 4.12: Facilitators of Initiatives

Facilitators	Frequency	Percent
Government	3	5.9
Government/NGOs/CBOs/Kiambaa Cooperative Society	1	2.0
Community Based Organisations	2	3.9
Government/ Kiambaa Cooperative Society	5	9.8
CBOs/ Kiambaa Cooperative Society	1	2.0
Kiambaa Cooperative Society	5	9.8
Not Applicable	34	66.7
Total	**51**	**100.0**

In regard to the benefits of being members of the cooperative society, the findings show that there were several benefits as opined by a FGD discussant;

"There are several benefits such as loan borrowing to pay school fees for children, pick inputs which is then deducted from milk account, no struggling in search of market, transport distance and time is reduced"

4.5.2 Type of Initiatives

The researcher further examined the type of specific initiatives that were provided towards women in zero-grazing dairy production system. Provision of funds, education and training, extension services, marketing services, processing services and demonstration tours were indicated among 9.8 percent of the sample, 3.9 percent indicated all the above, 3.9 percent also responded extension services as further elaborated in Table 4.13. The majority of dairy farmers are women but there are no gender-specific initiatives to promote them. This means that there is no level playfield for men and women while men have an added advantage of control of resources through

their ownership while women do not have. Men in the households of women practicing zero-grazing dairy cattle therefore are more empowered than the women. They make all decisions towards dairy management in addition to receiving all the money raised from the sector.

Table 4:13: Type of Initiatives among Respondents

Initiatives	Frequency	Percent
Provision of funds/education and training	1	2.0
Education and training	1	2.0
Extension services	2	3.9
Provision of funds/education and training/extension services/marketing services/processing services/tours	5	9.8
Provision of funds/education and training/extension services/marketing services/processing services/demonstration tours/ purchasing of animal feed on credit terms	2	3.9
Education and training/ extension services	2	3.9
Provision of funds/education and training/extension services/marketing services/processing services/ offering machinery and farm equipment on credit terms	2	3.9
All the above	2	3.9
Not Applicable	34	66.7
Total	**51**	**100.0**

Qualitative study findings show that indeed women had access to loans from various bodies such as government funded loans such as the Women Empowerment Fund however they did not seek these due to different reasons as espoused by a key informant.

"There are readily available loans from Women Enterprise Fund, Formal institutions (AFC, Equity bank). However women shy away because they are not sure of how to repay since men are the recipients of the money generated from milk sales"

In the FGDs, members identified the expectation that they have with the implementation of the Kenya Constitution 2010. In the constitution of Kenya, 2010, Article 60 (1f) talks of elimination of gender discrimination in law, customs and practices related to land and property in land. This will assist in removing barriers facing women in land ownership. Women can now freely own land through inheritance from spouses or parents and through purchasing. However, this may take a while to implement. The statement below was made by a key informant in regard to land ownership.

"The government has changed the constitution on land ownership. Women can now own land through inheritance and purchase. This is however yet to take effect on the ground. Women are yet to start inheriting land from their parents"

4.5.3 Impact of Initiatives

The study sought the perception of respondents on the impact of the identified initiatives on the participation of women in the zero-grazing dairy production system. As indicated in Table 4.14, a similar size of respondents answered a little extent, moderate extent and to a great extent, accounting for 7.8 percent. Among the sample 5.9 percent indicated to a good extent and 3.9 percent responded no extent.

Table 4.14: Impact of Initiatives on Women Participation in Zero-Grazing System

Impact of initiatives	Frequency	Percent
No Extent	2	3.9
A little extent	4	7.8
Moderate extent	4	7.8
To a good extent	3	5.9
To a great extent	4	7.8
Not Applicable	34	66.7
Total	**51**	**100.0**

4.6 Measures to Improve Women Participation in Zero-grazing Dairy Production

The respondents were asked to indicate what measures they would expect in order to improve their participation in zero-grazing dairy production system. Among the responses access to credit and finance was the most popular among 49.0 percent of the respondents; education and training in product development and tours were identified by 17.6 percent, access to animal feeds on credit terms and the availability of improved and quality breeds of cows were also identified among 9.8 percent respectively as presented in Table 4.15.

Table 4.15: Measures to Improve Women Participation in Zero-Grazing Production

Measures	Frequency	Percent
Access to finance and/or credit facilities	25	49.0
Make available quality breeds	5	9.8
Better access to extension services	2	3.9
Access to animal feed on credit terms	5	9.8
Agricultural seminars	1	2.0
Access to more land	1	2.0
Education and training in product development and tours	9	17.6
Formation of community groups such as women groups	2	3.9
Not Applicable	1	2.0
Total	**51**	**100.0**

Access to more land was also observed in the responses among 2.0 percent of the sample. Access is referred to as the opportunity to make use of something. This implies that women perceive the lack of control on such resources as land and dairy cows. These findings also show that although women have access to some of these resources (land, dairy cows, education and training, extension services, credit facilities, labour, equipment, income, assets, health services, child care, trees, cattle, household goods, labour and time) they do not have the control of these resources. lack of control means that they cannot make independent decisions on dairy management. This translates to mean that men are more empowered than women practicing zero-grazing dairy production. Among the sample, 9.8 percent farmers indicated that they would prefer assistance with more quality breeds of dairy cows. The breeds that were pre-dominant in the area were cross breeds between Friesians and Ayrshires according to a key informant;

"Quality breeds of dairy cows would ensure more efficient conversion of feed to milk; improved dairy animals are also larger and therefore fetch higher prices when sold for meat"

According to the GoK (2010), most cooperatives have not embraced value addition and processing including packaging and branding, and thus lose out on potential returns and benefits to their members or producers. Study findings show that women would require assistance in product development and demonstration tours so as to add value to the milk produce. Key informant interview revealed that the women sell their milk in its raw form given they have no means for s

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter of the study comprises of the summary of the study, conclusions and recommendations. It also proposes areas of further research based on the study findings.

5.2 Summary

The study sought to examine the challenges facing women participation in zero-grazing livestock production in Karuri sub-location. The study objectives were to identify challenges facing women in the zero – grazing dairy production system in Karuri location, and to establish the level of empowerment of women practicing zero – grazing dairy production system in Karuri location. The study conducted a literature review which included the challenges facing women in zero-grazing dairy livestock production, factors constraining their participation in zero-grazing dairy livestock production and initiatives promoting women participation in zero-grazing dairy livestock production. This also included the theoretical framework on which the study was premised which was the women empowerment framework. The study adopted a descriptive research design. The study adopted the convenience and purposive sampling techniques to identify the respondents of the study. The respondents were 51 women and key informants of the study were livestock production officers at the location and county levels and women leaders in the village. The primary tools for data collection were the survey technique, key informant interviews and the Focus Group Discussion.

5.2.1 Challenges Facing Women in Zero-Grazing Dairy Livestock Production

The study found that women that women are overburdened by productive roles of caring for the dairy animals. The workload is too much and already, women are overwhelmed by reproductive roles and as such, they may not effectively participate in zero-grazing dairy production. In the sample 90.2 percent indicated undertaking all the activities involved in zero-grazing dairy production. This has a negative impact on women since

these women find it difficult to effectively participate in community roles such as farmers cooperatives meetings or to take up leadership roles in such associations. The study found that men are the registered members of the cooperatives societies. This limits access and control to the income from the sale of the milk through the cooperative societies. This has led to women selling a part of the milk to milk bars at the shopping center, neighbors, schools and other institutions as well as hawking in order to generate a little income for themselves. Other significant challenges facing women in the zero-grazing dairy production system include access to markets, access to technology, land ownership, etc

5.2.2 Factors Constraining Women Participation in Zero-Grazing Dairy Production

The study found that access to credit was the major constraining factor among the respondents with an observed Mean of 4.04 and Standard Deviation of 1.1.48. Women's lack of control over resources such as land has serious implications also on their access to credit facilities since financial institutions require some form of collateral before approving any loan application. Cultural attitude towards dairy farming was also identified as a significant factor constraining women in dairy production with an observed Mean of 3.10 and Standard Deviation value of .671. There is a perception that dairy farming is for those who are not well-educated and that it is a lay man's activity due to its intensive nature. This is shown by the low number of youth undertaking the zero-grazing dairy production system in the area. Lack of improved quality breeds also implies that the production of milk is less as would be observed with such quality breeds.

5.2.3 Initiatives to Improve Women Participation in Zero-Grazing Dairy Livestock Production

The study found that majority of the respondents indicated that they were not aware of initiatives to support women participation in zero-grazing dairy livestock production system. The government and the Kiambaa Cooperative Society were the most prominent supporters of women efforts in zero-grazing. These included services such as marketing services for the milk produced, value addition processes and education and training in effective zero grazing dairy production. However, interviews revealed that the prices

offered through the cooperative society were poor and would not cater for the costs of inputs and guarantee profits.

5.3 Conclusions

The study concludes that small-scale zero-grazing dairy production is a viable option for economic empowerment and self-reliance for rural women. Women participation in dairy farming is popular despite the challenges observed. The study concludes that lack of credit was the most significant factor for the effective participation of women in regard to the access and control of resources. Although they perform most of the activities associated with milk production; women are less involved in decision making processes and are less likely to receive any income. Heavy workload mainly searching for fodder was also a major challenge; majority of the respondents had grown nappier grass for fodder but the size of land also influenced the availability of sufficient fodder for their dairy cattle. There exists cooperative society to assist dairy farmers to market their products but they are not farmer managed and male spouses are the registered members who are involved in decision making thereby further alienating women participation in management issues.

The study concludes that women led small business organisations should be developed and strengthened to support women dairy farmers. This would contribute to the empowerment of women in regard to identification of business opportunities and marketing of milk produce and products. The study concludes that initiatives that are adopted to address the plight of women dairy farmers should begin with the women and this should be facilitated with education and training on the viable options in the current market.

5.4 Recommendations

The researcher makes the following recommendations;

1. The study recommends that women should be supported to have enough dairy animals so as to participate in zero-grazing dairy production as a full time employment with sufficient income generated on a regular basis. The income

generated forthwith , if well managed would employ farm-hands to assist in the provision of labour for the dairy cattle. This would assist in off-loading the excess workload for the women and as a result, they may have more time to attend to other reproductive and community roles.

2. Spouses of the women practicing zero-grazing dairy production should be enlightened on the benefits of women empowerment. CBOs and extension officers ought to train them to allow the women to be registered members of the dairy co-operative societies. This will boost morale towards dairy farming as they will make decisions on the day-to- day management. This will eventually generate higher income from increased milk production, and the trickledown effect to the family, of better standards of living. Generally speaking, men should be encouraged to allow their spouses to actively participate in all aspects that would help promote the women participation in dairy management e.g. attending seminars, field study tours, workshops, making decisions on breeds, decisions on number of dairy animals to keep, etc.
3. The study recommends for the strengthening of small business organizations that are farmer (women) owned and managed institutions to promote, facilitate and coordinate investments in livestock and dairy sectors.
4. The study recommends for enhancing of value addition on milk and milk products. There is little evidence on on-farm and off-farm processing of milk produce for smallholder dairy farmers.
5. The study recommends that women should be provided with education and training on emerging technologies in dairy farming sector to lessen their workload which will allow them to have time to indulge in other reproductive activities such as attending cooperative society meetings.
6. The study recommends further research on areas that would promote and encourage women participation in the zero-grazing dairy production system.

REFERENCES

Abebe, W. and Galmessa, U. (2011). Gender role in peri urban dairy production system of Ambo town, Ethiopia. *Journal of Agricultural Extension and Rural Development* Vol. 3(13), pp. 224 – 228

Baltenweck, I. and Staal, S. J. (2000). Determinants of Adoption of Dairy Cattle Technology in the Kenyan Highlands: A Spatial and Dynamic Approach.

Bekure, S., de Leeuw, P. N., Grandin, B. and Neate, J. H. (1991). Maasai herding: an analysis of the livestock production system of Maasai pastoralists in eastern Kajiado District, Kenya. ILCA System Study, No. 4. International Livestock Center for Africa, Addis Ababa

Berhanu, K., Kindie, G., Derek, B and Kassa, B. (2006). Determinants of participation decisions and level of participation in farm level meilk value addition: the case of samllholder dairy farmers in Ethiopia. Ethipia. *Journal of Applied Science and Technology 2* (2) 19 - 30

Brink, I. (1999). Fundamental of Research Methodology for Health Care Professional. 2nd Edition. Cape Town: Juta and Company Ltd.

Carletto, C. (1998). Household Food Security and the Role Of Women. IFAD's experience in Guatemala. Staff Working Paper Series on Gender and Household Food Security No. 3 Rome. IFAD

C.B.S. (2001). The 1999 population and housing census, Vol. I Population distribution by administrative area and urban centers. Central Bureau of Statistics, Ministry of Finance and planning. Nairobi, Kenya

Chinogaramombe, G. N. C., Muchenje, V., Mapiye, C., Ndlovu, T., Chimonyo, M. & Musemwa, L. (2008). Challenges for improving smallholder dairy production in the semiarid areas of Zimbabwe. *Livestock Research and Rural Development, 20 (3).* Available at http://ftp.sunset.se/wmirrow.www.cipav.org.co/Irrd20/3/chin20034.htm

Cloud, K. (1985). Women's productivity in agricultural systems: Considerations for project design. In: Overholt C., Anderson M.B., Cloud K. and Austin J.E. (eds),

Gender roles in development projects. A case book. Kumerian Press, West Hartford, Connecticut, USA. pp. 17–56.

Constitution of Kenya (2010). Laws of Kenya. Government Printing Press, 2010.

Delgado, C., Rosegrant, M., Steinfeld, H., Ehui, S., and Courbois, C. (1999) "Livestock to 2020 – The Next Food Revolution". Food, Agriculture and the Environment Discussion Paper 28. IFPRI/FAO/ILRI.

Denise, F. P., Cheryl, T. B and Hungler, B. P. (Eds). (2001). Essentials of Nursing Research Methods, Appraisal and Utilization. New York: Baltimore.

FAO (2006). Planning Livestock Interventions with a Gender and HIV/AIDS Lens." Fact Sheet. Available at www.fao.org/ag/AGAinfo/subjects/documents/livestockaids0606.pdf

FAO and IDF (2004). Dairy Development n ewsletter. October 2004-Issue no.8

Freeman, H. A., Jabbar, M. A. and Ehui, S. K. (1998). Role of credit in the uptake and productivity of improved dairy technologies in Ethiopia. In: Freeman H. A., Jabbar M. A. and Ehui, S. K. (eds), Role of credit in the uptake and productivity of improved dairy technologies in sub-Saharan Africa. Socio-economic and Policy Research Working Paper 22. ILRI (International Livestock Research Institute), Addis Ababa, Ethiopia. pp. 16–35

Gilham, B. (2000). Case study Research Methods. London: PastonPrePress Ltd.

Government of Kenya (2008). Vision 2030 Medium Term Plan 2008 – 2012. Government Printers. Nairobi

Government of Kenya (2010). Agricultural Development Sector Strategy 2010 – 2020. Government Printers. Nairobi

Government of Kenya (2012). Dairy Farmers Training Manual. Ministry of Livestock Development. Government Printer. Nairobi

Government of Kenya (2013). Kiambu County Development Profile. Government Printer. Nairobi

Hanyani-Mlambo, B. T. (2000) Economics of smallholder dairying in Zimbabwe. Proceedings of the UZ/RVAU/DIAS/DANIDA-ENRECA project review workshop held between10-13 January 2000 in Harare, Zimbabwe

Huss-Ashmore, R. and Curry, J. J. 1992. Impact Of Improved Livestock Disease Control on Household Diet And Welfare: A Study in Uasin Gishu District, Kenya. ILRAD Technical Report No. 2. Nairobi, ILRAD.

International Fund for Agricultural Development (IFAD), World Bank and the Food and Agriculture Organization of the United Nations (FAO). Gender in Agricultural Livelihoods Sourcebook. Gender and livestock module – Overview, 2007

IFAD (2005). Empowerment of Women Producers Association Project. Federation of Bosnia and Herzegovina, signed in May 2005.

Kaleem, A. and Ahmad, S. (2008). Bankers' Perceptions of Electronic Banking in Pakistan. Journal of Internet Banking and Commerce. Vol. (13) No.1

Kamau, F. K. (1994). A Kenyan experience on R&D efforts linking crop and livestock improvement, NRM and human health. available at http://www.ilri.cgiar.org/InfoServ/Webpub/fulldocs/Aesh/kenyan.htm

Karanja, (2003). The Dairy Industry in Kenya: The Post-Liberalization Agenda. Paper presented at a Dairy Industry Stakeholders Workshop held in Nairobi, Kenya (27th August 2002).

Kenya Dairy Board, 2009. Annual Report, Nairobi Kenya.

Kenya National Bureau of Statistics, KNBS (2010). Quarterly GDP Report, December 2010, Government Press, Nairobi.

Kinambuga, D. (2010). Evaluation of the constraints to profitable smallholder dairying: a case of Nakuru County, Kenya. Master's Thesis. Master of Science Degree in Agricultural and Applied Economics. Egerton University.

Kurwijila, L. R. (2002). Dairy development in Tanzania: Country paper. In: Rangnekar D. and Thorpe W. (eds), Smallholder dairy production and marketing—Opportunities and constraints. Proceedings of a South–South workshop held at NDDB, Anand, India, 13–16 March 2001. NDDB (National Dairy Development Board), Anand, India, and ILRI (International Livestock Research Institute), Nairobi, Kenya.

Lanyasunya et al, (2002). Smallholder Dairy Systems in the Kenya highlands: Cattle Population Dynamics under Increasing Intensification KARI Naivasha 2002

Lanyasunya, Lokweleput, M. and Muhuyi, G. (1998). Effects of calf rearing packages introduced to smallholder dairy farms in Bahati Division of Nakuru District, Kenya. KARI Scientific Conference, Nairobi

Leksmono, C., Young, J., Hooton, N., Muriuki, H., and Romney, D. (2006). Informal Traders Lock Horns with the Formal Milk Industry: The role of research in pro-poor policy shift in Kenya, ODI/ILRI Working Paper 266.

Links (2003). Livestock and Gender: The Tanzanian Experience in Different Livestock Production Systems.

Madely, J. (2002). *Women food producers: releasing their potential (eds). Food for all: the need for a new agriculture.* Dhaka, Bangladesh: University press ltd. Publishers.

Maarse, L., Wenholt, W. and Chibudu, A. (1998). Making change strategies work: Gender sensitive, client oriented livestock extension in Coast Province, Kenya. Royal Tropical Institute, Amsterdam, Netherlands.

McCorckle, C. H. (1987). Highlights from sociological (CRSP) research on small ruminants. Pastoral Development Network, Paper 24d, ODI, London.

McGuire, J. S. and Popkin, B. M. (1990). Helping women improve nutrition in the developing world. Beating the zero sum game. World bank. Washington D.C

MoL&FD 2003, Ministry of Livestock Development. (2003). Annual Report

Muriuki, H. G. (2002). Smallholder dairy production and marketing in Kenya. In: Rangnekar D. and Thorpe W. (eds), Smallholder dairy production and marketing—Opportunities and constraints. Proceedings of a South–South workshop held at NDDB, Anand, India, 13–16 March 2001. NDDB (National Dairy Development Board), Anand, India, and ILRI (International Livestock Research Institute), Nairobi, Kenya

Muriuki H.G and Thorpe, W (2001). Smallholder dairy production and Marketing in Eastern and Southern Africa: Regional Synthesis

Neuman, W. L. (2003). Social Research Methods. London: Pearson

Niamir-Fuller, M. (1994). *Women livestock managers in the third world. Focus on technical issues related to gender roles in livestock production*. Staff working Paper 18, Wegeningen, The Netherlands: IFAD

Nicoletti, P. (1984). The Control of Brucellosis in Tropical and Subtropical Regions. Prev. Vet. Med. 2:193–196.

Ngongoni, N. T., Mapiye, C., Mwale, M. and Mupeta, B (2006). Factors affecting milk production in the smallholder dairy sector of Zimbabwe. *Livestock Research for Rural Development* 18 (5)

Njoroge, D. K. (2002). Evolution of biogas technology in South Sudan; current and future challenges. Proceedings Biodigester Workshop March 2002. Retrived 10th May, 2013 from http://www.mekarn.org/procbiod/kuria.htm

Ochola, W. O. (2002). *Gender integration in agricultural and livestock extension*. A Training Guidebook. National Agriculture and Livestock Extension Programme. Nairobi, Kenya: Ministry of Livestock and Rural Development.

Oluka, J., Owoyesigire, B., Esenu, B. and Ssewannyana, E. (2005). Small Stock and Women in Livestock Production in the Teso Farming System Region of Uganda. Livestock Research Development Programme. DFID

Omiti, J. and Staal, S. (eds). (1996). The Ugandan dairy subsector: A rapid appraisal. ILRI/NARO/MAAIF Research Report. ILRI (International Livestock Research Institute)/NARO (National Agricultural Research Organization of Uganda)/MAAIF (Ministry of Agriculture, Animal Industry and Fisheries of Uganda), Kampala, Uganda.

Omiti, J. M. (2002). Impacts of liberalization in Kenya's dairy sector. In: Rangnekar D. and Thorpe W. (eds), Smallholder dairy production and marketing—Opportunities and constraints. Proceedings of a South–South workshop held at NDDB, Anand, India, 13–16 March 2001. NDDB (National Dairy Development Board), Anand, India, and ILRI (International Livestock Research Institute), Nairobi, Kenya

Omiti, J. and Muma, M. (2000). Policy and institutional strategies to commercialise the dairy sector in Kenya. Occasional Paper 6/2000. IPAR (Institute of Policy Analysis and Research), Nairobi, Kenya.

Omore, A. O., McDermott, J. J. and Gitau, G. K. (1996). In: Proc. 5th and Scientific Conf. of the Kenya Agricultural Research Institute. October 14–16, 1996, Nairobi,

Kenya. Factors influencing production on smallholder dairy farms in Central Kenya, pp. 370–379.

Omore, A., Muriuki, H., Kenyanjui, M., Owango, M. and Staal, S. (1999). The Kenyan dairy subsector: A rapid appraisal. Smallholder Dairy (Research & Development) Project Report. Ministry of Agriculture/Kenya Agricultural Research Institute/International Livestock Research Institute, Nairobi, Kenya.

Oniang'o, R. (1999). *Trends in women's contributions to agricultural productivity.* A Paper presented at the conference on the roles, constraints and potentials of women in agricultural development, at the centre for social development, Bonn, Germany. Available at online www.zef.de/download/kw-women/plenary-Oniango.Pdf

Owango, M. O., Staal, S. J., Kenyanjui, M., Lukuyu, B., Njubi, D. and Thorpe W. (1998). Dairy co-operatives and policy reform in Kenya: Effects of livestock service and milk market liberalization. Food Policy 23:173–185.

Paudel, L. N., Meulen, U., Wollny, C., Dahal, H. and Gauly, M. (2009). Gender aspects in livestock farming: pertinent issues for sustainable livestock development in Nepal. *Livestock Research for Rural Development*. 21 (3)

Peeler, E.J. and A.O. Omore (1997): Manual of Livestock Production Sytems in Kenya 2nd Edition KARI/DFID, NARP II, National Veterinary Reaserch Centre, Kikuyu, Kenya

Piper, H., & Simons, H. (2005). Ethical responsibility in social research. In B. Somekh & C. Lewin (Eds.), Research methods in the social sciences (pp. 56-63) London: Sage Publications.

Quisumbing. A. (1994). Improving women's agricultural productivity as farmers and workers. Education and Social Policy (ESP) Discussion paper Series 37. The World Bank, Washington DC, USA.

Republic Of Kenya, 2013. Kiambu County Development Profile, District Development Office, Kiambu

Reynolds, L., Metz, T. and Kiptarus, J. (1996). Smallholder dairy production in Kenya. Available on http://www.fao.org/docrep/W2650T/w2650t07.htm

Saghir, A., Tanvir A., Munir, A. and Muhammad, Z. (2005). Gender participation in livestock production activities and their consumption trend of proteineous diet in Tehsil Fateh Jung. *Pak. J. Agri. Sci.,* Vol. 42 (3-4)

Salih Mohammed, 1985. Pastoralism and the State in African Arid Lands. An overview. Commission of Nomadic People: Institute of African Studies, Sweden. 1985

Samuel, M., Azage, T. & Hegde, B. P. (2009). Livestock ownership status and flock /herd structure in mixed production system of watershed of Livestock Agriculture. In Ethiopia. Tamirat Degefaand Fedede Feyissa (Eds). Proceedings of the 16thAnnual conference of the Ethiopian society of Animal prediction (ESAP) held in Addis Ababa, Ethiopia, 8 October 2008 part II. Technical session. In ESAP Addis Ababa, pp. 169-178.

Siva Kumar, P. S. and Trikha, R. N. (2002). Message design for community wall newspaper:

Participatory Approach. *Management Extension Research Review*. Vol (3) 1. National Institute of Agricultural Extension Management. Rajendranagar, Hyderrabad, India

Sukhatme, P. V. and Sukhatme, B. V. (1970). Sampling Theory of Surveys with Applications. ISBN: 0-8138-1370-0. Indian Society of Agricultural Statistics, New Delhi, India and the Iowa State University Press, Ames, Iowa, U.S.A.

Staal, S. J. (2002). Smallholder Dairy Competitiveness. In: Rangnekar D. and Thorpe W. (eds), Smallholder dairy production and marketing. Opportunities and constraints. Proceedings of a South–South workshop held at NDDB, Anand, India, 13–16 March 2001. NDDB (National Dairy Development Board), Anand, India, and ILRI (International Livestock Research Institute), Nairobi, Kenya.

Stevens, A. (1990). Women and Livestock Production in Asia and South Pacific region. FAO, Bangkok.www.fao.org

Tallam, E. J. (2009). Influence of Gender Access to and Control over Resources on Milk Production among Smallholder Dairy Farmers in Kabarnet Division, Baringo District. Master of Science Degree in Agricultural Extension of Egerton University

Tambi, E., Mukhebi, A. W., Maina, O. W. and Solomon, H. M. (1997). Privatization of animal health services in Kenya: An evaluation of the Kenya Veterinary Association Privatization Scheme (KVAPS). OAU (Organization of African Unity)/IBAR (Inter-African Bureau for Animal Resources)/PARC (Pan-African Rinderpest Campaign)/ILRI (International Livestock Research Institute) Report. ILRI, Nairobi, Kenya.

Tangka, F. K., Jabbar, M. A. and Shapiro, B. I. (2000). Gender roles and child nutrition in livestock production systems in developing countries: A critical review. Socio-economic and Policy Research Working Paper 27. ILRI (International Livestock Research Institute), Nairobi, Kenya. 64 pp

Tarfa, S. B. and Ogunwale, S. A. (1998). Women's integration into decision-making on the utilization of agricultural processing technologies in Nigeria. In: Ranaweera N.F.C, Gunasena H.P.M., Senanayake Y.D.A. (eds), *Changing agricultural opportunities: The role of farming systems approaches. Proceedings of the 14th International Symposium on Sustainable Farming Systems, Colombo, Sri Lanka, 11–16 November, 1996*. AFSA (Asian Farming Systems Association), Peradeniya, Sri Lanka. pp. 279–285.

Tsehay, R. (2002). Small-scale milk marketing and processing in Ethiopia. In: Rangnekar, D. and Thorpe, W. (eds), Smallholder dairy production and marketing—Opportunities and constraints. Proceedings of a South–South workshop held at NDDB, Anand, India, 13–16 March 2001. NDDB (National Dairy Development Board), Anand, India, and ILRI (International Livestock Research Institute), Nairobi, Kenya.

UNDP (1997). Human Development Report, Oxford University Press, New York. Available on www.fao.org

Wambugu, S., Kirimi, L. and Opiyo, J. (2011). Productivity trends and performance of dairy farming in Kenya. Tegemeo Institute of Agricultural Policy & Development. WPS 43/2011

Whalen, I. T. (1984). Problems and perspectives in expanding the participation of women. Paper prepared for IITA/ILCA/Ford Foundation Workshop on Women in Agriculture in West Africa, Ibadan, Nigeria, 7–9 May, 1984. pp.24

Xuto, N. and Bell, S. F. (1992). Gender issues in livestock production in Thailand. In: Bunyavejchewin P., Sangdid S. and Hangsanet K. (eds), Animal production and rural development. Proceedings of the sixth AAAP animal science congress, Sukhothai Thammathirat Open University, Nonthaburi, 23–28 November 1992. Volume 1. AHAT (Animal Husbandry Association of Thailand), Bangkok, Thailand. pp. 287–29

APPENDICES

APPENDIX 1: QUESTIONNAIRE FOR WOMEN DAIRY FARMERS

Section 1: Demographic Characteristics

1. Age

18 – 25 Years	[ ]
26 – 30 Years	[ ]
31 – 35 Years	[ ]
36 – 40 Years	[ ]
41 years and above	[ ]

2. Highest Education level?

None	[ ]
Primary	[ ]
Secondary	[ ]
College	[ ]
University	[ ]

3. Marital Status?

Single	[ ]
Married	[ ]
Separated / Divorced	[ ]
Widow	[ ]

4. Number of years practicing zero –grazing?

1 – 4 Years	[ ]
5 – 8 Years	[ ]
9 – 12 Years	[ ]
More than 13 years	[ ]

5. Number of dairy cattle kept? ……..

6. Size of land? ……

7. Crops cultivated? ……

Section 2: Challenges facing Women in Zero – Grazing Dairy Production System

6. What are some of the activities you undertake in the zero – grazing dairy production system? (Multiple responses allowed)

Fodder cutting	[ ]
Transportation of fodder	[ ]
Offering fodder to the animals	[ ]
Cleaning of sheds	[ ]
Offering water to the animals	[ ]
Milking	[ ]
Animal health treatment	[ ]

Other (*Specify*)
…….

7. Are there any challenges you face in zero – grazing dairy production system?

Yes	[ ]
No	[ ]
Not Sure	[ ]

8**.** If yes, what are some of these challenges?

Access to markets	[ ]
Animal diseases	[ ]
Lack of technology	[ ]
Inadequate fodder	[ ]
Extension services	[ ]
Restocking	[ ]

Other (*Specify*) ……

Section 3: Factors Constraining Women in Zero – Grazing Dairy Production System

9. Identified in this section are factors that are perceived to constrain women participation in the zero – grazing dairy production system. Please indicate to what extent you agree or disagree with the factors. **SD = Strongly Disagree, D = Disagree, N = Neutral, A = Agree and SA = Strongly Agree.**

Factors	SD	D	N	A	SA
a) Lack of access to finance and credit facilities					
b) Workload					
c) Lack of technical skills					
d) Access to extension services					
e) Land tenure systems					
f) Cultural attitude					
g) Lack of improved breeds					
Other (*Specify*)					

Section 4: Initiatives to Promote Women in Zero – Grazing Dairy Production System

10. Are you aware of any initiatives to support women participation in the zero – grazing dairy production system?

Yes [ ]
No [ ]
Not Sure [ ]

11. If yes, who facilitates these services?

Government [ ]
NGOs [ ]
CBOs [ ]
Religious organisations [ ]

Corporate organizations [ ]

Other (*Specify*) …….

12. What are some of these initiatives or what do they involve?

Provision of funds (Loans) [ ]

Education and training [ ]

Extension Services [ ]

Marketing services [ ]

Processing services [ ]

Tours [ ]

Demonstrations [ ]

Other (*Specify*)

……

13. How would you rate the impact of the identified interventions?

To a great extent [ ]

To a Good extent [ ]

Moderate extent [ ]

A little Extent [ ]

No extent [ ]

14. In your opinion, what measures would improve women productivity in zero – grazing dairy production?

……

……

……

APPENDIX 2: KEY INFORMANT GUIDE FOR LIVESTOCK PRODUCTION OFFICERS

1. What are some of the services that you offer to zero – grazing dairy farmers in Karuri Location?
2. What is the average number of cattle do smallholder dairy farmers in Karuri Location keep?
3. What are the cattle breeds that are kept by smallholders' dairy farmers in Karuri Location?
4. What are some of the challenges that women face in the zero – grazing production system in Karuri location?
5. What are some of the factors constraining women involvement in zero – grazing dairy production system in Karuri Location?
6. What assistance do you think women would benefit from to improve productivity in the zero – grazing dairy production system?
7. Do you provide any gender specific form of services to smallholder dairy farmers in Karuri Location?
8. What are some of the existing initiatives to improve women participation in zero – grazing dairy production system?
9. What contributions have these initiatives had in promoting women productivity in the zero – grazing dairy production system?
10. What are some of the products the smallholder dairy farmers in Karuri Location produce?
11. What is the market for dairy products in Karuri location?

APPENDIX 3: KEY INFORMANT GUIDE FOR WOMEN LEADERS

1. What are some of the challenges faced by women practicing zero-grazing dairy production?

2. What are the factors contributing to these challenges facing women practicing zero-grazing dairy production?

3. Has the government or any other organisations ever attempted to tackle these challenges?

4. In your opinion, what do you think can be done to promote the welfare of women practicing zero-grazing dairy production?

APPENDIX 4: FOCUS GROUP DISCUSSION GUIDE FOR WOMEN DAIRY FARMERS

1. Are you a member of a co - operative society?
2. What are some of the benefits of being in a cooperative society?
3. What are some of the challenges of the co – operative society?
4. Have you tried securing a loan with a formal institution? What was the experience?
5. Have you tried securing a loan from an informal institution? What was the experience?
6. Where do you sell the dairy products?
7. In what form do you sell the dairy products?
8. What form of assistance would you require to improve dairy production in your farms?
9. Who owns the land that you keep the dairy animals?
10. Who owns the dairy animals?