AN EVALUATION OFDAIRY GOAT RESTOCKINGON HOUSEHOLD FOOD SECURITY IN MOLO AND KIPKELION SUB-COUNTIES IN KENYA

By
Douglas Machuchu

This dissertation is submitted in partial fulfillment of the requirements for the award of a Master of Development Studies (MDS) from St. Paul's University

September 2016

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DECLARATION

This dissertation is a product of my own work and is not the result of anything done in collaboration. It has not been previously presented to any other institution. I agree that this dissertation may be available for reference and photocopying, at the discretion of the University.

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1/we confirm that the work reported in this dissertation has been done by the student under my/our supervision.

NAME OF SUPERVISOR Prof. Charity Irungu

SIGNATURE OF SUPERVISOR _____ DATE _____

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ABSTRACT

Food insecurity has been demonstrated to be both a cause and a consequence of violent conflict. Various food security interventions are appropriately employed to either prevent or mitigate consequences of violent conflict. This study compared data collected from two groups; dairy goatrestocking beneficiaries and a counterfactual control, to determine what changes the intervention had on post conflict household food security. Bothcategories belonged to a common group of 5,000 households, selected for sharing baseline circumstances as victims of the 2007/8-post elections violence (2007/8-PEV), having suffered displacement, loss of most household livelihood assets and some death, of especially breadwinners, in Molo and Kipkelion Sub-counties in the Rift Valley. Only 400 households were targeted by the project due to budget limit.The overall studyobjective was to determine the change the intervention had on household food security by employing an ex-post evaluation methodology. The list of 400 beneficiaries and the remaining original 4,600 served as sampling frames from which respondents were selected.Study respondents comprised 100 beneficiaries and 101 controls. Three enumerators collected primary data in April 2014, using a questionnaire, two Focused Group Discussions and Key Informant Interviews with line ministries in both Sub Counties and project staff members. Quantitative data was processed and analyzed using Excel and SPSS programs and graphically presented in charts and tables. Voice recorded qualitative data was transcribed into specific themes, providing background and triangulation to the quantitative findings upon which conclusions were drawn and recommendations made. The study found a positive correlation between dairy goat restocking and improved household food security in the four pillars: availability through own production, access through age equitable and gender equality household member milk distribution, utility through better Knowledge, Attitudes and Practices, and stability assured upon building social capital and networks through dairy goat owner groups formation and hope in the new constitution ensuringrespondents' access to own productive resources and security. It recommends restocking as a food security intervention under similar conditions to promote household food security through improved sustainable agriculture. Such package should comprise case tailored livestock health services,beneficiary-focused insurance policy terms andelaborate awareness

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creation on drug withdrawal period observation and zoonosis control emphasisto promote food safety.

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LIST OF ABBREVIATIONS AND ACRONYMS

AEZ	Agro-Ecological Zone
AHP	Anti-Hunger Programme (of FAO)
ASALs	Arid and Semi-Arid Lands
CU	Community Units
DFID	Department for International Development
DLPO	District Livestock Production Officer
DVO	District Veterinary Officer
FAD	Food Availability Decline
GIZ	*Deutsche Geselleschaft fur Internationale Zusammenarbeit*
HISA	Heifer International, South Africa
HRW	Human Rights Watch
ICRC	International Committee of Red Cross IEG of
WB	Independent Evaluation Group of the World Bank
IFAD	International Fund for Agricultural Development
IFPRI	International Food Policy Research Institute
ILRI	International Livestock Research Institute
KARI	Kenya Agriculture Research Institute
LEGS	Livestock Emergency Guidelines and Standards
LID	Livestock in Development
MDG	Millennium Development Goal(s)
NGO	Non-Governmental Organization
PEV	Post Elections Violence
OECD	Organization for Economic Cooperation and Development
OFDA	Office of Foreign Disaster Assistance
RIGA	Rural Income Generating Activities
SSA	Sub-Saharan Africa
UN/FAO	Food and Agriculture Organization of the United Nations
VSF Suisse	Veterinaires San Frontiers- Switzerland
WFP	United Nations World Food Programme
WFS	World Food Summit
WHO	World Health Organization

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Chapter One

INTRODUCTION

1.1.Background tothe Study

Agriculture is characteristically a major economic driver in developing countries, especially in sub-Sahara Africa (SSA), a region whose population is largely rural, practicing rain fed and rudimentary technology based subsistence production, (Todaro and Smith, 2009; Seck, 2009). Kenya is a developing SSA country and agriculture is the chief economic activity, both in crop and livestock production. Conflict is both a cause and an effect of food insecurity, (Collier, 2009; Brinkman, H and Hendrix C.S., 2011).Prior to the 2007 presidential election results announcement,Kenya had enjoyed relative peace in a neighborhood fraught with conflict, (Human Rights Watch, 2008). The former Rift Valley province where Molo and Kipkelion, then districts (now sub-counties), are located, iscommonly referred to as the breadbasket of the country. The two sub-counties largely inhabited by the Kalenjin community and some Kikuyu, Kisii, Luo and Kamba communities have experienced ethnic skirmishes especially during election years since the introduction of multi-party political system in 1991 targeting the minority groups (Akiwumu Report, 1999). In 2007, the skirmishes culminated in the worst ever form of inter-ethnic conflict resulting in loss of human lives, human displacements- both internal and external, loss of property and livelihoods, among other abuses of human rights(Waki Report, 2008).

Conflict has been shown to be both a cause and an effect of food insecurity. Two schools of thought put the causes of conflict aseco- Malthusian emiseration, environmental

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scarcities and political, economic and cultural factors. According to Messer (2002), the basic underlyingand trigger causes of conflict are not exclusively environmental, ethnic, or political economic, but interactive. Investigations into the cause of the post elections violence in Kenya in 2007/8 that affected the two sub counties under study among others, point to the conclusion drawn above: an interactive array of factors. Lives (of household members, household heads, breadwinners, friends, business associates i.e. human resource and social capital) and livelihoods (crop, livestock, employment, businesses and other forms of property like land, houses, i.e. economic capital) were lost; an outcome that put the victims in a worse state of development, as in addition, peace, security and trust are major prerequisites to investment (Collier, 2007),an inevitable development component.

1.1.1 Livestock based relief interventions

The relevance and contribution of livestock to rural livelihoods changes according to the Agro-Ecological Zones (AEZ), availability and source of animal feed(Pingali, 1987, cited in IFAD, 2010). Under extreme environmental conditions, such as those characterizing dry lands or mountainous areas, mobile livestock production systems may be the only sustainable land use, as the human-livestock interaction has proved to be the only way to produce food while protecting the natural resource base. In less extreme ecological areas livestock helps to diversify the livelihood system and increase the overall productivity and risk-bearing capacities of the farming system. In areas where crop production is feasible, mixed farming systems show a greater capacity to sustain local livelihoods while providing for effective resource management, flexibility and resilience, *ibid.*

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Emergency responses need to take into account the livelihoods of affected populations:not just "saving lives" but also protecting and strengthening livelihoods (Livestock Emergencies Guidelines and Standards- LEGS, 2009). This ensures recovery for the victims, thereby increasing their resilience and reducing their vulnerability to future shocks and disasters (Young, 2001). That can be achieved by harmonizing relief and development thereby checking some negative effects on development like failure to protect and at times destroying local livelihood strategies, undermining existing development initiatives and negative impact on local service provision (Lautze, 1997).

Livestock interventions, depending on the project objectives, range from destocking (with options of accelerated off-take or slaughter destocking), veterinary services provision (primary clinical veterinary services or support to public-sector veterinary functions), provision of feed (relocation of livestock or emergency feeding), provision of water (water point rehabilitation, new water point establishment or water trucking), livestock shelter and settlement (settlement, infrastructure or shelter) and provision of livestock (herd reconstruction or other form of livestock distribution) (LEGS, 2009). The last listed approach, provision of livestock, encompasses restocking.

According to the International Fund for Agricultural Development (IFAD) (2010), restocking is an approach that aims at helping individual pastoral households or communities to build up lost herds and flocks in a sustainable manner. Most of the restocking projects featured in literature are on pastoralists. It is emerging as a new

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strategy in modern livestock development efforts (Heffernan, 1997), although NGOs such as Heifer Project International have reported on activities that started more than half a century ago following World War Two (Heifer International Annual Report, 2013). In its application, restocking, the SPHERE recommended minimum standards and guidelines are followed.

It is on the basis of the prevailing global and local economic, social, political and environmental conditions that the victims of the post elections violence (PEV) found themselves in, that FAO sponsored an international NGO, *Veterinnaires Sans FrontieresSuisse*(VSF Suisse,) to intervene using a dairy goat restocking approach aimed at improving the victims' household food security.

1.2.Statement of the Problem

Restocking is commonly done for pastoralist in arid areas especially following severe herd decimating droughts, but rarely for sedentary farmers. Following the 2007/8-PEV in Kenya, VSF Suisse restocked 400 victim households with dairy goats to improve their household food security in Molo and Kipkelion districts. While an end of project evaluation was conducted immediately, an impact evaluation was not conducted.There is a knowledge gap for comparison between the two contexts- arid/wet, and causes ofloss; drought/conflict that the study intends to fill.

1.3.Justification

Following the lapse of the 2015 deadline for the Millennium Development Goals, among others, the target set for halving world hunger was not achieved in sub-Sahara Africa.

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The challenges remain and are ever getting worse in world faced with increasing insecurity and negative climate change. World leaders adopted the 2030 Agenda for Sustainable Development at the UN sustainable development summit, on 25th September 2015 as framework to address them.

Many challenges that developing countries face, require more efficient and effective innovative approaches that are environmentally friendly, economically viable and culturally acceptable to address. It is through objective investigation and appropriate documentation of the various projects that an archive of information is built from which lessons are drawn to inform decisions on future programs.

There exists information on restocking projects especially in pastoral communities, but little does on mixed farming system with dairy goats. This study set out to provide such information in a different context for comparison.

1.4.Objectives

i. To assess the difference the dairy goat restocking intervention had onfood availability period (number of months own produce yield lasted in moths) in the beneficiary households compared to control households
ii. To assess access of the dairy goat products to different categories of beneficiary household members
iii. To assess the beneficiaries' knowledge, attitude and practices on dairy goat products utility.

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1.5.Research Questions

i. How did restocking with dairy goats change the food availability (in terms of the number of monthsown produce lasted) in the beneficiary households compared to the control households?

ii. How are the dairy goat products and benefits accessed by household members?

iii. What knowledge, attitudes and practices do the beneficiaries have on issues related to human health as regards handling and consumption of dairy goat products?

1.6.Scope of the Study

The study focused on the two districts of Molo and Kipkelion in the former Rift Valley province of Kenya. From the two districts were selected beneficiaries of the dairy goat-restocking program targeting the victims of the PEV in 2007/8 that led to loss of lives-especially household breadwinners, livelihood assets and displacement. The study focused on the specific households that were restocked in an FAO funded project that was implemented by VSF *Suisse,* which specializes in livestock related emergency and development interventions. The changes in household food security following the project were examined along the food security pillars of availability, access, utility and stability to establish an attributable link between the project inputs and outcomes.

1.7.Definition of Terms

*Impact evaluation*in this study will adopt the International Committee of Red Cross (ICRC) definition that entails "the positive and negative, primary or secondary, short or

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long terms effects produced by the intervention, directly or indirectly, intended or unintended" as regards household food security (ICRC, 2005).

Evaluation: The systematic and objective assessment of an ongoing or completed operation, programme or policy, its design, implementation and results. The aim is to determine the relevance and fulfillment of objectives, as well as efficiency, effectiveness, impact and sustainability.

Ex post evaluation shall mean the evaluation of an operation after it has been completed.

Food security will mean the widely accepted World Food Summit definition of "access to all people all the time to food that is safe, sufficient and nutritious to meet their daily tasks and health requirements" (FAO, 1996).

Restocking:the study adopts the Livestock Emergency Guidelines and Standards (LEGS) description of the 'provision of livestock (restocking)' interventionas livestock distribution, which broadly encompasses herd reconstitution and other livestock distribution approaches, whose objective is to either replace lost/decimated flocks/herds following a disaster, whether the target group largely relies on livestock like pastoralists and agro-pastoralists or are mixed farmers who equally depend on but a fewer number of livestock, as a major livelihood, (LEGS, 2009).

Zoonosis: the World Health Organization website defines zoonosis as any disease or infection that is naturally transmissible from vertebrate animals to humans. The site notes that zoonoses may be bacterial, viral, or parasitic, or may involve unconventional agents. As well as being a public health problem, many of the major zoonotic diseases prevent the efficient production of food of animal origin and create obstacles to international trade in animal products (WHO, site)

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*Counterfactual:*This shall mean establishing "What would have happened in the absence of the intervention(s)?" In impact evaluation, to achieve attribution, three factors need to be established; the counterfactual for comparison purposes to delineate the difference between the two groups, elimination of *selection effects*– that introduce differences between the comparison groups, and *unobservables*- omitted variables that can lead to biases. Intervention outcomes, impact, can be assessed by either measuring the variable "before and after" or conducting a "counterfactual analysis"also called "with versus without". For a counterfactual scenario to obtain, a comparison group, variously called "control" is used against the beneficiaries of the intervention also called the "treatment" group.

1.8.Outline of the Chapters

The first chapter has provided the background to, context and framework that guided the study, the second chapter will provide the literature reviewed to understand the study subject- household food security, as it relates to development as a driver and goal, the food security interventions, the role of livestock in food security, restocking as an intervention, the contemporary food security theories and the conceptual framework that diagrammatically links dependent and independent variables.

Chapter three provides the study methodology; the method employed by the study, the instruments, the subjects identification and mode of engagement, data collection, entry, processing, analysis, interpretation and presentation. Chapter four presents the study findings results, analysis interpretation and discussions. Chapter five presents summary findings, conclusions and recommendations from field findings. The last part is the bibliography of works consulted during the study and appendixes.

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Chapter Two

LITERATURE REVIEW

2.0.Chapter Overview

This chapter has five sections; the first section presents a literature review on food security as a development goal and driver, followed by a section on general food security interventions in both crop and animals agriculture. The third section features livestock based food security interventions and restocking specifically for food security. The forth section deals with food security theories, followed by section four which presents a

conceptual framework and section five a schematic presentation of the conceptual framework.

2.1. Food Security: ADevelopment Goal and Driver

The phrase food security is dynamic and continuously evolving, meaning different things to different people in different contexts. The most widely used definition is by the 1996 World Food Summit that "food security exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life (FAO, 1998). From this definition there are four recognizable dimensions of food security: physical availability of food, economic and physical access to food, food utilization and stability of the other three (former) dimensions over time. In that regard, an individual's food security status is influenced by an array of factors ranging from agricultural production, trade, income, food quality, clean water, sanitation, governance and political stability, (FAO, 2008).

First food must exist in a wholesome state of quantity and quality, then it must be obtained through any of the various means (entitlements), the consumer must be in a state that, on consumption of the wholesome food (including food safety), makes use of it and these three conditions must be steady over time for food security to hold, (Sen, 1981). The "all time" phrase in the definition should be qualified by an "on need" basis; it is an empirical fact that resources are limited, and nutritionally, excessive consumption of food, leads to complications like obesity, (FAO, 1998). Literature presents the food security theme as both a development goal towards which program activities are geared and a development driver upon which other sectors of the economy depend up on.

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Food availability is the amount of food that is physically present in a country or area through all forms of domestic production, stocks, commercial imports and food aid, FAO, 2008. Domestic production is achieved through among other means, agriculture in both crops and livestock. According to Todaro and Smith (2009), most developing countries' economies, are agriculture based. Most African economies are agriculture dependent, which is prominently subsistent, rural and mainly rain fed, (Seck et al, 2009). This shows how critical food security is as a central driving force of all other sectors of the economy. Whether through domestic production or importation, food security ensures other sectors of the economy are running, as food is the fuel on which labor whether skilled, specialized or neither drives on. Diamond (1997), confirms Adam Smith's postulation that food sufficiency leads to emergency of specialized skills in a community. When food is available physically through efforts of others, it frees other people to engage in other trades, developing their skills to perfection (specialization) from which they optimally earn and exchange for food and other needs and wants. As such, the subsistent characteristic of developing world agriculture is an indication of food insufficiency in the bulk of the households.

Agricultural growth remains central to poverty reduction, particularly in the poorest countries, where a large share of the population relies on agriculture for their livelihood (WB, 2010a). Moreover, global demand for some of the major agricultural product groups is growing due to the growth in population and incomes, dietary shifts, and demand for biofuels,(FAO, 2008). Yet, agriculture as practiced by the rural poor cannot

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reduce poverty as it is unsustainable. The transition from subsistence to commercialized agriculture faces numerous challenges some, intricate as witnessed among pastoralists' failure to dispose of livestock in face of drought to save stock.

Children living in rural areas of developing regions are twice as likely to be underweight as are their urban counterparts, despite progress in other fronts. Given that in the developing countries agricultural production is rural and mainly rain fed and subsistent, the findings point to the role market is playing among urban dwellers and that malnutrition is a multi-factorial caused condition among which knowledge, attitude and practices play on nutrition and public health a key role (UNMDGs report, 2011).

Lack of access to adequate nutrition, is one of the risk factors associated with poverty that act on "pathways" or "mediating variables" from low socioeconomic status due to poor cognitive development (Naudeau *et al*, 2010). Low levels of cognitive and overall development in early childhood influence performance in school and in the long term through reduced employability, productivity, and overall wellbeing. These negative effects seriously undermine the social and economic benefits expected from the investment that parents and governments (in the case of publicly funded education and health policies) make in children, (WB, 2010b). These effects determine the quality of human resources available in the labor market and their capacity to make an effective contribution to facing the challenges of competitiveness and overall development of their country (Heckman and Masterov 2007 as cited in Naudeau *et al*, 2010). This is even more pronounced in the face of globalization and advances in electronic communication

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connectivity, (Sachs, 2005). This exposes one pathway of poverty traps in developing countries if the rate of development relies on thesort of investment that a country's quality and quantity workforce will attract.

A descriptive analysis of income generating activities of 19 countries based on the Rural Income Generating Activities (RIGA) database (Covarrubias, et al, 2013), found that all countries tend to have high levels of participation in on-farm activities regardless of the GDP per capita level. Conversely, involvement in nonfarm activities rises with per capita GDP with wealthier countries demonstrating higher levels of participation in the nonfarm sector than poorer countries. A wealthier household has the saving to invest in other sectors having met the most basic need- food, and can access food in the market through exchange than own production, *ibid*.

According to Diamond (1997), people seek food to satisfy hunger and fill their bellies. Hunger in terms of food insecurity, depending on severity and time, according to Sen (1981), is an integral aspect of poverty. Poverty in its various forms and manifestations is a state of underdevelopment from which through the process of development one acquires freedom (Sen, 1998).

According to International Food Policy Research Institute (IFPRI) (2012) there exists an agriculture, nutrition and health nexus: -

> Although the agriculture, health, and nutrition sectors all seek to improve human well-being, agriculture has rarely been explicitly deployed as a tool to address nutrition and health challenges.

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> With agriculture moving higher on the global agenda, in part because of volatile food prices, there is growing recognition that it is an opportune time to bring together the agriculture, nutrition, and health sectors and unleash the potential of agriculture—as a supplier of food, a source of income, and an engine for growth—to sustainably reduce malnutrition and ill-health for the world's most vulnerable people (page 2).

Hunger is a result of extreme poverty, but it also perpetuates poverty by severely reducing the productivity and productive capacity of individuals, communities and entire nations. Reducing the incidence of hunger is, therefore, an excellent investment, as it enables people to shift from a state of economic dependence and exclusion to participating in and contributing with their talent and energy to growth and development (IFAD, 2002). For instance, crop cultivation is an energy demanding activity and during drought, despite knowledge of public health consequences of not properly disposing off of carcassesfrom drought livestock deaths, hungry keepers are too weak to dig up holes to bury their dead animals.

Lack of the suggested investment leaves the affected people caught up in a cyclic poverty trap, hard to break without external assistance or structural changes that enhance the process of producing and exchanging at a level that allows reasonable gain to save, invest and reinvest to lead to capital accumulation that can break the poverty chains, (Sachs, 2009). This qualifies food security at the individual, household and subsequently national level as a development goal.

Gross et al (2000) note that in the evolution of the food security concept in the 1960s, it was acknowledged that food aid may be a barrier to development for self-sufficiency,

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upon which the concept of food for development was introduced and institutionalized. They provide further that in the 1990s, concrete plans were defined to eradicate or at least reduce hunger and malnutrition drastically.

The MDGs emerged as key objectives in guiding the planning and implementation of a broad range of global and national development efforts (WB, 2011). For instance under MDG1, the world has been united under target 2 at reducing by half the number of people who suffer from hunger by 2015, (Todaro and Smith, 2009).

As food prices nearly doubled from 2006 to 2008, the number of people suffering from hunger soared and by 2009, one billion people were undernourished in the world (OECD, 2012). This was attributed to two decades of gradual neglect of the issue (of food security), and a steady drop in investment in agriculture. This affected food availability, which among other factors has affected food access as change in prices affect the entitlement system of especially the poorest segment of the population. It is a double tragedy for poor households as change in food prices is accompanied by unfavorable change in fuel prices that they use for transport and cooking. In the rural area, there is likely to be change of type of fuel used to the self harvested firewood and charcoal burning practices that degrade the environment with further detrimental consequences for majority rural poor residents.

In the developing world the number of chronically undernourished people increased from 800 million in 2000 according to IFAD, (2002) to more than 1billion according to IFPRI,

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(2011). On the other hand, food insecurity may be caused by the unavailability of food, insufficient purchasing power, inappropriate distribution, or inadequate use of food at the household level. Food insecurity may be chronic, seasonal or transitory (FAO/WFP, 2009). The proportion of the hungry tends to increase as longs the factors that lead to food insecurity are not arrested. For instance, the state of insecurity keeps deteriorating all over the developing world, population growth rate among the poor and climate change for worse is constant reality.

In the broader development sense of which attainment of food security is a constituent, agriculture plays a major role as life sustenance, a source of employment opportunities and income generation. Todaro and Smith (2009) identify three types of agrarian systems in the developing countries namely: traditional agrarian system as found in sub Saharan Africa, mixed farming system as found in South East Asia and commercial farming as found in Latin America. The challenge in development is transition from the traditional system to the commercial system. The most viable option for the developing countries is the "linear-like" path through the mixed system as instant transformation to commercial agrarian system is very unlikely. Rather transitionally and gradually the segment of the traditional agricultural practitioners reduces as the mixed farmers increase. Mixed system involves growing and rearing different species of crop and livestock on the same farm. In a developed status, even food production has to be highly specialized and commercialized, *ibid*.

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Aflatoxins are natural carcinogenic substances found in high quantities in some of Africa's agricultural crops. Aflatoxins spread rapidly in warm tropical weather, causing harm to humans and animals (IFPRI, 2012). All consumers and particularly the rural and urban poor can be at risk from food borne diseases and zoonoses, even if they do not themselves keep livestock (International Livestock Research Institute – ILRI, 2002). Therefore, agriculture both crop and livestock, is not only the basic source of food and hence a major avenue to food security, but also poses other challenges to human wellbeing, as its products are either inherently harmful to human health or are vectors of injurious materials or organisms.

In addition, Lessing (2010) provides:

> "…Farmers to administer sub-therapeutic doses of antibiotics to large groups of animals, encouraging a natural selection in favor of antibiotic-resistant bacteria.…These resistant bacterial strains are then transferred to humans through the animal product, through human contact with livestock, and through environmental channels such as a contaminated water supply. …As studies in the United States and Europe prove, drug resistant strains of bacteria threaten human health more than nonresistant bacteria because the former type of infections makes humans sicker for longer periods of time than the latter, (pg. 459 and 476)

The third element of food security, utility, is twofold; the wholesome state food to contribute to the health of the consumer and the health state of the consumer to digest, absorb and assimilate nutrients from the food accessed. The study sought to establish if the beneficiaries' knowledge, attitudes and practices are in conformity to public health standards on use of animal products like observing drug withdrawal periods after livestock medication and boiling milk before consumption.

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Before World War II, according to Lessing (2010), farms were small, family-owned and produced multiple animal and crop products from diverse livestock and crops in amounts sufficient to subsist. The symbiotic relationship between animal and land was effective because animals were fed by neighboring crops on the same farm while certain plots lay fallow. Animal wastes were recycled back onto the fallow plots whose nutrients had been depleted by crops in previous seasons. Farms continued producing food indefinitely without damage to the health of their ecosystems, *ibid*. With the introduction of the goats into the farms by the project, the study sought to establish if the animals distributed had such an effect to the farms' productivity and the environment.

2.2.Food Security Interventions in Crop and Livestock Agriculture

The existing array of appropriate interventions ranging from immediate life-saving interventions, through promotion and protection of livelihoods, to support for infrastructure, institutions and services cannot universally be based on project evaluation inferences for design and implementation due to the diverse, dynamic, highly differentiated both in the geographical and social nature of beneficiaries' needs and priorities (Flores, 2005).

In addition, the vulnerability or susceptibility of a household/ community to factors that place them at risk of becoming food insecure or malnourished should be considered. This is a combination of the degree of households' exposure to risk and of their ability to cope with shocks (FAO/WFP, 2009).

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It has proved difficult to identify the extent to which short- and longer-term interventions address the critical food security concerns of affected populations, (Longley *et al*., 2003; Hofmann et al., 2004, cited by Flores *et al* 2005). Impact monitoring and evaluation, where carried out at all, tend to focus on process aspects of interventions, that is, the efficiency and timeliness of implementation and, in some cases, the achievement of outputs. While some information may be fed back into needs assessment, in general, they rarely address impacts and the appropriateness of policies responsible for shaping the response. Yet it is impact evaluation and the cost benefit analysis of what works where and how, which should inform up scaling and replication (*ibid*).

Options prior to implementation of relief operations, according to Lautze, (1997) are first, not to intervene, as conditions of operations are untenable, there being a significant risk of causing more harm than good or relief resources not reaching intended beneficiaries. Secondly, rapidly distribute free relief goods; or, thirdly, strategically intervene to save lives through more "livelihood-oriented" relief interventions.

Rapid distribution of free relief goods or "distribution of free handouts" that undermines people's dignity and sense of worth (Mulwa, (2010), has a rational application in situations like sudden landslides, floods, earth quakes, among others in which one cannot assemble victims, (where Disaster Risk Reduction strategies are embryonic or simply insufficient or nonexistent), to plan and allow them the luxury to decide on how to be saved. Pingali et al (2005) elaborate thus:

> Enhancement of food production/supply and livestock is normally one of the very first measures to be adopted. When a crisis is protracted, a society's productive capacity and traditional technical

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> knowledge may substantially decrease, increasing the danger of relief dependency. A Track One intervention should therefore focus on rebuilding such capacities through restocking and protecting assets and rebuilding knowledge and agricultural and livestock investments. The earlier these interventions occur, the lower the risk of losing knowledge and capacity (page 16-17).

In situations of chronic instability (Bradbury, 1998, cited in Hemrich, 2005), humanitarian crises tend to be redefined as opportunities for development. This is referred to as normalization. To overcome that, Lautze's (1997) advice is to strategically intervene to save lives through more "livelihood oriented" relief interventions. The "saving lives and livelihoods" approach is aimed at self-sufficiency and productivity in complex emergencies based on fundamental eight principles. However, it is not as straightforward as listed because resource mobilization and allocation, and even when contingency funds are set aside, logistical delays and approval decision making bureaucratic processes intertwined with political intrigues weigh down efficiency and effectiveness, *ibid*.

Pingali et al (2005) observed that the relief mechanisms adopted by the international community are based on the assumption that one can have only two very distinct intervention contexts: the development context, where a fully accountable government is in place and where interventions are designed to support governmental policies aimed at sustainability; and the acute crisis context, where interventions seek to provide immediate relief, on the understanding that such operations are temporary and that developmental instruments will assume prominence again in the near future. Such dichotomy may be necessary for targeting but can lead to "hanging" interventions, whose termination, on saving lives (or children), will lead to highly vulnerable adults who are continually in

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need of aid. Rehabilitation- the recovery processes and capacity building for resilience of communities building on what is already available are necessary as links between the two "phases", *ibid.*Designing such projects is faced by difficulties when donors call for proposals that are specifically tailored for emergency response. Restocking in pastoral areas is implemented as post drought recovery intervention; replacing what has been lost to start rebuilding new stock.

Flores *et al* (2005), argue that the past acknowledgement in both humanitarian and development camps that food security crisis interventions should, in principle, address more systematically the short- and longer-term food security concerns of affected populations to some extent, required an understanding that short-term interventions have an endogenous effect that can be either positive or negative for longer-term food security. Such is the case with supply of food from outside which affects the price of local produce discouraging further production or introduction of "carrier livestock" from elsewhere which can spread disease to local species. This has been observed in cases of restocking, purchase of animals, seasonal migration, or even raiding, whereby diseases pathogens, for instance for footandmouthdisease (FMD),are spread. Worse is the suitability of the newly introduced species or breeds that require enough time to determine source appropriateness, as availability is determined by producer willingness to dispose.

The Twin Track Approach of the Anti Hunger Programme (AHP) comprises the first track, which addresses recovery measures for rural livelihoods, and the second track, which provides immediate support to vulnerable groups. The two tracks are intended to

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be mutually reinforcing, and the positive interaction between them should generate incentives to follow a path toward recovery (FAO, 2002).

The type of intervention is influenced by the severity of food insecurity. This may be determined from two perspectives: first, by assessing whether people are able to meet their immediate food needs (the risks to lives); and second, the vulnerability and risks faced by different livelihood groups and their coping strategies (the risks to livelihoods). On this basis, appropriate interventions are identified, ranging from free food assistance to a wide array of livelihood-support initiatives, such as cash-for work and de-stocking (Young, et al 2001).

An evaluation of the World Bank funded programs in agriculture and agribusiness (both factors affecting food security in terms of food production and trade) spanning 1998-2008 found that interventions in East Asia, Latin America, transition economies in Europe, China and India to be equal to stated objectives or better. But performance of WB Group interventions was well below average in Sub-Saharan Africa, where International Finance Corporation had little engagement in agribusiness. This was attributed to inconsistent client commitment and weak capacity that have limited the effectiveness of Bank Group support in agriculture-based economies. In addition constraints on staffing and internal coordination within the Bank Group have also hurt outcomes. Financial sustainability has been constrained by insufficient government funding and the difficulty of maintaining agricultural services and infrastructure (WB IEG, 2011). Nonexistent or poor government policy priorities and practices that breed

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corruption that skew regulations and investment decisions characteristic of sub SaharanAfrica awash in current media, create a non development enabling environment.

According to ILRI (2011) smallholders will continue to play key roles in increasing the availability of animal-source foods in South Asia and sub-Saharan Africa for the foreseeable future. In a mixed farming system, there are synergistic benefits that arise from integrated crop-livestock production apart from those that directly contribute to household food security. Crop byproducts can serve as feed or supplements for raising livestock, while manure is utilized in improving soil fertility for a better crop yield, IFAD (2010). Resultant increased livestock and crop productivity enhances household food security and the soil erosion control strengthens environmental sustainability.

According to ILRI, (2002) livestock contribute to food and nutrition security; they generate income and are an important, mobile means of storing wealth; they provide transport and on farm power; their manure helps maintain soil fertility; while fulfilling a wide range of socio-cultural roles.

The co-existence theme underlying the string of thought underscores a balanced approach to food security. In the current agrarian systems in the developing countries as noted in the introduction, the only plausible development path from traditional to commercial farming is through the mixed farming stage(Todaro and Smith 2009). This does not suggest a break in between the stages but a gradual reduction in the proportion of population practicing traditional agricultural, largely subsistent. However, one wonders if

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the overall long-run goal should be to have many self-sufficient subsistent rural farmers or a highly specialized population in other fields, with a few farmers that produce enough food for the country.

Basic social infrastructure for instance Community Unions (CUs), facilitated by a program improves the situation with regard to the satisfaction of basic needs by playing a central role in a conflict sensitive way and according to rules of good governance. This helps to prevent local conflicts and increases cooperation and mutual understanding and trust building at the end of the programme. They are the central instrument of a participatory approach to community development, (Deutsche Geselleschaft fur Internationale Zusammenarbeit, GIZ, 2011). The study sought to find out if dairy goat owners group formation contributed to sustainability of gains made by the restocked households.

In the highly agricultural dependent developing economies availability of food is highly reliant on domestic, rain-fed subsistent crop and livestock production. According to Seck *et al* (2009), agriculture will remain, in the foreseeable future, the most important sector of developing African countries to raise farmer incomes and overcome food security and poverty problems. In Sub Saharan Africa agricultural input use is very low by international standards. Yet organic farming, by use of manure is more sustainable as the goats were hoped to contribute.

The use of agricultural subsidies is hoped to induce farmers to adopt the use of inputs and thereby increase agricultural productivity. This raises controversy to many economists

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who argue that agricultural subsidies of all kinds are expensive, mainly benefit the wrong people, and distort agricultural markets by encouraging farmers to overusing whatever is subsidized. An evaluation study of agricultural input "smart subsidies" in Sub-Saharan Africa conducted by Baltzer and Hansen (2011) found that input subsidies appear to raise agricultural productivity substantially especially as observed in Malawi and Zambia. However, they conclude that agricultural input subsidies are not likely to be an appropriate use of scarce fiscal resources, if subsidy programmes are designed and implemented as the "smart subsidy programmes" studied, asthey were found to be still plagued by many of the same problems associated with the earlier generation of universal input subsidy programmes. However, support to post conflict victims is not tantamount to a subsidy to farmers under normal circumstance. Restocking projects do require extra support from experience especially on animal health before households stabilize, (LEGS, 2009).

Improvements in food security are often the result of synergies between different interventions and pre-conditions like production, markets and land security,(Bodnár, 2011). In a laboratory experimental set up, conditions assumed to hold constant to achieve expected outcomes in a natural social context are actually controlled. Given the complexity of food security underlying factors that affect the proxy- indicators and variables, the myriad socioeconomic relations and networking, and other shared pre conditions like the productivity of land, the local and national market and land tenure, the conclusion above is highly plausible.

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According to Buchanan-Smith and Maxwell (1994 cited by Flores *et al* 2005) the rationale underlying linking (short-term) relief with (long-term) development is that better development can reduce the need for emergency relief and better relief can contribute to development and better rehabilitation can ease the transition between the two. The success of the dairy goat project as a recovery intervention would positively reflect this premise.

Brasseur,*et el* (2015) conclude:

> 'A true, sustainable intervention that targets the cycle of hunger and food insecurity must ultimately target the cycle of poverty including intergenerational unemployment and welfare dependency. As a result, the analysis of food insecurity moves beyond the idea of simply providing food in time of need and captures domains that influence human behavior. These domains not only include biological and physiological, but also social and psychological.'

The study set to investigate other aspect of the intervention, which influenced knowledge, attitude and practices, which dealt with trainings and group formation of goat owners and how they affected the success and sustainability of the intervention outcomes.

2.2.1 Livestock Based Food Security Interventions

In the wake of the food crises of the early 1970s and the resulting World Food Conference of 1974, a group of innovators realized that food security depends not only on crop production, but also on the policies that affect food systems, from farm to table, (IFPRI, 2012). Is crop production the only source of food? Notably, household food security assessments, evaluations and interventions, even those targeting pastoralists focus most on crop while ignoring the livestock component.

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In Niger, 60 per cent of households rely on sale of animals to cope with food shortages or unexpected medical expenditures,(Alary *et al*, 2011). Ownership of a cow is a significant predictor of height for age status in children in south western Uganda, even after controlling for other indicators of economic status (for example, occupation, land owned, years of education, (Vella *et al*, 1995). Role of livestock in food and nutrition security is important.

In some circumstances, livestock are the only means of livelihood that can be adapted to suit the local conditions to support life. For instance, the Greater Horn of Africa comprises of an ecologically fragile areas described as arid and semi arid lands (ASALs). This area is home to the world's largest concentration of traditional pastoralists who have adapted and are able to raise livestock by utilizing scarce resources over the years. In Kenya, ASALs provide 67% of the red meat consumed, (KARI, 2004).

As observed above in a mixed farming system, there are synergistic benefits that arise from integrated crop-livestock production apart from those that directly contribute to household food security. Though not all poor livestock keepers can readily link to growing livestock markets or sustainably intensify their livestock production, among pastoral peoples living in more marginal regions, livestock assets remain critically important for reducing risk and enhancing resilience(ILRI, 2011). Market access by the rural poor should be a welcome avenue for income generation from farm products to gain the means of exchange at competitive prices and for better commodities and services.

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ILRI (2011) forecast that smallholder farmers would continue to play key roles in increasing the availability of animal-source foods in South Asia and sub-Saharan Africa for the foreseeable future. Animal-source foods are highly nutritious and more costly compared to crops. Capone, *et al* (2014) stress that currently, the main concern for the food and agricultural sector is to provide simultaneously enough food, in quantity and quality, to meet the nutritional needs of a growing population and to conserve natural resources for future generations.

The study sought to establish if the beneficiaries were producing enough milk to sell some so that they can buy other basic, staple foods. In addition the aspect of how having a goat on the farm is contributing towards the benefits aforementioned in crop production and environmental sustainability were investigated too.

According to IFAD (2004) the rural poor should be linked to the world market (rural agriculture commercialization) to compete with well off, sometimes heavily subsidized and protected developed world farmers, without other supportive structural and policy changes. Yet, according to the OECD, (2006) smallholder producers now compete in markets that are much more demanding in terms of quality and food safety, and more concentrated and integrated than in the past. But trade can start at their own level too.

Livestock are a common asset amongst rural households across all expenditure quintiles and poorer households are more likely to keep small ruminants than richer ones, who are more likely to keep large ruminants (Pica-Ciamarra *et al*, 2011). When not considering the multiplier effects of livestock sector growth, livestock contribute marginally to the

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rural poor household income (*ibid*). This implies that increases in productivity or profitability of livestock are unlikely to be a direct pathway out of poverty for the majority of households.

Income determines access to food and other services whose deprivation describes poverty. However, in terms of rural life one may be poor but has a steady supply of food-availability from own subsistent produce, a challenge, from general knowledge, even in measuring the actual Gross Domestic Produce (GDP). Though the study sought to find out the source of the beneficiaries' income and changes after restocking, income cannot be the only measure of access to food for the rural households, rather majorly the own production and period of availability after harvest.

Mineral and vitamin deficiencies, also known as hidden hunger, afflict billions of people. The consequences, in terms of malnutrition and health, are devastating and can result in blindness, stunting, disease, and even death, (IFPRI, 2012). A solution can obtain in livestock (ILRI, 2002) as animal food products such as meat and milk are concentrated sources of high-quality protein and certain vitamins and minerals. When children consume even modest amounts, these products help alleviate poor growth, poor mental development and general ill health, *ibid*. The study sought to ascertain beneficiary households' children access to milk.

Given the previous observation that poor rural households tend to diversify into small livestock acquisition on meeting basic needs, it is apparent an extant prophylaxis and therapy are procured in the process.

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2.2.2 Restocking for Food Security

The majority of 800 projects and programs for Livestock in Development reviewed had not had a significant impact(Heffernan, *et al* 2001), either due to the proposed technologies being developed but not delivered to the poor or inappropriate ones were delivered or in cases where appropriate technologies were successfully delivered, wealthier farmers or herders tended to capture the benefits. This can happen in a flawed approach to selection/targeting of beneficiaries, when beneficiaries self select despite the criteria, with little facilitation and supervision, or no community engagement by the implementer as has been observed elsewhere. In addition is evidence of a gap between research institutions and target beneficiaries: top down approach to solving problems-address their perceived needs and ignore the "ignorant" illiterate farmers, and a tendency to resist change as foreign and misleading. Some research findings are presented in difficult language that cannot be interpreted by farmers while some findings are expensively priced for the poor heavily taxed farmers that ironically support repayment of loans that fund such works. Further, Seck *et al* (2013) observe that the major constraints in the utilization of agricultural research results are the lack of adequate public investment in agriculture, lack of well-trained researchers, inadequate research infrastructures and poor management of the agricultural research and development system.

According to Chambers, (1983) spatial, project, person, dry season and more specifically politeness and professional biases contribute to rich farmers being beneficiaries of technologies meant for the poor.

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Hunger and starvation are inextricably intertwined with poverty (Sen, 1981). To end poverty (Sachs, 2005) is to enable the poorest of the poor to get their foot on the first rung of the "ladder of development", which hangs over their heads as they are stuck underneath. This is through acquisition of six capitals of which is human capital that entails health, nutrition and skills for economic productivity.

The 'livestock ladder' may allow the poor to progress from modest livestock holdings, such as a few poultry, to acquiring sheep and goats or pigs, or even cattle or buffaloes, ILRI (2002).

Further research work on livestock enterprises by ILRI (2011) indicates that poor households are able to increase their food security through livestock production in two ways: by increasing direct household consumption of animal-source foods and through sales of animal-source products, with the income derived used to purchase both food and other household essentials. In a single effort, food availability and access are addressed, while the extra income can be used to procure health and other services which improve food utility.

According to Kristjanson (2004) in western Kenya, once a poor household meet basic needs like food, clothing, shelter and education, it could diversify the extra income by investing in small livestock; poultry, sheep and goats. Diversification of income sources through livestock farming emerged as a particularly important strategy for escaping

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poverty in one of the densely populated and with better agricultural potential districts,Vihiga (*ibid*). The role of livestock in a mixed farming enterprise in manure provision and supply of the nutrient rich products for home consumption and sale for income by the household has been explained.

These findings are in support of "cargo net" interventions, which help people, climb out of poverty, as opposed to "safety net" interventions that stop people falling into poverty (*ibid*). Redistributive programmes build the assets of the poor people (such as giving a heifer to poor households- a form of restocking) may be effective in achieving long term reductions in chronic poverty but have to be complemented by safety net policies (*ibid*). Emphasis for safety net strategies should be aimed at the huge health and education constraints that such communities are often bound to encounter to avert failure. This justifies linking the livelihoods interventions with relief for success. The study sought to find out if the goat distribution was comprehensively complemented for success.

The food security section of the SPEHRE project initiated in 1997 to enhance accountability to disaster affected people is subdivided into three sections: food transfers; cash and voucher transfers; and livelihoods (SPHERE 2011). The livestock emergency guidelines and standards (LEGS) is a guide to food security interventions specifically for livestock based interventions during disaster, based on a livelihoods and rights approach with an objective to provide rapid assistance, to protect the key livestock-related assets and to rebuild key livestock-related assets of crisis affected communities through livestock-based interventions, LEGS, (2009).

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Rebuilding key livestock assets is achieved through provision of livestock – herd reconstitution and other livestock distribution, and provision of veterinary service, water, feed and/or shelter.

Herd reconstitution and livestock distribution includes restocking. Restocking has been employed in addressing the needs of pastoralists (Hazell, *et al*, 2001), though it has been also implemented in other area with mixed results (Heffernan, 2009). The size, mix of packages and approaches differ with different results but IFAD and Heffernan concur that restocking requires heavy initial capital and additional input from the beneficiaries like health service provision before realization of benefits, which if not catered for as noted above lead, to project failure. The study sought to find such inputs were provided and their role.

Indigenous livestock breeds are the result of selection over many generations and as such, are suited socially and environmentally to the geographies from which they originate (Tisdell, 2001, cited by Heffernan, 2009). On this basis it is advisable to conduct redistribution, which is local purchase of the animals for distribution as they are adopted to the local environment, resistant to endemic pathogens and do not pose the danger of introducing diseases from outside to the remaining local naïve stock.

Heffernan (2009) further warns of the danger of losing biodiversity with its inherent advantages. However, despite the adaptability to the local environment, the local breeds

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are also poor producers and it's a scientific fact that cross breeding improves productivity and disease resistance through hybrid vigor. This fact though negative as regards biodiversity, has been demonstrated by Heffernan, (2009) through modeling that implementation of a single restocking project is primarily likely to accelerate the decline of an indigenous breed by a further nine per cent, in addition to an initial one third or a lower 20% achieved under random breed selection.

This may entail better milk yields for dairy goat restocking beneficiaries with local goats and their neighbors. However, the lost biodiversity may signal a danger postulated by Sen (1981) posed by "specialization" in one type of species which can be lost to one shock attack, destabilizing a narrow based entitlements map.

Heffernan evaluated restocking projects of the 1990s (Isiolo, in the ASALs) and concluded that they had little long term impact on household food security or livelihood security, but alternate income generating activities, not livestock, provided the majority of income and had the greatest impact on household economic conditions and consequent food security. However in pure disregard to the major product that pastoralists derive from livestock- milk, Heffernan (1998) concludes that one can only access food as a livestock keeper on receiving livestock post-disaster as gift (restocking) only through slaughter or sell in the market of the acquired animals. This oversight has led to a common misunderstanding as to why pastoralists cling on to their livestock in the face of calamity. The study will provide contextual comparison results.

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2.3.Theoretical Framework

The study was guided by Sens Capability approach giving a broad development framework anda specific thematic framework addressing various dimensions of food security at community development unit and household level.

a) The capability approach: It is an economic theory whose core focus is on what individuals are able to do (capable of) introduced by Amertya Sen as an approach to welfare economics in 1980s. It brought together a range of ideas that were till then excluded from (or not comprehensively addressed in) traditional (utility and resource based) approaches to the economics of welfare. When assessing capabilities, Sen proposed consideration of the following:

   i. The importance of real freedoms in assessment of a person's advantage
   ii. Individual differences in the ability to transform resources into valuable activities
   iii. The multi-variate nature of activities giving rise to happiness
   iv. A balance between materialist and nonmaterialist factors in evaluating human well-fare
   v. Concern for the distribution of opportunities within society

   It underscores functional capabilities also termed substantive freedoms, that people have reason to value, instead of utility (happiness, desire-satisfaction and choice) and access to resources (income, commodities and assets).

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With the contributions of a political philosopher Martha Nassbaum, development economist Sudhir Anand and economic theorist James Foster the theory has gained prominence in human development policy debate, which led to creation of the UN's Human Development Index, a human development measure that captures capabilities in health, education and income.

It has evolved further to include a list of capabilities by Nassbaum and other development measurements, too extensive to discuss here.

It served to guide the study to obtain a broad view of overall gains made towards sustaining and anchoring gains in food security at household level,(Wikipedia accessed 2014, Sen, 1998).Were beneficiaries' substantive freedoms expanded?

b) The 1996 World Food Summit definition, "food security exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life" was adopted to guide the study at the thematic level. The dimensions of food security derived from the theory- availability, access, utility and stability, formed the independent variables that were examined throughan array of factors, (identified by FAO, 2008) *inter alia*, agricultural production, trade, income, food quality, governance, political stability, practices, knowledge, attitudes, to assess the intervention contribution to household food security. This formed the basis for the conceptual framework.

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2.4.Conceptual framework

According to De Muro and Aurina (2011), food security has a complex nature that is multidimensional, multi-scalar and a process, which poses theoretical and methodological problems in its measurement, not always taken into account in literature. As such, measurement of food security takes a mere empirical/statistical approach based on selection of available data on various unrelated variables, instead of a solid theory. This, they argue, may be because a theory of food security has not been established.

They recommend that an approach with a sound theoretical foundation is needed. To this they propose use of the framework proposed by Burchi and De Muro (2011), that is, a capability approach to food security based mainly on the landmark work of Dréze and Sen of 1989 and on the human development paradigm.

They show the relationship between the first three dimensions of food security-availability, access and utilization, and conclude that they are rather complementary than incremental, thus:

It is evident that in order to have a proper utilization of food, a logical pre-requisite is to have access to food; and that in order to have access to food, a logical prerequisite is food availability. Therefore, the Food Security process is characterized by a logical (not necessarily temporal) sequence: the final step is utilization, the intermediate step is access and the first step is availability. (De Muro and Aurina, 2011)

Then a relational equation:

Utilization = g(Access, Determinants of Utilization)

Access = h(Availability, Determinants of Access)

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Availability = Food supply/Population

Where g (.) is a Utilization function that maps Access (food accessed) and other factors into proper Utilization (adequate nutrition), and h (.) is an Access function that maps Availability (food available) and other factors into Access.

Then:

Utilization = g (h (Availability, Det. Access), Det. Utilization)

That means that the achievement of FS can be represented by a nested (or multi-level) pseudo production function.

(Adopted from De Muro and Aurina, 2011)

Hence it is recommended that in multidimensional measurement of food security we should not just assemble indicators of the three dimensions, but rather:

–Verify if there is sufficient availability of food (in quantity and quality);

–Analyze if people can access an adequate amount (and quality) of available food;

–Analyze if people are capable to utilize properly the food that they accessed.

The three dimensions are therefore arranged in a Theory of Change as outcomes that are affected by specific activities implemented in a project in a cause and effect pathway. Weiss (1995, quoted in Stein and Valter, 2012) described a Theory of Change as "a theory of how and why an initiative works."

Stein and Valters (2012) indicate that the Theory of Change can be used both for project planning and evaluation. In the evaluation the outcome and activities/inputs are mapped forward in causal pathways. In a broader presentation than the intervention under study food security Theory of Change could be organized as below.

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2.5.A Schematic Presentation of the Conceptual framework

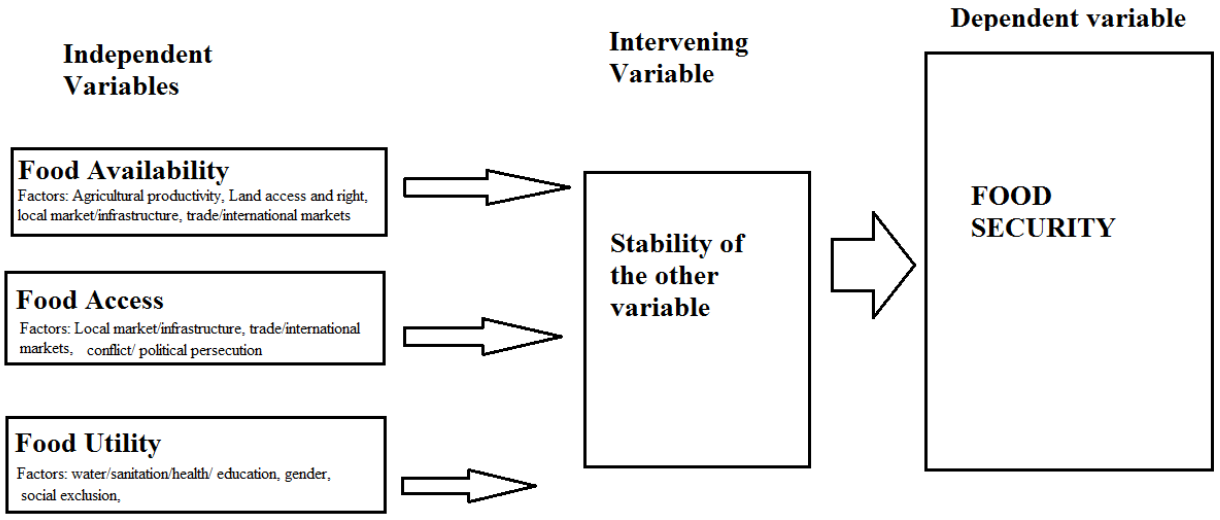


Figure 1: Conceptual framework:Link between food security pillars and food security

Adapted from De Muro, 2011

Income is a very important factor under the food access variable of food security, as it is the medium of exchange in the market. Own food produce- whether of crop or livestock origin, can be consumed either directly or be exchanged with another item determined as equal in value, or be converted into income through a transaction in the market to procure any other food or commodity (good or service) of choice.

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Chapter Three

RESEARCH METHODOLOGY

3.0 Overview

The chapter will look at the methodology employed in the proposed study. 3.1 gives some background information on the study area, research design is handled in section 3.2, research process under which the sampling technique, method of data collection, analysis and interpretation and report writing are dealt with under section 3.3, section 3.4 deals with validity and reliability, section 3.5 tackles ethical issues while section 3.6 deals with the study limitations.

3.1 Study Area

The study evaluated a project that was conducted before the promulgation of the new constitution in Kenya that created new administrative areas namely counties and sub-counties. For consistency, the study chose to use the original terms – districts and divisions. The study covered Kipkelion and Molo districts of the former Rift Valley province of Kenya.

According to the Kenya National Bureau of Statistics, KNBS, (2010), Kipkelion and Molo District covers a total area of 1,884 Km^2 of which 512.4 Km^2 falls under forest cover. Human population is approximately 207,581 people with a poverty index of 56%. The population density is 114 persons per Km^2.

Kipkelion district administratively had 4 Divisions, while Molo district had 5 divisions. The districts receive an annual average rainfall of between 900-1500mm/year. The areas

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fall under two ecological zones: Low Highland-$_2$ (LH_2) and Upper Midland-$_2$ (UM_2,) based on FAO (1998b) land ecological classification.

The predominant ethnic group is Kalenjin with some Kikuyu, Kisii and Kamba communities. These districts have experienced ethnic clashes each election year since the introduction of multi-party democracy, in 1992 as noted from the Akwumi report above. This phenomenon was most pronounced in 2007/8 following disputed presidential election announcement, leading to deaths, displacements, loss of property and livelihoods.

Map for the areas is attached- source FAO- Kenya (***Appendix I***)

3.1.1 Target Population

The target population comprised the resident population of Molo and Kipkelion sub-counties. The selection of the 400 hundred beneficiary households was based on criteria which fit the initial 5000 households. Due to limited funds, only 400 hundred households could be targeted- 200 from each district. This exercise was conducted by the local administration, the ministry of livestock and social services officials facilitated by VSF Suisse field staff.

Placement in the project may not have been random hence a selection bias to contend with. However, this bias was controlled for on the basis that the 5,000 households presented had been matched on the basis of economic status. The remaining 4,600 households provided a counterfactual sub-population sampling frame from which a control group for comparison was selected.

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Using the restocked households beneficiary list from VSF Suisse's records as the sampling frame, every forth entry on the list was selected for interviewing, 100 beneficiaries respondents in total, that is, 50 households per sub-county.An extra 100 non-beneficiary households from the remaining 4,600 who had been selected but not targeted were identified as a control group for comparison; again 50 households per sub-county, for individual questionnaire interviews. The control group respondents were randomly picked from the 4,600 list of non-beneficiary as the sampling frame.

3.2 Research Design

The study employed an *ex post* evaluationdesign that examined outcomes after program implementation as opposed to an *ex ante* evaluation that predicts program impacts using data before implementation. This design allows comparison between the beneficiaries-herein the treatment group and control group of nonparticipants but of similar initial characteristics as the beneficiaries, so that noted differences can be drawn and be attributed to the intervention. According to Khandker *et al*, (2010) main challenge across different types of impact evaluation is to find a good counterfactual—namely, the situation a participating subject would have experienced had he or she not been exposed to the program. However, given the existence of a 5000 proposed potential beneficiary list from which the 400 final beneficiaries were drawn, the control group was randomly picked from the remaining 4600 individuals list. Missing target interviewees were replaced by their closest neighbors on the list..

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3.3 Sampling Technique

The list of 400 beneficiaries of the restocking project formed the sampling frame for the first group of the study while the control group came from among the remaining 4,600 of the initial 5,000 households who were presented as the most affected by the 2007/8-PEV in Molo and Kipkelion, but did not benefit from the restocking intervention due to limited funds.

A systematic random sampling was done whereby out of the 400 household beneficiaries 100 were selected by using a formula (400/100) = 4; every 4thindividual on the sampling frame was selected for interviewing.Both VSF Suisse and the District Livestock Production Officer offices in each of the former districts, now sub-counties, provided the beneficiaries' list. Each district contributed 50 treatment members to make up 100, which is a quarter of the target sample. A further 50 members per district (total of 100) were selected from the locations identified as not having participants using the list of the remaining 4,600 households left after picking the 400 for restocking to make up a total of 200 individual questionnaire interviewees.An extra control group member was interviewed making a total of 101 control respondents.

3.4 Methods of Data Collection

A total of 201 individual questionnaires were administered: 100 to dairy goat restocking project beneficiaries and 101 to the control group. Three enumerators administered the questionnaires. An initial pre test of a few (ten) was administered to check for and correct any irrelevant and ambiguous questions before the actual data collection by the three enumerators. Each evening the questionnaires filled were examined for accuracy.

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Two focused group discussions were held, one in each sub-county comprising 12 (Molo) and 11 (Kipkelion) members in each to collect qualitative data forclarification and triangulation with the quantitative data obtained from the individual questionnaires.

Three key informants were interviewed using a semi structure interview checklist; the former District Livestock Production Officer Molo, and his assistant who was responsible for the dairy goat beneficiary groups in the area and the former District Livestock Production Officer, Kipkelion. The District Veterinary Officer who was present during the project in Molo had since passed on and for Kipkelion was away on an urgent impromptu official function.

3.5 Data Analysis Methods

The primary data collected through individual questionnaires wasdescriptive in nature.. The data was cleaned, entered and analyzed using the Excel and SSPS software..Data from FGD and KII was analyzed using the manual thematic analysis method by transcription from the recorder and then grouping the critical responses with emphasis placed on what carried consensus in the discussions and varying opinions providing perspective diversity in defining themes, trends and patterns. Conclusions were drawn from the ensuing results. Data analysis using statistical techniques gave sample statistics describing sample characteristics, namely central tendencies like mean, median and mode, and measure of dispersion, the range.

Qualitative data thematic analysis was done by identifying ideas from the discussions and groupingthemunder similar topics. They were categorized into major concepts through

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perusing transcription notes, coding materials based on samples of data, classifying the materials under themes, then drafted into a summary report that links the themes and relationships between them. They are presented as explanations along with the diagrammatically presentedas charts and graphs.

3.6 Report writing

The report was compiled following the analysis and interpretation of data collected using the St Paul's University prescribed format under guidance of designated the Supervisor. Results were presented using graphs and charts with interpretation, discussions in relation with literature and facts, and contextual conclusions drawn within findings. Recommendations were based on the conclusions drawn.

3.7 Validity and reliability

3.7.1 Validity

Validity is the concept of a research instrument being able to measure exactly what it was designed to measure. This is the degree to which a research measures what was set out to be measured and is achieved through logic and statistical evidence (Kumar, 2005).

Efforts to achieve this include, ensuring that research questions and the objectives are correlated and literature review is relevant to help guide design of the study instruments. In addition, an element of triangulation was ingrained in the process to enhance fidelity by use of organizational documents- records and reports, to confirm if the interviewees' responses were accurate, interviewing key informants, and making actual field observation. The overall overseeing and guidance by the supervisor (an expert in the field

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of study) and observation of procedures on thesis preparation were followed to enhance adherence to validity.

Findings from the field pre-testing exercise, helped ascertain beforehand if the responses to the questions were consistent with what was expected to be measured and allowed for timely appropriate corrections.

Recruitment and thorough training of enumerators was conducted to help limit misreading and misinterpretation of questions for accurate responses as the respondents mainly spoke in Kiswahili.

3.7.2 Reliability

Reliability refers to the consistency of a measure of a concept (Bryman and Bell, 2011). It has to do with establishing credibility, transferability and dependability of the research process.

Kumar, (2005) explains, "The greater the degree of consistency and stability in an instrument, the greater is its reliability".

Three factors are considered when considering whether a measure is reliable, namely; stability- is a measure stable over time? Internal reliability- are indicators that make up the scale or index consistent i.e. repeatability and inter-observer consistence- consistency in responding or interpreting qualitative data (Bryman and Bell, 2011)

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In consideration of the above and factors that influence reliability of research instruments as provided by Kumar (2005), attempts were made to address reliability issues in the conducted study.

The wording of the questions: pre testing helped to determine if there was ambiguity in the questions and corrections were made appropriately. Despite the differing first languages of the target groups, same language – Kiswahili, a Kenyan national language, was employed for uniformity in meaning and wherever necessary local translator services were engaged.

Being a one-time exercise the possibility of repeating the exercise in a similar physical setting did not arise for the same respondent. However, respondents were visited in their homes in the hope that they were settled to respond without being nervous.

The respondent's mood may be difficult to control as it is subject to other factors beyond the interview setting but efforts were made to ensure everything was stable and the team introduced no external disturbance. For example, the recording machine used was introduced, explained how it worked and permission to use it sought.

The nature of interaction between the interviewing team and the respondents was maintained as naturally as possible at the respondent home ground.

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The regression effect of an instrument was minimized once again by the fact the it was a one-off exercise, that would not be repeated for the same study and the respondent would not feel obliged to change their opinion to “fit in”.

The standard external consistency procedures: Test/re-test and parallel forms of the same test that are used for testing the reliability of the instruments were not applied to due limited resources and time, nor was the split-half technique for internal consistency procedures applied. However, pre-testing was applied to help serve the same role, whereby corrections were made based on responses received for given questions, for fidelity of what was intended.

3.8 Ethical Issues

A number of ethical issues were expected to arise from the proposed research process and in anticipation, precautionary measures taken and correctional mechanisms were employed to avoid and/or mitigate objectionable consequences.

According to Diener and Crandall (1979 cited by Bryman and Bell, 2011), transgressions of ethical principles in research recur in the four main areas, namely whether there has been harm to participants, lack of informed consent, invasion of privacy and deception.

The likely avenues in the proposed study are related to first to issues of authority. In this case a permit to conduct research as prescribed by the institution was acquired from the ministry prior to visiting the field. At the local level, the district (now county) administration and the educational officer were notified and written consent offered. This document served as an introduction to the local officers- livestock department and authority, who also further facilitated the data collection process.

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The purpose of the study was carefully and elaborately explained to rule out false expectations and confusion as an avenue to conflict. This too served in establishing a foundation for arbitration in case of subsequent misunderstandings with respondents arising. Being responsible for these areas regarded traditional hotspot for clashes, they were key to provision of security updates and actual security, in the event need arose, both for the respondents and the study team. The line ministry department heads – district livestock production officers, whom the project had utilized, served as the entry point. Their consent, permission and facilitation to conduct the data collection were sought prior to setting out. The work plan was shared in advance to allow changes that may have been necessitated by other official and personal commitments. However, the veterinary department was unable to give contributions due to impromptu functions (in Kipelion) and the recent arrival of the office holder in Molo, following the demise of the former officer.

Secondly, was the acquisition of public and individual consent: It was understood that the proposed respondents, post elections violence victims, underwent psychologically traumatizing experiences. Despite counseling services offered immediately after by other stakeholders and the explanation offered to the proposed respondents at the inception stages of the project under study as regards the monitoring and evaluation components being part and parcel of the project package for the purposes of ascertain progress and outcomes, the design of the data gathering process of the study had inbuilt measures to avoid evoking undue emotive reactions. It was explained from the beginning what the

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exercise was all about, spelt out that there was no forthcoming further assistance due to the undertaking to avoid creating false hope and what the findingswere to be used for, as research findings. Before starting the FGDs, the participants were made aware of the voice-recording device for later transcription, confidentiality was assured and their consent sought.

The subject of confidentiality was observed regardless of the presupposed level of risk associated to participating in the interviewing- best practice. At all times, engaging of respondents was preceded by a formal individual request to be interviewed. A sizeable number on being informed of the option of anonymity preferred it and their identities were retained as numbers only in the questionnaire sheets. Extra standby respondents identified at the sampling stage in case some among the selected were unwilling to attend or due to unforeseen circumstances like illness would not participate proved extremely helpful and time saving.

The third consideration was plagiarism. This is understood as criminal as it is and all that is required by law and rule was closely adhered to and measures put in place like acknowledgement of sources of information, ideas, concepts and thoughts through appropriate citing and referencing to avoid penalization. Anything beyond that is an error of omission.

The final critical consideration is ownership of data and results of research. The candidate conducted thestudy independently without sponsorship, but the findings will be shared

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with the community under study and it will be availed as the institution may allow for research as copyright and not for commercial distribution.

It was clear that the respondents were multi-ethnic in background from project documents consulted. Cultural sensitivity, especially in use of language and dressing code, was exercised to avoid offence. Repeating the purpose of the study and reassurance of confidentiality were applied in whenever unreceptive, reluctant or shy cases of respondents will occur. Just the corresponding number on list was kept on the questionnaire for those requesting anonymity.

3.9 Limitations

A number of factors that were anticipated to pose challenges to the study were considered and countering measures were put in place on how they were to be overcome. First is security. The area was classified as a "trouble hotspot" especially during electioneering time, which had been concluded. It could have been naïve to assume that all would be calm as some people could be disgruntled with the outcome. For any eventuality, the local administration was informed of the exercise as indicated under the ethical issues and their services were sought if necessary. The officers in charge of the project beneficiaries at each district's level were enlisted for facilitation as an entry point. Immediate departure was planned for in case need arose. The departmental heads were notified and permission sought accordingly.

To avoid political interference from opportunists out to gain mileage from the intervention a clear honest explanation was given to all participants as regarded the objective of the study and what the consequences of interference to the final outcome

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could be. The line ministry heads and group leaders were sensitized and to help explain in case such an occurrence came pass.

Inconsideration that as many as 5,000 beneficiaries had been nominated out of which 400 were selected, it was clear that the project drew a lot of interest and any new development about it could raise expectations, at worst false. A concerted effort was made to make it clear that the current exercise was not an indication of a similar project in future. Consistently, prior to every engagement during the data collection, an honest explanation was offered such that all were at par.

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Chapter Four

RESULTS AND DISCUSSIONS

4.0 Introduction

This chapter presents the study results per variable and an analysis in relation to the research objectives and questions. The results are compared in an effort to delineate difference between the evaluated intervention beneficiary households and the control group.

The sets of data analyzed are both quantitative and qualitative and diagrammatically presentedin charts and tables. Inferences were drawn for quantitative data and descriptions made from qualitative explanations for clarifications and triangulation.

4.1 Study Report

The study respondents were two groups of the Kenyan 2007/8-PEVvictims, who had lost virtually all means of livelihoods including household members- some breadwinners, and temporarily internally displaced persons. The two groups comprise a dairy goat restocking package intervention beneficiary group and a control group also drawn from a larger list from which the beneficiary group was drawn but were not targeted due to limited funds. By the time of the intervention, the respondents had gone back to their land hence the restocking implementing organization chose the livestock provision option, as described under LEGS wealth transfer interventions, as the most appropriate in the circumstances. The beneficiaries did not have dairy goats as one of the qualifications for restocking. To qualify into the list of the 5000 proposed group one did not have a dairy goat at the project implementation time. All the control group respondents did not have

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dairy goats. The study considered only the dairy goat restocking project goats though according to livestock production department records there existed dairy goats in other households in the areas. The study areas covered were the former Molo and Kipkelion districts, currently sub-counties in Nakuru and Kericho Counties respectively.

Data collection was conducted by three enumerators with the help of sub-county livestock production office staff members who had facilitated in the project implementation process and post distribution monitoring and mentoring of beneficiaries. The list of beneficiaries was used as sampling frame for identification of interviewees. The beneficiaries had formed groups at the time of dairy goat distribution, which coordinated management issues, among which were passing on of a female first offspring to the next beneficiary in line and the sharing of a male goat for breeding. These helped keep the groups intact. By use of the local administration and the group members, the control interviewees who had initially been selected but left out due to limited funding were identified and interviewed on consent. The exercise started by informing the interviewees of the purpose, their right of choice to be interviewed and confidentiality. On request, respondents maintained in most cases that they remain anonymous. One hundred (100) dairy goat beneficiaries while 101 control respondents were interviewed, making a total of 201 respondents. In addition focused group discussions (FGD) were held with different beneficiary groups, who included those that were secondary beneficiaries after the first direct beneficiaries. They provided further information explaining the closed end questionnaire answers. FGD sessions were recorded and transcribed later, from a hired machine, for analysis. The use of the gadget was introduced before the process initiated and consent sought. Other sources of information

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as key informant were the Sub County Livestock Production Officers in both areas and the organization project staff members. The three enumerators had been subjected to a brief training prior to the pre-testing of the questionnaires.

4.2 Report of Findings, Analysis and Presentation

4.2.1 Household Demographics

A total of 201 respondents were interviewed, comprising 101 control and 100 beneficiary respondents. As shown in Table 1 below there were overall more female respondents (51%) than males (48%). More control males (53%) responded than female (47%) while more beneficiary female (56%) than males (44%). No child of either gender was represented. The difference between sexes was insignificant.

Table 1: Sex of study respondents

		Totals	**Sample split**	
			Control	**Beneficiary**
Q1.1. Sex of the respondent	Adult male	48%	53%	44%
	Adult female	51%	47%	56%
	Total	201	101	100

(Source: study data, 2014)

The household head ratio constituted 81% male and 19% female in total. Among the controls, this comprised 86% males and 14% females, while among the beneficiaries 75% were males and 25% were females. The household size on average was six members in both groups of respondents. The minimum recorded was two members and a maximum of eleven members, while the median was six members.

Among the respondents, 99% of controls claimed to be resident while 1% was an internally displaced person (IDP), while under the beneficiaries 98% were resident and 2% were IDPs. This implied most of the respondents were settled with access to land for

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food production. FGDs and the project documents confirmed that the selected dairy goat project beneficiaries were 2007/8-PEV victims, who had lost all belongings and had temporarily been displaced from their homes/land but had all since returned. Respondents did not own dairy goats then, though previously had other livestock like cattle, local goats, sheep and poultry that were all lost during the violence. Some community members strategically retain the "IDP" budge to access future government compensatory and resettlement project benefits.

The beneficiaries were targeted having lost all their livelihood assets apart from land (which they acquired back once peace returned) and on basis of a baseline assessment by the organization that concluded the dairy goat distribution was the most appropriate intervention.They were small-scale rural farmers with small land whose household members could benefit directly from consuming the dairy goat milk and income from its sales.

4.2.2 Household Socioeconomics

The main source of income between both groups was sale of crops (72%), followed by casual labor (20%), sale of livestock products (3%), informal trade (2%) and salaried employment (1%).

Control group's main income source, sale of crops (at 59%) was lower than beneficiaries' (85%). Fewer beneficiaries were engaged in casual labor (10%) than control (31%) while beneficiaries derived more income from sale of livestock products (5%) than control (1%). The control conducted informal trade in charcoal (4%).

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Table 2: Main household source of income

		% Income component	
S/no.	Income source	Control	Beneficiary
1	Sale of livestock	0%	0%
2	Sale of livestock products (milk)	1%	5%
3	Sale of crops	59%	85%
4	Casual labor	31%	10%
5	Remittance- support from others	1%	0%
6	Salaried employment	3%	0%
7	Local brewing	0%	0%
8	Informal trade (sale of charcoal...)	4%	0%
9	Other (specify)	1%	0%
	Total	100%	100%

(Source: Study data, 2014)

The highest literacy level attained by a head of household was tertiaryeducation in both groups of respondents, the majority had primary education and the lowest was nonattendance of school. The difference between the two groups in each category was not significant to bear effect at outcome level. This information is presented in the figure below.

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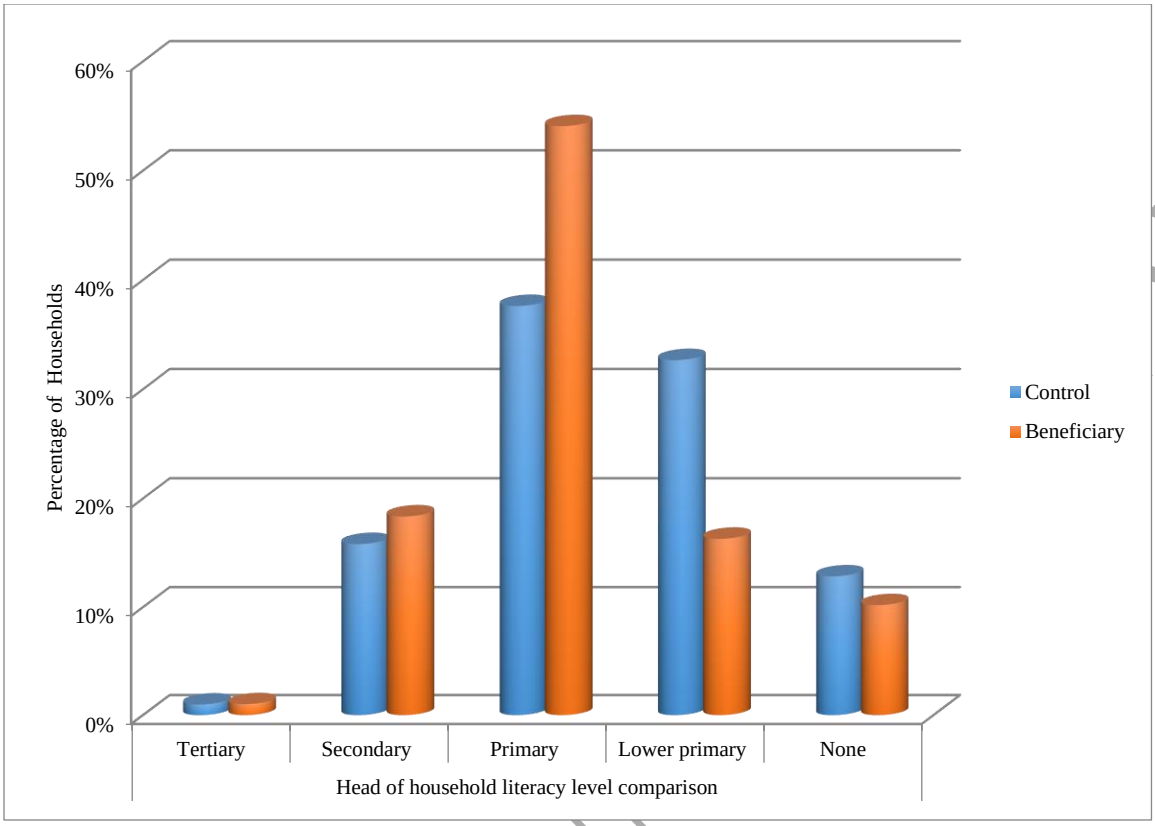


Figure 2: Household Head Literacy level

(Source: Study data, 2014)

4.2.3 Household Food Security: Availability

The main source of food at the household level across the groups was own production (88%), the beneficiaries being more (93%) than control (88%). The market was next (12%) on average, being more among the control (19%) than beneficiaries (7%). The chart below presents the findings:

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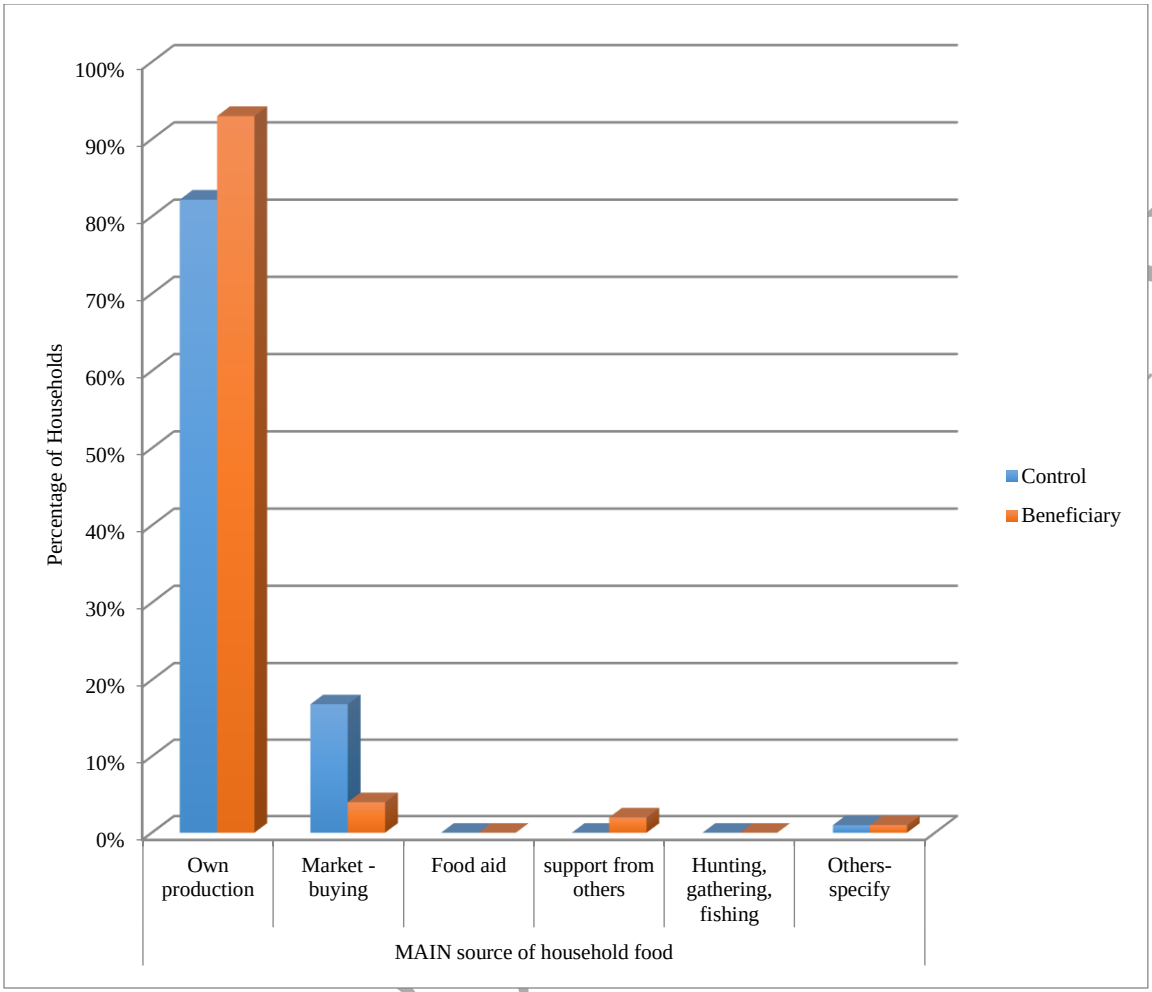


Figure 3: Main household food Source per category

(Source: Study data, 2014)

The yield lasted from one harvest to the next more in beneficiaries (75%) than control (28%), as presented in chart (figure 4) above.

The difference in own production between the groups was made up for by the higher labor and procurement from the market by the control group. Beneficiaries were better in production.

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The findings gave an indication on food availability in the households throughout the year. Longer availability of food in the respondents' households after harvest was better correlated with the dairy goat restocking.

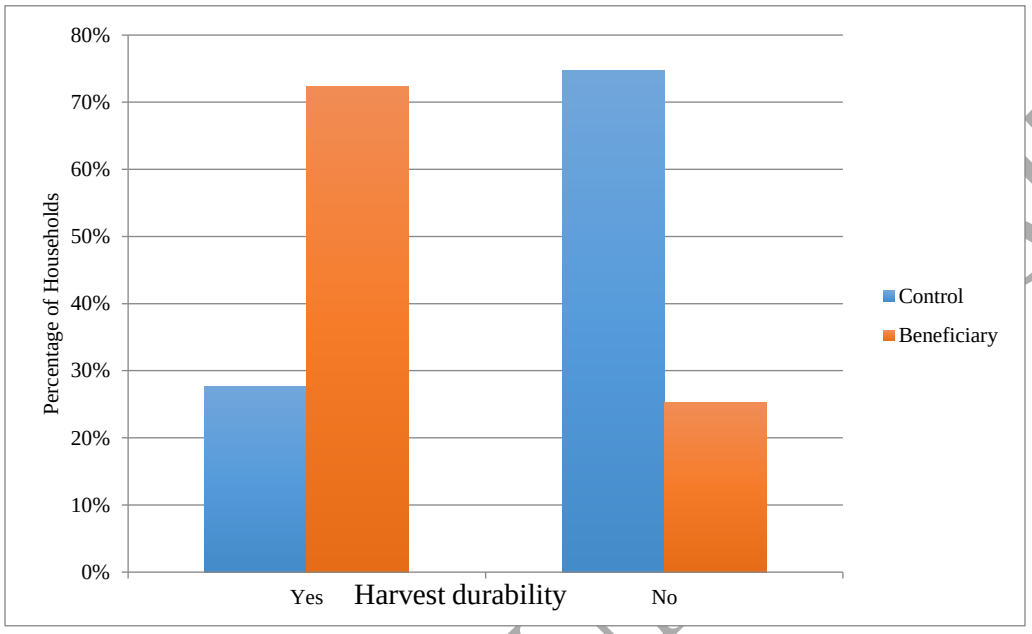


Figure 4: Harvest-to-harvest household yield durability in the last two years comparison
(Source: Study data, 2014)

In a period of two years, own yield lasted longer in months among beneficiaries than control as presented in the chart below.

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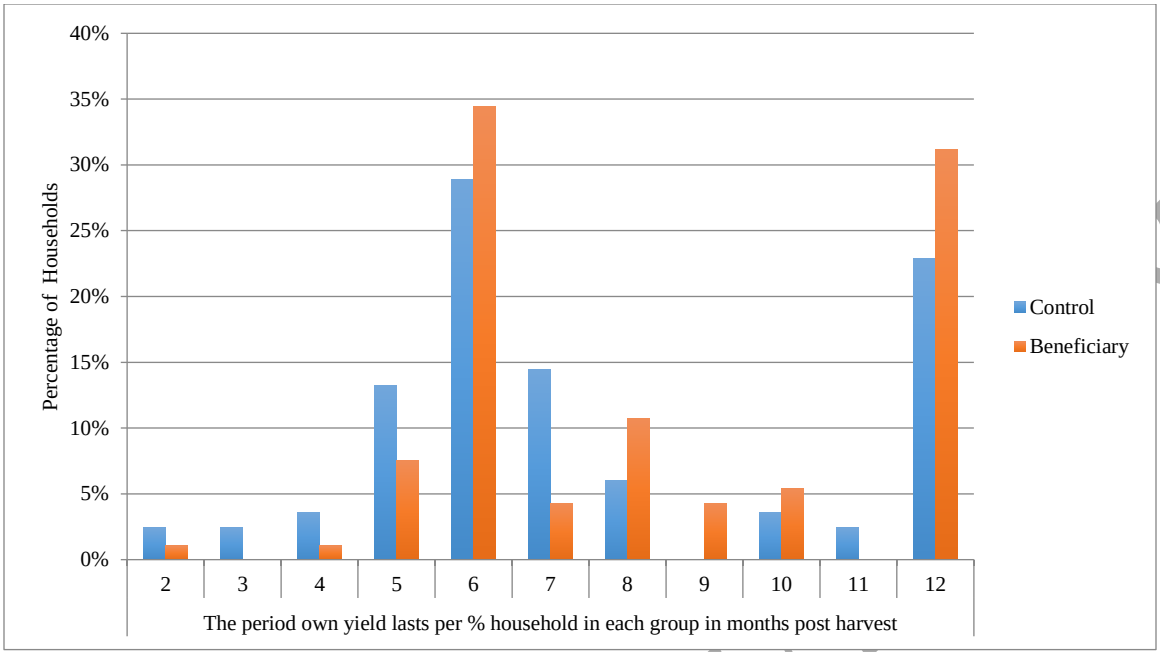


Figure 5: Household yield durability in months in a year

(Source: Study data, 2014)

The findings displayed a seasonality pattern in tandem with the phenology of crops the household produced: either biannual or annual. The crop mix indicates quick recovery in case of crop failure for whatever reason and a stable stock over the year. For those who mainly grow short maturing foods like potatoes which take 3 to 4 months to harvest, the food stock last from harvest to harvest within 6 months, while those that grow grains, mainly maize, once a year the yield stock lasts for up to 12 months and both indicated yield lasts from harvest to harvest. In either categories of crop maturity length, the beneficiaries' produce lasted longer than controls', indicating better household food security in terms of availability from own production among beneficiaries.

Respondents who sold milk (beneficiaries from dairy goat and some control had cow milk) spent the cash to: purchase food more among beneficiaries (70%) than control (57%); on education- (as fee and other reading materials) more in beneficiary (35%) than

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control (29%); household medication (5%) to (0%); for water at (0%) to (14%); livestock health at (10%) than (0%); buy livestock feed at (15%) to (29%); and purchase of local breed goat at (5%) to (0%), for beneficiaries to control, respectively. The bar chart below presents the comparative findings:

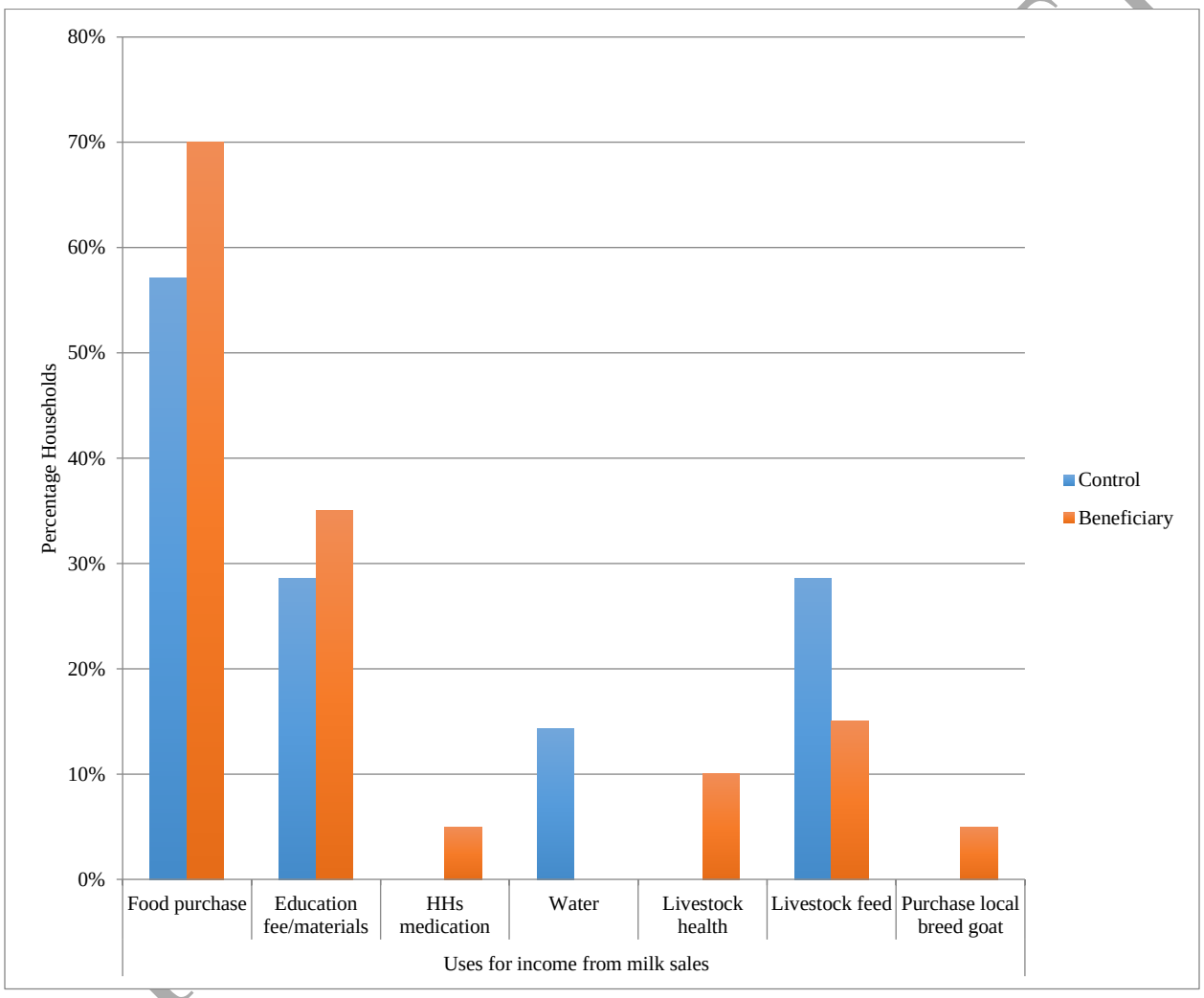


Figure 6: Proportional use of income from milk sales by households

(Source: Study data, 2014)

FGD findings indicated the use of the income to buy staple food from market when household stock was finished.

This is in tandem with FAO findings that for the rural poor, food procurement takes the highest percentage of income expenditure, in this case from livestock product (milk) sale. This indicates that the goats contributed not only to availability of milk but other components of the food basket. It is not possible to say whom the respondents sold milk to, and it can be concluded that the intervention did in fact contribute to a more balanced diet as other elements of the diet were purchased. Also, the income was used to purchase food when stocks were low, ensuring household food access through the market.

Most of the distributed dairy goats kidded between 6 months and one year (51%), some before six months elapsed (29%) and least between one year to one and half year (20%). This makes restocking a better recovery intervention than emergency relief.

It is after kidding that milk becomes available, though access to each household member depends on the amount of milk produced to share between the goat's kid and household members. Since goat gestation period lasts about 6 months, findings indicate that a high proportion of distributed goats were pregnant and all households benefitted from a reproductively mature dairy goat. According to FGDs findings, some goats died but the sample was not reflective of the fact because those that lost were restocked again with offspring of those whose goats survived.

Unlike the sale (cash income) or slaughter (meat) of the animal as suggested by Heffernan (unknown), the primary and therefore most critical benefit from female animal, for subsistence keepers, even among pastoralists whose animals are notoriously low producers, is the milk. Market is far from accessible and near perfect in their

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environments to be a primary determinant making such sales a desperate last resort. The fact that goats can optimally, kid twice in one and half year, makes them an appropriate species for restocking poor families which makes milk, a source of high quality protein, readily available,for a balanced diet, to household members especially children and the elderly.

4.2.4 Household Food Security: Access

Most (90%) of the beneficiary households drunk the diary goat milk at home compared to those that sold (9%) and did value addition (1%) as presented in the pie chart below:

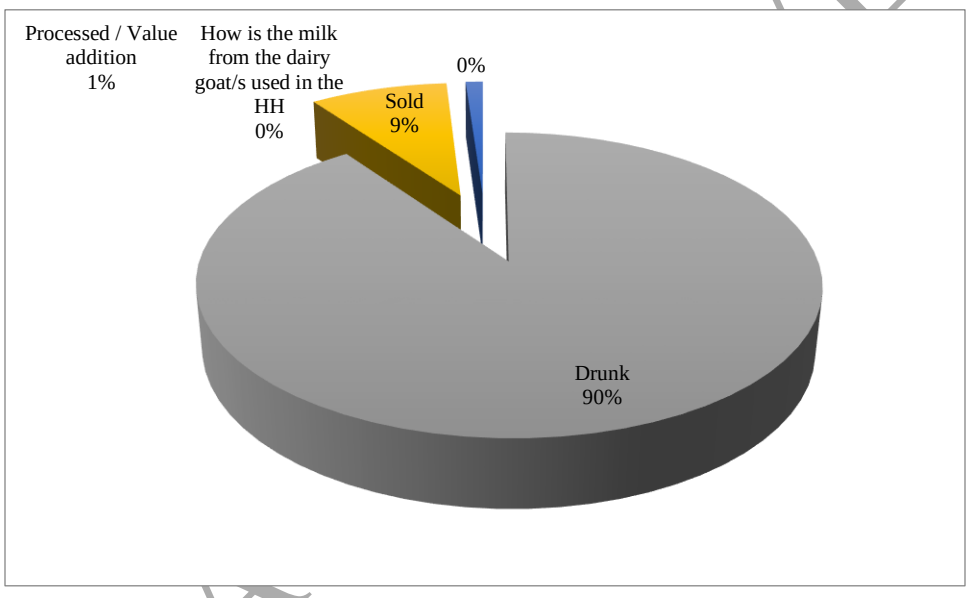


Figure 7: Dairy goat milk use in the beneficiary household

(Source: Study data, 2014)

On basis of age, individual access to the dairy goat milk at the household level was found that in most households (53%) the dairy goat milk was shared equally among members, followed by those (46%) in which children were given more and least (1%) where adults drunk more as seen in figure 8 below. From FGDs it was found that most of the milk was drunk in or as white tea.

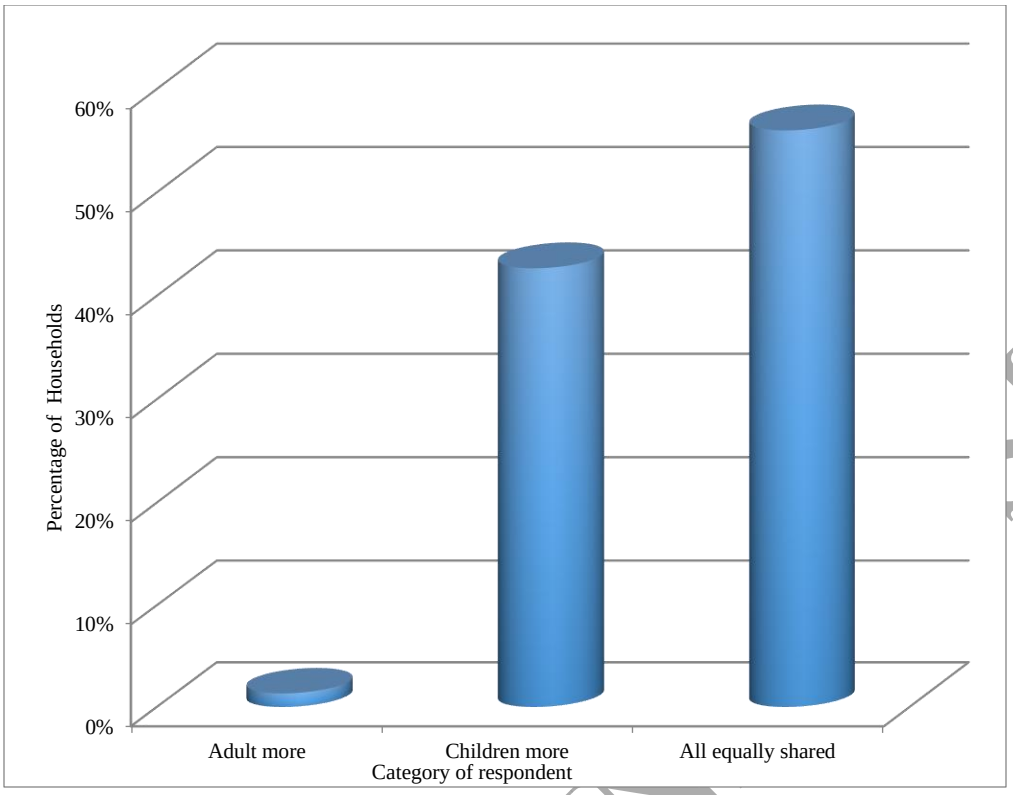


Figure 8: Dairy goat milk distribution among household members on age basis

(Source: Study data 2014)

On basis of household member gender, in most household (99%) the milk was sharedequally while among a few (1%) female household members drunk more and in none males drunk more (0%), as shown in figure 9 below.

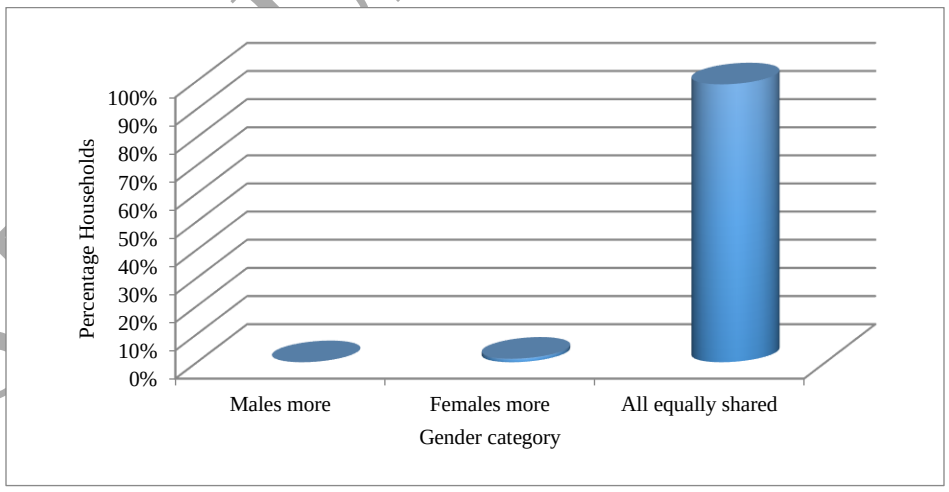


Figure 9: Dairy goat milk distribution among household members on sex basis

(Source: Study data, 2014)

FGDs provided that children were favored when milk was too little to share and women were slower in starting to drink the goat milk because of being averse to trying new foods.

Availability of food at the household does not guarantee access to all members. But the findings indicate that the distribution of dairy goat milk in the household was equitable on age basis and equal on gender basis, contributing towards addressing child malnutrition and gender discrimination, both key development issues.

Other contributions to household food access by the dairy goat were: meat (0%) in households, kids (4%,) skin (2%) and manure (99%) of all households.

FGDs provided that beneficiaries who got male kids that they could not pass on to the second-generation beneficiaries, slaughtered them for meat and the skins (and did not consider both extra benefit!). Goat manure helped make a saving on buying fertilizer and contributed to a better maize production. Generally, the dairy goat made a positive contribution to household food availability through manure contributing to better yield and saving income meant for buying artificial fertilizer to access other foods in the market.

Fewer respondent households among those who got other products from the dairy goat apart from milk sold the products (11%) and most (89%) did not sell.

It was obtained from FGDs that in some cases the income from the sale of other dairy goat products could be expended to meet urgent household needs like medication that

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could otherwise require sell of food items for example grains and eggs to obtain liquid cash to pay for them.

The beneficiary respondents assigned the following uses a percentage of income obtained from sale of other products (apart from milk) from the goat as presented in the chart below:

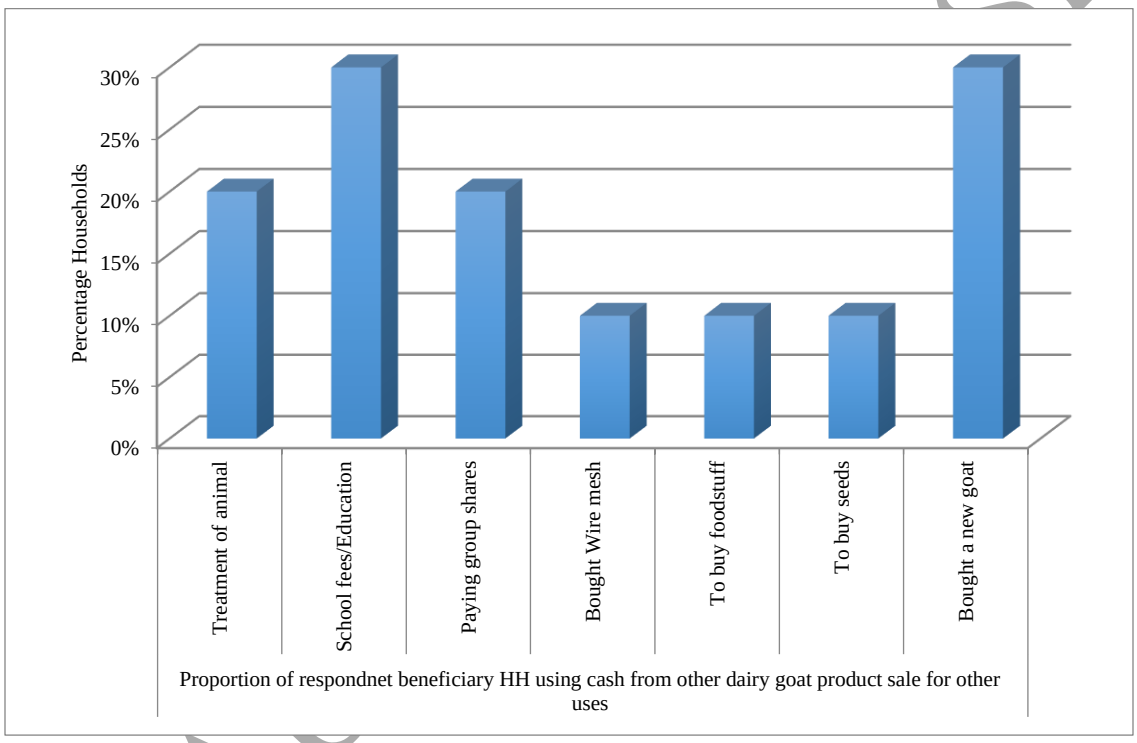


Figure 10: Uses of extra income from sales of other goat products

(Source: study data, 2014)

A combined large proportion of the income so obtained went directly towards strengthening food security as; animal health, buying other food stuffs, seeds and another goat while the spare income was used to meet other expenses which could have required disposal of other food items (given the main source of household income) as indicated above, indirectly contributing to household food availability. Paying school fees, paying

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for group shares, buying a wire mesh and another goat indicates an investment stage that is preceded by the ability to save.

The average price of dairy goat milk per liter among beneficiaries was reported more (Ksh55) – which was what they either sold or could sell at, than the average overall (Ksh52) and less among the control (Ksh48)- a price they either bought or could be willing to buy at.The median in both groups was Ksh50, a more reasonable price. Note that the price could vary depending on who is reporting as it depends on at what level and from whom along the value chain they buy.

The average cow milk price per liter among beneficiaries was more (Ksh35); two shillings more than overall average while among the control was (Ksh32) less by one shilling.The median between both groups was Ksh30. From the FGDs, some of the responses given were for milk sold from the farm, in the market or processed from the shop, hence the price variance. Generally FGDs participants agreed that goat milk was of superior quality.

A general trend is drawn between the two groups despite their slight differences. Goat milk is more expensive than cow milk. This could mean that once the goats are well established the keepers can get more income based on the belief that goat milk is superior to cow milk.

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Two issues arise from the findings, namely, the slightly higher price reported by the beneficiaries who actually have milk at home from their goat hence do not need to buy and may be misinformed about the price and end up exaggerating. The second issue is the obvious difference in price between cow and goat milk. The respondents generally seem to agree that goat milk costs or should cost more. The explanation to this observation came during the FGDs and in another question in the questionnaire where they all tend to concur on average that goat milk is of superior quality.

The reasons that the respondents attribute to goat milk upon which in comparison to cow milk price superiority is witnessed are tabulated below. Percentage scores are weighted on the basis of number of times a reason is mentioned as a percentage to indicate importance attributed to the reason across the respondent divide, viz:

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Table3: Reason respondents considered goat milk more valuable than cow milk

Q4.6. Specific benefits attributed to goat milk compared to that of other animal species		Totals	Sample split	
			Control	Beneficiary
1	Has medicinal value/Used as a medicine	23%	24%	22%
2	It is thicker/More cream	24%	34%	14%
3	It's more nutritious	35%	31%	40%
4	It's tasty/Better taste	4%	1%	7%
5	Boosts/Improves Immunity/Prevents diseases	38%	19%	58%
6	Makes more tea/Use less to prepare tea	10%	4%	16%
7	It gives energy	1%	0%	3%
8	Does not spoil easily	5%	0%	10%
9	Builds the body/High protein content	2%	3%	2%
10	Generates more income (Shortage in supply, so higher prices and more income)	7%	6%	9%
11	It's of better/high quality	8%	4%	13%
12	Provides fat for cooking vegetables	1%	0%	3%
13	No idea	11%	17%	6%
14	It is good for children/Preferred for use by children	3%	3%	4%
	Total	**201**	**101**	**100**

(Study data, 2014)

Of importance among the attributes respondents (beneficiaries [40%] and control [30%] attach to dairy goat milk is that it is considered more nutritious. This is emphasized by other reasons like it builds the body, gives more energy, and provides more fat for cooking vegetables. All these contribute to utility aspect of food security. The fact that goat milk is reported, though marginally, preferred by children emphasizes the proposition that it can be used to fight malnutrition as goats are cheaper to buy and rear,

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hence affordable by poor households compared to cows. That dairy goat milk is a source of fat that can be used for cooking vegetable makes a scarce type of cash income saving for other uses in the household. In addition, it attracts higher income per unit price in the market henceenhanced access to other varieties of food (and addressing other needs).

From the foregoing findings, it can be concluded that the dairy goats made a positive contribution to beneficiary households food security access.

4.2.5 Household Food Security: Utilization

Having food available and accessible does not guarantee food security. Once taken in food will be useful if the body is able to assimilate and metabolize (break it down and use it to build up/repair the body) it in order for it to satisfy the third dimension of food security. The study sought to find out how the ownership of the dairy goat affected food utility in the beneficiary household as compared to the control households based on knowledge, attitude and practices in various aspects.

On the public health food safety aspect of zoonotic diseases, slightly more beneficiaries (79%) were aware than controls (76%). The close gap was attributed to the fact that the information was discussed after trainings and it was also aired on radio as exposed during FGDs.

The degree of knowledge of the most prevalent zoonotic diseases – brucellosis (they referred to as *ugonjwa wa maziwa*) and tuberculosis also emphasized during project trainings, was higher among beneficiaries (76% and 18%) than controls (70% and 10% for each disease respectively), as shown in the table below.

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Table4: Zoonoses mentioned by respondents

	Score per sample split	
Disease/zoonosis mentioned	**Control**	**Beneficiary**
Brucellosis	70%	76%
Worms	13%	29%
Typhoid	0%	4%
Tuberculosis	10%	18%
Rift Valley fever	5%	0%
Anthrax	16%	14%
Gout	1%	1%
Mastitis	1%	0%
Menengitis	1%	0%
Amoeba	0%	1%
Rabies	1%	5%
Total respondents	**77**	**79**

(Source: study data, 2014**)**

Both groups practiced milk boiling before consumption (100%). More beneficiaries (44%) indicated milk is boiled before selling than controls (9%). All controls (100%) boiled milk directly as opposed to a marginal less beneficiaries (99%).

Boiling milk before consumption is promoted against transmission of zoonoses, improving food safety. Boiling milk before selling, a highly perishable product improves its shelf life, ensuring higher income among beneficiaries than controls. The response that milk is sold before boiling means most control respondents (91%) do not buy shop pasteurized milk but raw milk from vendors.

To determine the basis upon which milk is boiled and therefore the seriousness it is given, the respondents were asked the rationale behind the practice. The findings are presented in figure 11 below:

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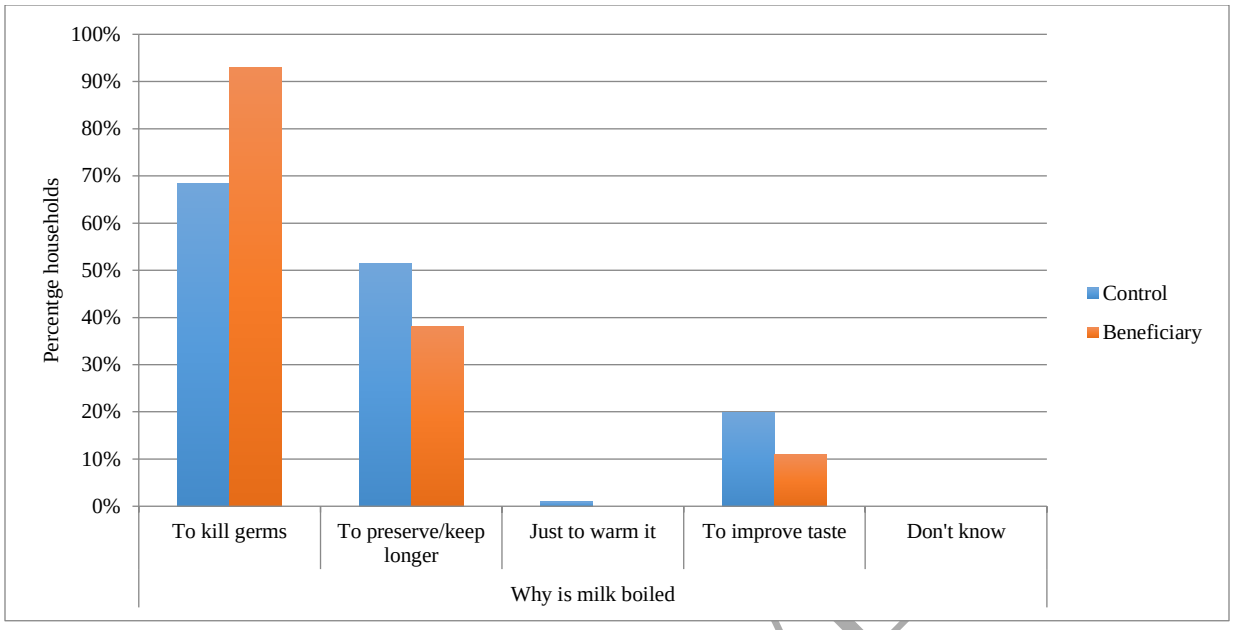


Figure 11: Reasons why respondents boil milk

(Source: Study data, 2014)

More beneficiaries (93%) gave 'to kill germs' as the reason for boiling milk as opposed to fewer controls (68%). Knowledge that boiling kills disease causing germs would make one conduct the process better than just for preservation and other reasons as observed among the beneficiaries, enhancing food safety. The control group respondents (51%) who put emphasis on milk boiling for an improved shelf-life and had previously shown they buy unpasteurized milk from vendors may be at more risk of contracting a zoonosis with a casual milk boiling approach, compromising food safety among the group.

To understand the diet mix of the respondents, they were asked what other foods they eat with milk and figure 12 below presents the findings.

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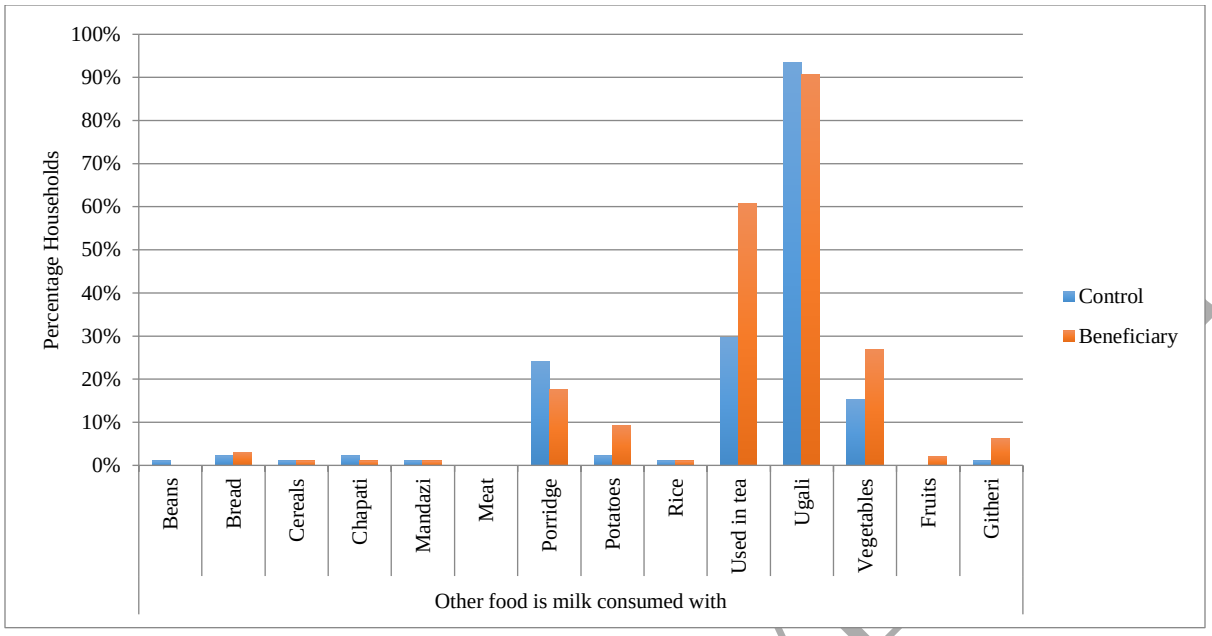


Figure 12: Other food taken by respondents along with goat milk

(Source: Study data, 2014)

Probing under FGDs confirmed maize and potatoes as staple foods. The findings show variety across the three food classes- proteins (beans and *githeri* (a mixture of boiled maize grains and beans), carbohydrates (wheat in bread, *chapatti and mandazi*, cereals, maize in porridge, *ugali*, and *githeri*, and rice) and vitamins and minerals (vegetables and fruits). A considerable amount is consumed as tea, which is accompanied by with sugar- a carbohydrate. The quality of the food diversity was good but better balanced for beneficiaries under the disease-preventing category of vitamins shows beneficiaries at (27%) in vegetables and control at 15% and fruits at 3% compared to 0% respectively. This is important in the food security utility aspect, as this group of food is what ensures that the body utilizes the building blocks of proteins and energy of carbohydrates and fats to sustain the body through growth and repair. This put the beneficiary group at an advantage compared to the control group.

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The milk-transmitted zoonosis, brucellosis, is among the causes of livestock abortion especially in late pregnancy. The pie chart below indicates the proportion according to beneficiaries of the goats that aborted.

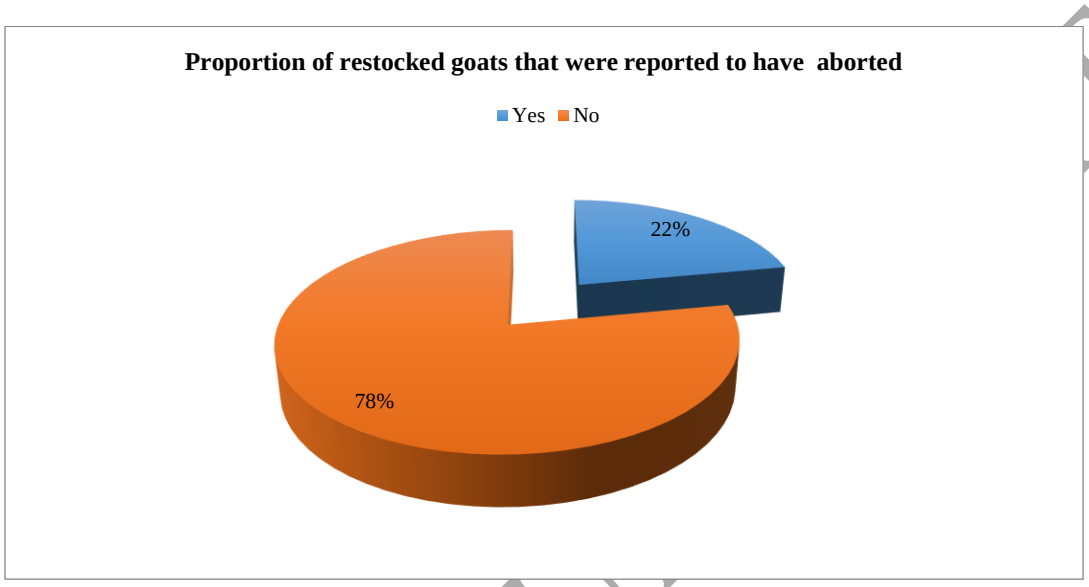


Figure 13: Proportion of female dairy goats that aborted

(Source: study data, 2014)

Of the beneficiary respondents (22%) whose goats aborted, among 23% it occurred in late pregnancy a stage usually associated with brucellosis as a causative agent. This comprise 5.1% total household, at risk of getting brucellosis.

More beneficiary households had members diagnosed with brucellosis (5%) and tuberculosis (6%) than controls at (4%) and (1%) respectively, as presented below;

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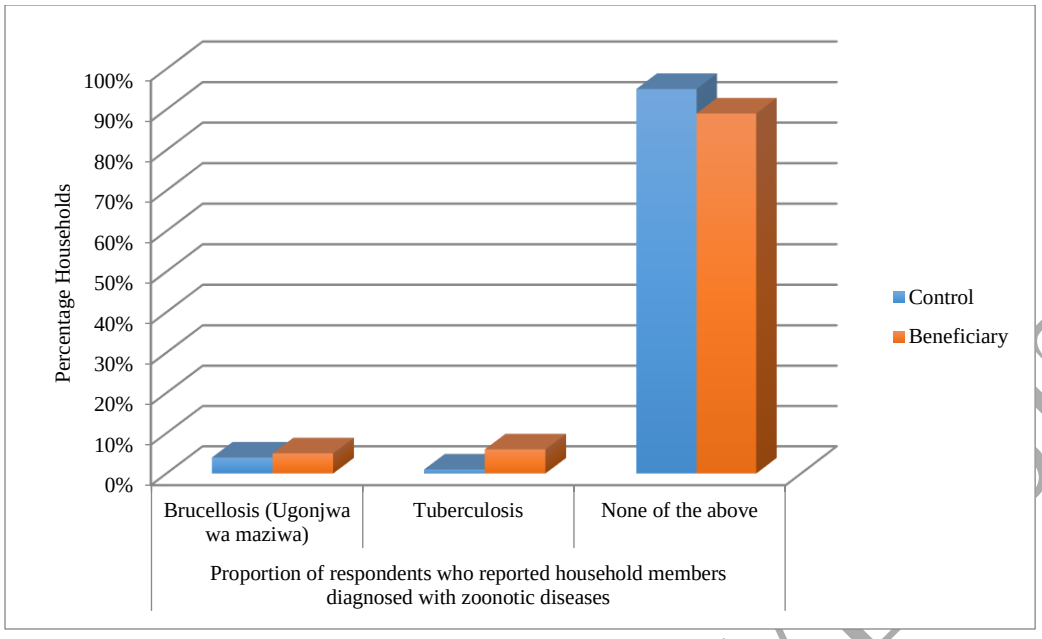


Figure 14: A copmarison between those who have suffered the two main zoonoses

(Source: Study data, 2014)

The close coincidence between the proportion of goats reported to have aborted late in pregnancy (5.1%) and the households reporting human brucellosis cases (5%) among beneficiaries is highly suspect. Given the beneficiaries have good knowledge of the milk transmission route and practice boiling milk to kill germs before consumption; the possible route of transmission is inappropriate handling of the aborted fetus and membranes when assisting the animals during abortion or at birth, not addressed here.

Slightly more beneficiaries (5%) reported household members diagnosed with malnutrition than controls (4%). However, all the cases among beneficiaries (100%) and most among controls (75%) occurred before the project, early in the project no beneficiary (0%) and some controls (25%) and none for both groups after the project. Malnutrition is a multi-factor caused condition among which is the health status of the

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victim (presence of infectious diseases causing diarrhea, worms), sanitation and care practices of caregivers, food accessed and assimilated are paramount. The findings point to the time before or around the conflict before the project when the respondents were displaced. Beneficiaries recovered faster after the project than the control that reported cases (25%). More utility issues are addressed under next subtitle like drug residues in livestock products. Abortion is a failed investment leading to loss of expected returns: a kid, milk and the incomethat could be used to access food from market, while zoonosis, impairsthe victim's health and the ability to utilize food and overall productivity.

4.2.6 Household Food Security: Stability: Knowledge, Attitudes and Practiceson dairy goat milk

Sustainability of food availability, access and utility must be incrementally maintained for food security to obtain at whatever level. This can be grounded on the Knowledge, Attitudes and Practices (KAPs) of the respondents, among other means.

More beneficiaries (95%) considered goat milk better than cow milk compared to controls (50%). This presented in the chart below.

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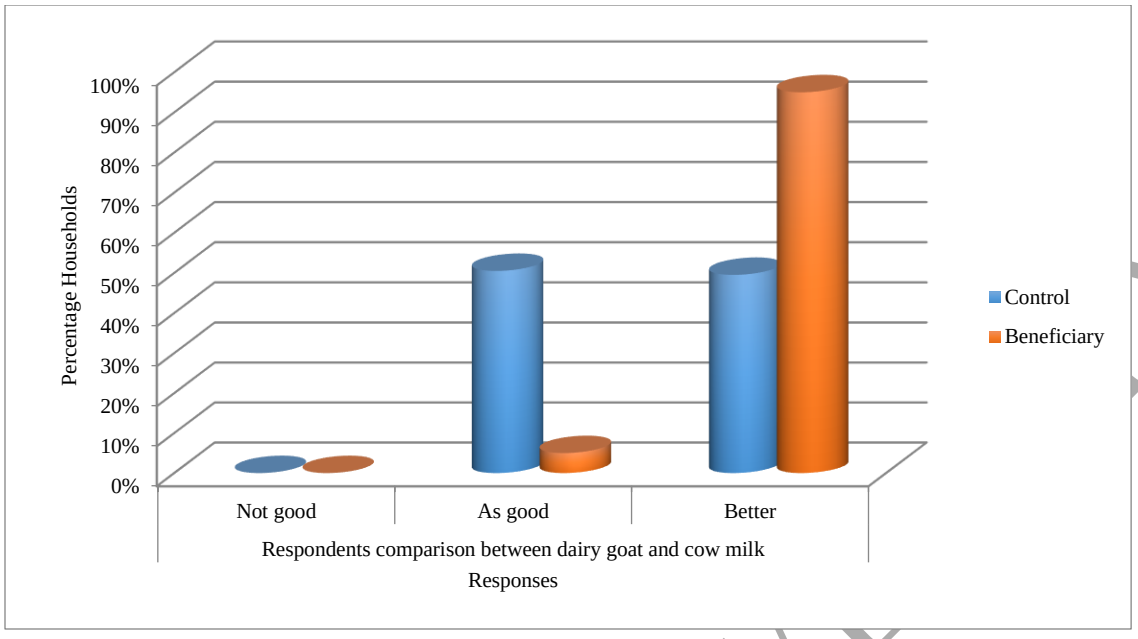


Figure 15: Respondents' comparison between dairy goat and cow milk (Source: Study data, 2014)

Respondents gave the following reasons for considering goat milk better than cow milk; believe that it has medicinal value against some diseases, it boosts immunity/prevents diseases, funds raised from sales can be used to pay for education expenses, is of high/good quality (very thick), a similar quantity with that of cow makes more tea hence saves cash, has more nutrients, it is sweeter/tastes better, has more cream and is a better source of energy.

The high level of dairy milk acceptability among the respondents predicts high chances of sustaining the gains made in other dimensions of food security, reinforced by the reasons provided for preference.

On the practice of observing drug withdrawal period (not consuming milk and meat from livestock for a number of recommended days upon treatment), was poorer among the

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control in all aspects compared to beneficiaries, as seen in figure 16 below. Antibiotics resistance linked to improper practices in animal health is a major global concern.

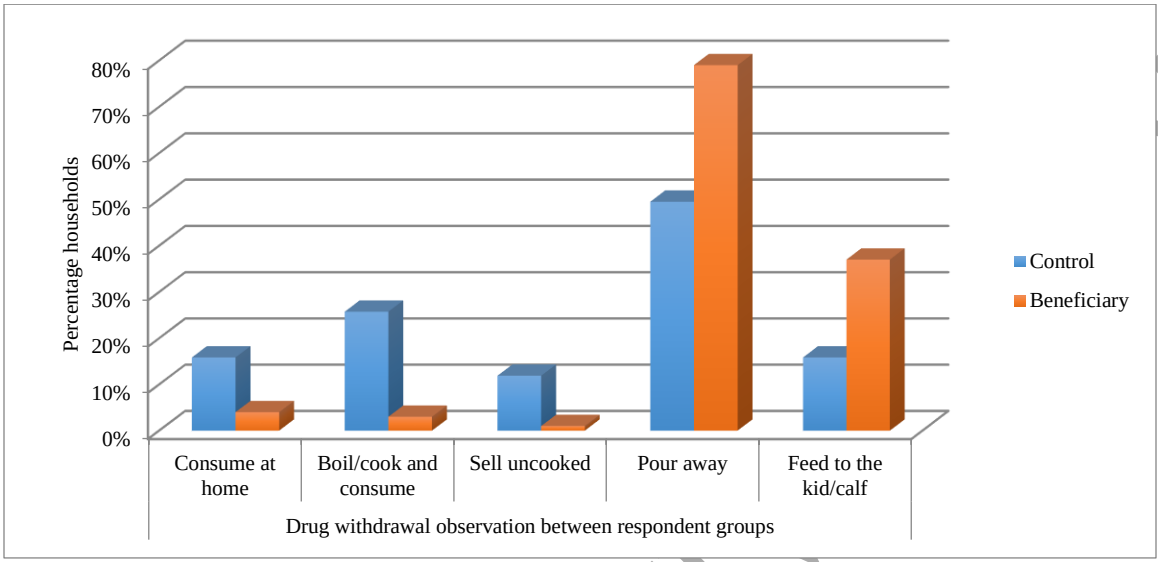


Figure 16: Drug withdrawal observation among respondents

(Source: Study data, 2014)

From the foregoing, on the food safety aspect of food security utility, beneficiaries are better protected than controls in the drug residue effects from livestock products. This is attributed to awareness trainings provided by the project. However from the FDGs, it emerged that veterinary extension services are scarcely available especially in Kipkelion.

On value addition for the highly perishable main dairy goat product- milk, the respondents had the following responses in table 3 below:

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Table 5:Other products that respondents (could) make from dairy goat milk

	Product	**Totals**	**Control**	**Beneficiary**
1	Fermented milk	86%	75%	96%
2	Cheese	1%	3%	0%
3	Yoghurt	2%	3%	1%
4	Others- Mala	19%	21%	17%
	Total respondents	**201**	**101**	**100**

(Source: study data 2014)

The main product made, fermented milk*/mala*, does not keep longer than 3 days. From FGDs it was ascertained that other products were not made due to insufficient quantities of milk produced in addition to lack of skills. Animal proteins are of high quality hence required in small quantities. Value addition techniques that increase products shelf life ensure they are prepared during abundance to be available during seasonal scarcity. This aspect could not be addressed so early in the project life before milk was available. However cream used for vegetable preparation during cooking saves on buying cooking fat.

As to who takes care of livestock in the household- male, female, adult or children the responses are presented in the chart below.

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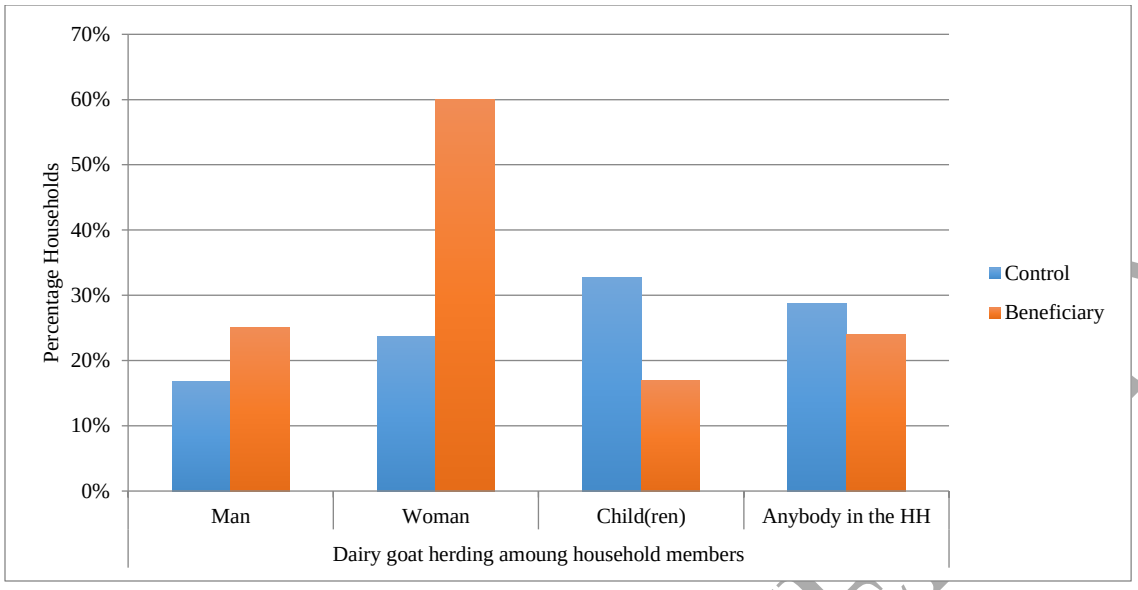


Figure 17: A comparison on which HH member (could: - for control) herd the dairy goat
(Source: Study data, 2014)

The FGDs established that women actually thought it was a positive change in their lives to own the goats despite the extra duty as they were not idle to gossip, something they supposed led to conflict among community members. Conflict was the cause of the difficult situation they were in, reinforcing food insecurity, from which they were recovering. Rather, the project had specific targeting of women and their tendency to herd the animal was an expression of ownership and a decision-making mandate. Women stressed that the animal did not come as an extra burden to affect core chores like preparing meals for children but also a networking and unifying factor between group members from different ethnic backgrounds and competitive conflicting interests.

Restocking of vulnerable households as a food security intervention is accompanied by other supportive activities to enhance recovery and sustainability. The table below lists

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the extra support narrated with accompanying percentage scores indicating emphasis on importance of each as recalled.

Table 6: Other support given to beneficiaries

	Other support the beneficiaries could recall they received from the project	Score
1	Training/Capacity building on animal husbandry	83%
2	Seeds for fodder crop	53%
3	Fodder crop(Grass, Oats)	5%
4	Dewormer	2%
5	Mineral licks/Salt Lick	10%
6	Free treatment of animals	12%
7	Drugs	4%
8	Milk can	3%
9	None	7%

(Source: Study data, 2014)

Training on improved animal husbandry was recalled by many of the beneficiaries emphasizing its appreciated centrality to the success of the project and sustainability of gains made.

Some respondents(7%) could not remember or relate any of the support to the dairy goat supplied. This was established to be partly due to the fact that some respondents were spouses representing their registered beneficiary partners. This indicated a flaw in information flow at households. It requires a systematic inquiry to establish if spouses share information from workshops, the degree to which this happens and which spouse is likely to share more than the other and factors influencing the sharing like differences in literacy level, respect for each other and willingness to learn/interest. It is critical during targeting too; who is going to be responsible and needs the information in decision-making. It therefore matters who represents the household in the activities and who is interviewed.

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The beneficiary respondents were asked how they thought the extra support helped in achieving the dairy goat keeping objective and how important that was. The following reasons were provided: training on feed/seed production 10%, learnt on proper animal husbandry methods 74%, learnt new/good farming methods 10%, learnt other methods of produce management 1%, used the knowledge at home 1% and learnt on benefits of goat keeping 2%.

Other advantages of having a goat in the farm apart from milk were listed as; a source of manure, source of income, they are clean animals (easy to manage), keeps one busy (reasonably engaged), saving on milk cost (instead of buying), source of employment/occupation, meetings as dairy goat owners has brought good relationship between neighbors, has brought unity in neighborhood, better land use, use of crop residues, increase in herd size through kids, sources of meat, nutritional benefits, gives owner hope, good training/information sharing through group members, financial assistance/loaning through group members. These responses indicate a positive contribution toward the survival of the gains made by the project at the household, especially peaceful co-existence. It emphasizes sustainability on gains made in household food security.

From organization records, it was established that beneficiaries were encouraged to form dairy goat owners' association groups and the study sought to find out what benefits it had to members. The following were enumerated; acquisition of knowledge on better dairy goat care, numerous training through capacity building sessions, benefits from

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group saving/loan schemes/merry-go-round, unity and peace among members/neighbors, sharing of ideas/learning, passing forward /giving others kids/secondary beneficiaries, group access to loan facilities/financial support, more projects/group income generation, financial security among the group members, advice in production and development, moral strength and encouragement and targeting for educational seminars in goat keeping.

Respondents gave the following critique on the project design and implementation to be consideredinfuture for improved and more successfulproject results: the first beneficiary should keep the first kid (control 0%, beneficiary 6%)- beneficiaries felt one doe was insufficient for far too early a donation to make of a first offspring. From FGDs, this had two effects: one, it brought the first generation and second generation beneficiaries together to have one objective achieved; having the goat kid born and raised successfully.

From FGD respondents proposed the following: More follow ups/support or longer project cycle, or the organization stays longer to offer guidance or generally more guidance for the beneficiaries(control 6%, beneficiary 10%);More veterinary drop points/distribution of veterinary supplies/veterinary supplies should be brought closer (control 0%, beneficiary 7%);Veterinary supplies should be made cheaper/subsidized (control 0%, beneficiary 2%);Treatment of animals/training on treatment should be prolonged (control 0%, beneficiary 3%);Marketing of milk/organized marketing of milk (control 0%, beneficiary 1%);More than one goat to be given out/distributed (control 52%, beneficiary 18%);Facilitating marketing of the male kids (control 0%, beneficiary

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1%);Free supply of supplements- mineral/salt licks (control 0%, beneficiary 3%);To be given good/pure breed/high milk yielding goats (control 0%, beneficiary 6%);Replacement of lost goats/insurance follow up (control 0%, beneficiary5%);The beneficiaries should be able to sell the goats or facilitated to get a central/organized market to sell (control 3%, beneficiary 3%);Should target more groups/households (control 13%, beneficiary 4%);Implementing organization should facilitate/support to register goats to sell better (control 0%, beneficiary 3%);Nothing/so far so good (control 16%, beneficiary 22%);Morerefresher trainings to improve production (control 3%, beneficiary 8%);The organization should facilitate the groups get loan/financial facilities (control 0%, beneficiary 3%);Group beneficiaries should donate to non-beneficiaries (control 3%, beneficiary 0%);Goats should be checked for defects before departure (control 0%, beneficiary 1%);Project should change bucks/cross breeds for better results (control 0%, beneficiary 1%);And bring cows instead of goats (control 3%, beneficiary 0%).

4.2.7 Stability, sustainability and right to food

Both groups received further assistance, beneficiary (36%) more than control (16%). The form of help included farm inputs- beneficiary (73%) more than control (67%), relief/food aid more beneficiary (19%) than control (0%), loan acquisition beneficiary (4%) more than control (0%), house construction beneficiary (0%) less than control (33%), unspecified help more beneficiary (4%) than controls (0%), as shown in chart below. However, it happens that the beneficiaries were mainly listing items that made up the restocking package. The narrated extra support for beneficiaries (36% Vs control 16%) was mainly the fodder production part of the restocking package, loans were those

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acquired from dairy goat beneficiary group savings, and food aid was distributed during the skirmishes to all before the restocking occurred. However the house construction support that the control group members reported was specific. The beneficiaries did not access extra support that could have given them undue advantage over controls.

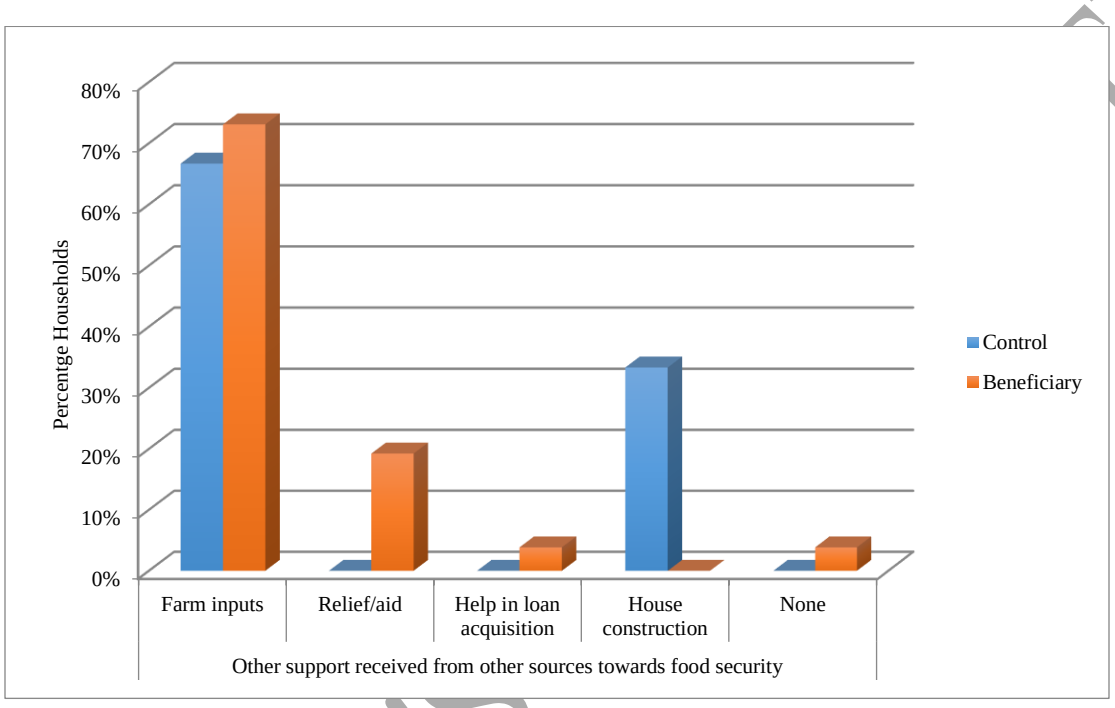


Figure 18: Other support received by respondents towards food security

(Source: Study data 2014)

Respondents' perceptions on the impact ofthe newly promulgated constitution aimed at promoting appropriate governance, tolerance, security, peace and stability if it could ensure their access to food in future are presented in the bar chart below:

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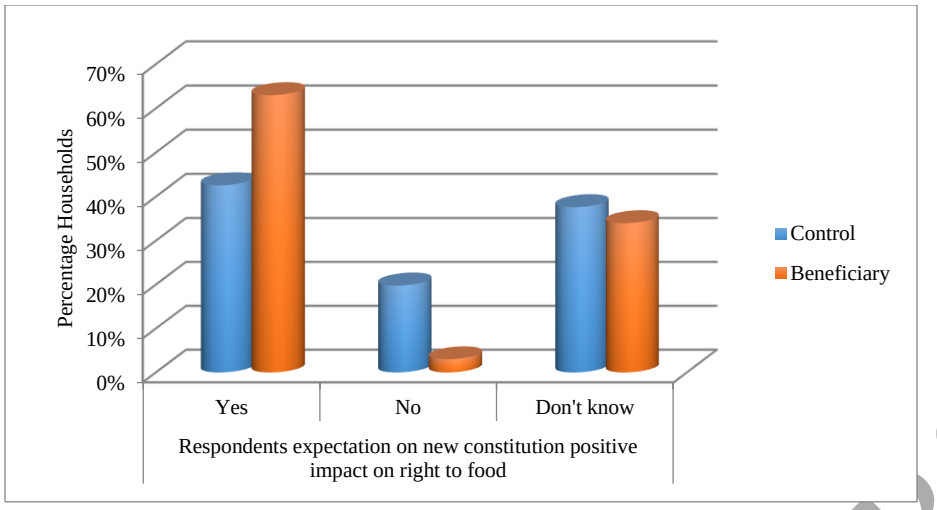


Figure 19: Respondents' perception on the new constitution's impact on the rgith to food in future
(Source: Study data, 2014)

Generally more respondents had a positive perspective on the new constitution guaranteeing their right to food in future for the reasons presented in table 5 below, each with a percentage indicating the popularity of the reason among respondents.

Table 7: Respondents' reasons the new constitution secures the right to food

	Reason	Control	Beneficiary
1	Proper laws which bring order	7%	12%
2	Peace and security leading to increase in production	33%	54%
3	Improvement of human rights	4%	8%
4	Improved services due to devolution	11%	14%
5	Civilian involvement in government	0%	3%
6	Reduced price for farm inputs	9%	0%
7	Unity leading to better relations among the people	4%	5%
8	Lack of insecurity	2%	0%
9	Creation of employment	4%	0%
10	It is better than the old one	0%	2%
11	Improvement on infrastructure leading to more market	7%	2%
12	Government to give seeds/fertilizers to farmers/ Extension services	11%	0%
13	Increase in farm produce prices	2%	0%
14	Don't know	4%	0%

(Source: Study data 2014)

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Both sets of respondents thought there was enough food in the market: beneficiary (92%) and controls (90%).

More beneficiaries (56%) could afford food in the market than control (18%) as depicted in the figure 20 below.

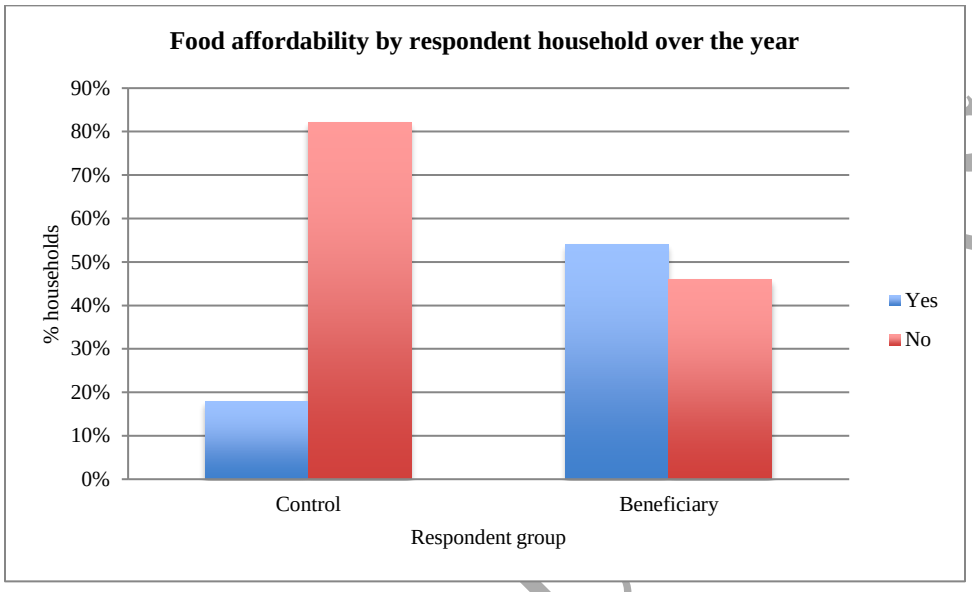


Figure 20: Food affordability by respondents over a year

(Source: Study 2014)

This means more beneficiaries could raise income to procure food in the market compared to control, hence more food secure.

4.3 Chi-test for household data to determine differences in food security proxy indicators

The study set to test two proxy indicators to determine the changes the intervention had on beneficiary household's food security: how long yield lasted in the year to show difference in food availability at the household level, and ability to access food any time of the year in the market to determine food access through disposable income.

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1. The difference in how long own yield lasted in the household post harvest in the two households compared

Table 8: Cross-tabulation between sample groups and availability of food

			Q3.3. Food availability all year round		Total
			Yes	No	
Sample Groups	Control	Count	23	60	83
		% Within Sample Groups	27.7%	72.3%	100.0%
		% Within Q3.3. Food availability all year round	28.0%	75.0%	51.2%
		% Of Total	14.2%	37.0%	51.2%
	Beneficiary	Count	59	20	79
		% Within Sample Groups	74.7%	25.3%	100.0%
		% Within Q3.3. Food availability all year round	72.0%	25.0%	48.8%
		% Of Total	36.4%	12.3%	48.8%

(Source: Study data, 2014)

From the table above, it is evident that among the respondents who reported to have food stocks lasting from harvest to the next harvest were: control 27.3% and beneficiary74.7% while those who did not, were: control 72.3% and beneficiary 25.3 %. Overall, among those who reported their yield lasts from harvest to harvest, 28% are control as compared to 72% beneficiary households.

Table 9 : Chi-square tests table A

Chi-Square Tests			
	Value	Degree of Freedom	Asymp. Sig. (2-sided)
Pearson Chi-Square	35.728	1	.000
Continuity Correction	33.873	1	.000
Likelihood Ratio	37.187	1	.000
N of Valid Cases	162		

(Source: Study data, 2014)

There is a significant difference in food availability between control group and beneficiaries (Chi-Square Value =35.728, Df=1, P-Value <0.01). The findings show that

beneficiary households had the yield from own food production harvest lasting longer through the year than in the control households. Given the contributing factors realized above like manure, saving from buying and selling milk, buying inputs like seed and fertilizer, it shows that the dairy goat intervention had a positive impact on the beneficiary households as compared to the control group's food security.

2. The difference in disposable income between the two sets of households under study: beneficiary and control

Table9: Cross tabulation between Sample Groups and Disposable income

			Q8.5. Disposable income (Can you afford buy food in the market anytime of the year)		Total
			Yes	No	
Sample Groups	Control	Count	18	83	101
		% Within Sample Groups	17.8%	82.2%	100.0%
		% Within Q8.5. Disposable income	25.0%	64.3%	50.2%
		% Of Total	9.0%	41.3%	50.2%
	Beneficiary	Count	54	46	100
		% Within Sample Groups	54.0%	46.0%	100.0%
		% Within Q8.5. Disposable income	75.0%	35.7%	49.8%
		% Of Total	26.9%	22.9%	49.8%

(Source: Study data, 2014)

The presentation compares respondents' ability to afford food in the market through the year.

By using *"ability to buy food in the market all year round"* as a proxy indicator for disposable income, the table above shows the distribution of disposable income between the control and the beneficiary households. It shows that those among the control group who reported that they are able to buy food from the market all year round were 17.8% while those who reported that they were unable were 82.2%. On the other hand among the beneficiaries, 54% reported they were able to buy food in the market all year round

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while 46.0% did not have enough money to buy food from the market throughout the year. The findings in the table show that among the families who were able to buy food in the market all year round, 75.0% are among the beneficiary families while 25.0% are control group. These findings indicate the dairy goat restocking intervention has increased income among the beneficiaries to buy food from the market to supplement what they produce. This is improved access through affordability.

Table10: Chi-Square Tests table B

Chi-Square Tests			
	Value	Degree of Freedom	Asymp. Sig. (2-sided)
Pearson Chi-Square	28.608	1	.000
Continuity Correction	27.056	1	.000
Likelihood Ratio	29.595	1	.000
N of Valid Cases	201		

(Source: Study data, 2014)

There is a significant difference in disposable income to buy food in the market between the control group and the beneficiaries (Chi-Square Value =28.608, Df=1, P-Value<0.01). The findings show that the milk apart from being accessed both equally, on gender basis and equitably for children, other food were equally accessible from the market by using income saved from by having a goat that provided milk for consumption, sell, therefore generating income that was used to procure inputs for growing food and other foods.

On examining the various dimensions of household food security, there is a general positive advantage of the beneficiary households' standing compared to the control correlated to the dairy goat restocking intervention.

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Chapter Five

SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

5.0 Introduction

This chapter presents the summary findings against each study objective on the changes that the dairy goat restocking intervention had on the post election violence victims' household food security. It further provides conclusions drawn from the findings, the recommendation and areas for further research.

5.1 Summary of Findings

The study compared results from two groups of respondents with a similar background of being 2007/8-PEV victims. The respondents' household demographics were similar with an average of six members. There was a balance on the female-male ratio in participation. Socio-economically, the respondents were mainly rural agriculturalists whose main sources of income are crop sale and casual labor.The 2007/8 skirmishes led to internal displacement, loss of family members, forsome breadwinners, and loss of access to livelihood assets. Among livelihood assets lost were livestock like goats, which the project found most appropriate to intervene with.

Dairy goats were selected as the choice species for distribution because of their fair cost compared to cows allowing more beneficiaries access and spread of the risk loss, less input requirement to rear, small scale rural farmers as target, higher milk yields than local breeds and their ability to multiply faster. Prior to the project none of the beneficiaries had a dairy goat and all had gone back to their land/home (returnees) after displacement.

Under each objective, the study found:

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i. To assess the change the dairy goat restocking intervention had on the amount of food available in the beneficiary households

It was established that both respondent groups' main source of food was own production, which was higher among beneficiaries than control. A harvest's yield lasted longer on average, some from harvest to harvest in beneficiary households than control, correlating with dairy goat ownership. Reasons for this relationship are attributed to the following reasons/findings: Most of the milk (90%) from the dairy goat was consumed at home while control households boughtmilk from the market whenever they required some. Some beneficiaries sold dairy goat milk and most of the income so obtained was used to procure other food types and other food production improving inputs like seed and fertilizer, leading to better food production that lasted longer unlikethe controlhouseholds. The dairy goat ownership contributed to higher crop food production through manure while saving on fertilizer procurement to buy other inputs, other types of foods and meeting some basic needs for which the control had to sell own food produce in order to buy. Cream from the goat milk was used to cook vegetable making a saving on buying cooking oil/fat that was otherwise obtained by selling crop produce.Most of the beneficiary households were able to access dairy goat milk- a source of high quality proteins, within a year after distribution.

ii. To assess access to dairy goat products for different categories of beneficiary household members

It was supposed that availability of food in the household does not guarantee access to all household members equally. The study found that the dairy goat milk (of which 90% was

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consumed at home) was either equally distributed (53%) among all ages or more equitably to children (46%). Nearly in all households (99%) the dairy goat milk was equally distributed among both gender members. When other dairy goat products were sold, the income went to strengthen food security through production by procurement of inputs like seeds or acquisition of assets like more goats. The major source of household income was sale of crop producewhose yield improved as seen by lasting longer in beneficiary households than control households due touse of manure from dairy goat ownership and any income associated to the dairy goat went towards paying for immediate basic needs like health and education, usually met through sale of crop yield. Income is the medium through which food in the market is accessed. This resulted in staple food yield lasting from one harvest to the next in more beneficiaries than control households. Generally, dairy goat milk fetched a higher price than cow milk in the market as it was considered of superior quality and was considered a saving when obtained from directly from the goat. Children prefer dairy goat milk but women were the slowest to start consuming it, as adults are cautious trying out new things, in this casefirst white as tea. Whatever milk consumed by the control respondents had to be bought from the market.

iii. To assess the beneficiaries'knowledge, attitude and practices on dairy goat products utility

The third dimension, variable, of food security,utility, was assessed by looking at the beneficiary household members KAPs in comparison to the control household members to determine their food safety and quality. Beneficiaries were found better aware of the public health danger of zoonosis and the specific diseases- brucellosis and tuberculosis

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than control. Both groups of respondents boiled milk before consumption at home. The direct milk boiling approach used in both groups is likely to denature milk sugars and proteins as opposed to pasteurization. More beneficiaries (44%) believe milk is presented in the market boiled than control (9%). Significantly more beneficiaries (93) boiled milk to kill germs than control (68%) a reason the study considered could ensure a more rigorous approach to the process of boiling milk than improved shelf life preferred by control (51%) than beneficiary (48%) especially when milk is consumed at home. Beneficiaries had a better balanced diet that included more vegetables (Beneficiary 27%, Control 15%) and fruits – bought in market (Beneficiary 3%, Control 0%).

Cases of malnutrition were reported in both groups prior to the project, likely as a result of the conflict but beneficiary households recovered early. No malnutrition case was reported during the project by beneficiaries (0%) while the control reported 25%- of 4 households that positively responded), indicating better utility of consumed food.

A high number of beneficiaries (95%) considered goat milk better than cow milk in addition to control (50%), a sign of high acceptability reinforcing household food security stability gains. Beneficiaries had better practices, despite a wide gap from being perfect, when it came to observing drug withdrawal periods.

Women preferred herding the dairy goat as an expression of ownership and expressed satisfaction on exercising decision-making mandate over the assets. They considered it "gainful engagement" as opposed to the common conflict generating idle talk and a forum for learning through sharing ideas with others.

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All respondents received extra general support, mainly emergency relief, before the restocking project. The extra support listed by beneficiaries, as other support received was part of the restocking package, affording them no extra advantage.

In addition to milk, other benefits received from the intervention as direct and indirect outcomes included: manure, income from sale of dairy goat products (some like milk with a competitive price), skills on production management, better land use, use of crop residues as goat feed, meat, reduced household milk cost, economicallymeaningful engagement which reduced time for gossiping as a source of conflict, herd increment, group belonging as a platform for knowledge sharing and skill exchange, saving and loan facility from group and motivation. All went to augment the food security stability pillar.

5.2 Conclusions

The study concludes that the dairy goat restocking intervention for 2007/8 PEV victims in Molo and Kipkelion, Kenya, had a positive contribution towards household food security in terms of food availability at the household through own production, by contribution of manure and other agricultural inputs- seeds and fertilizer, procured from market using income either generated from milk sales, income saved by not buying milk for the household consumption orby not selling staple food (maize) to buy other household basic needs. The dairy goat contributed to beneficiary household food security through access from the market through having a saving effect on staple food in the house by selling goat milk to generate income to meet basic needs, and equitable (on age basis)and equal (on gender basis)access of dairy goat products to household members. Beneficiary household food utility was better than control households in food safety through better knowledge, attitudes and practicesin consumption and handling dairy goat

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products. The study found that despite the two groups- beneficiary and control, having similar socio-economic conditions at baseline, after the 2007/8 PEV, and both groups having averagely similar households sizes, food yield lasted longer in beneficiary households in months than in control household and beneficiary households reported being able to buy (access) food from the market throughout the year more than control households.

5.3 Recommendations

1. With longer lasting own produced yield (in months) in beneficiary households compared to control, more income and better utilization of milk products, it is safe to conclude that restocking intervention under similar circumstances, as werein Molo and Kipkelion,improves food security but should be designed closely to address the needs of the target community in their context. It presents a good opportunity for mixed livestock-crop production, a sustainable agriculture practice as livestock produce manure for crop production instead of high cost fertilizer for the rural poor.
2. Restocking households post conflictas a household food security intervention, should include sufficient veterinary inputs and an insurance policy as recommended bybeneficiariesto the extent the beneficiariesare able to raise income from their new assets as access to both veterinary inputs and insurance is affected by availability and affordability.
3. Under restocking milk and other products (except manure for crop production) are not immediately available to beneficiaries till the distributed the animal start lactating/calves down or kids. Restocking is best suited for rehabilitation after saving lives (emergency) to sustain gains into development in food security through diversity

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and symbiosis of crop and livestock. It can target poor households to address malnutrition among children as it was reported they love goat milk and promote ecologically sound mixed farming with manure.

4. Group formation facilitation for the new owners is important for support to each other to achieve objectives through sharing ideas and skills, enhancing food production.
5. Supplementary trainings on zoonoses, milk hygiene and handling, veterinary drug safety practices (withdrawal), fodder production and other production skills for beneficiaries are imperative for restocking project sustainability. More emphasis should be put on zoonosis mode ofspread during awareness creationfor improved (in animal source) food safety.

5.4 Suggestions For Further Research

1. Research should be conducted on standard observation of veterinary drug use and livestock product withdrawal after treatment to design counter interventions to prevent drug resistance and improve food safety.

2. More research should be done on dairy goat restocking interventions to determine environmental impact, especially in high potential areas.

3. Cost-benefit analysis for dairy goat restocking in high potential areas should be conducted to ascertain effectiveness. More restocking project impact evaluations in various contexts to document findings to guide future projects are required.

4. More research on animal based zoonoses among humans should be done and the effects of direct boiling both to nutrients and pathogens as they affect food security utility.

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5. A comparative study to determine the spouse gender likely to share and apply information from training than the other in households for focused targeting.

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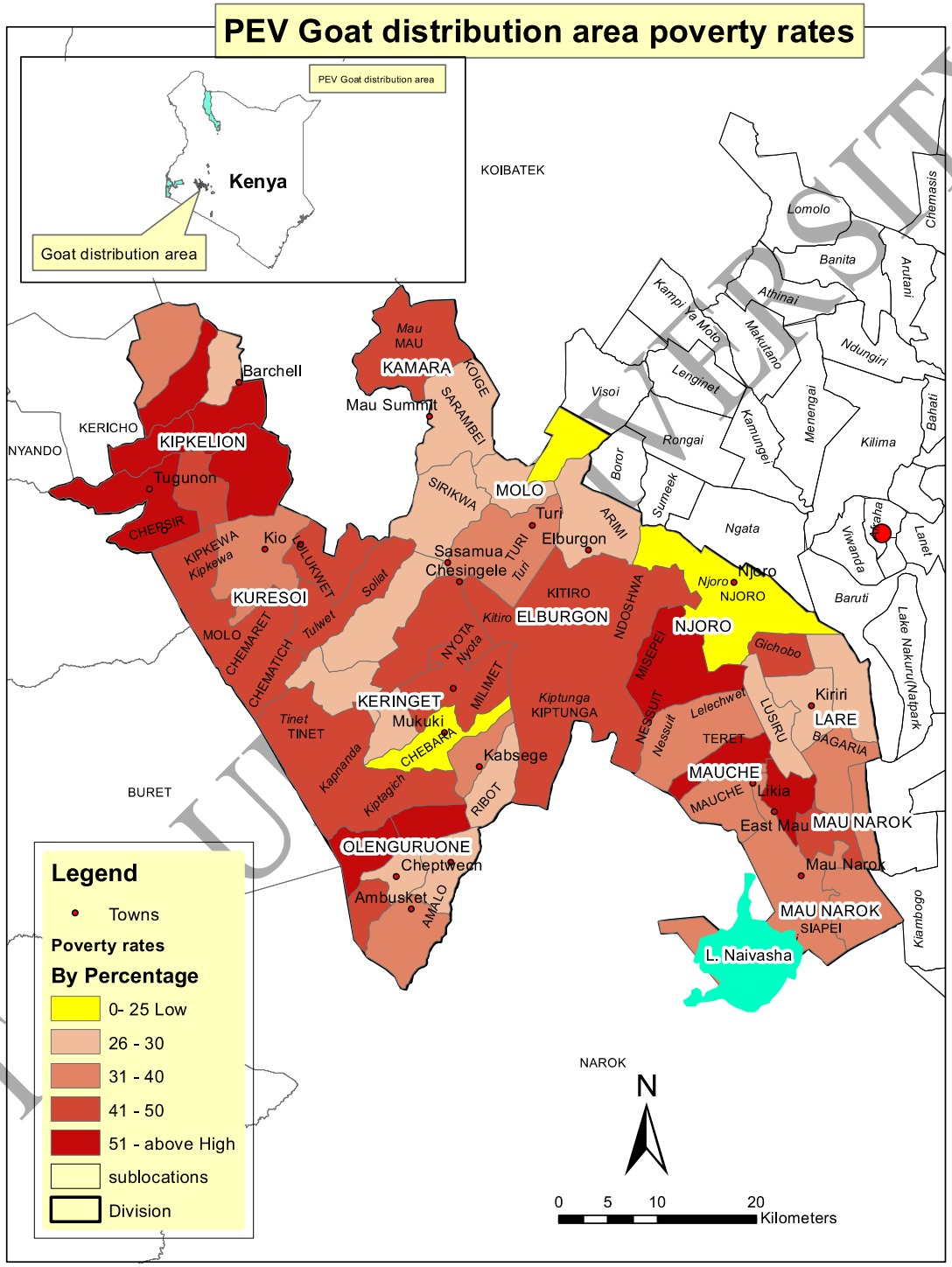
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APPENDIXES

Appendix 1: Study Area Map



Source: UN FAO,K

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Appendix 2: Study questionnaire sample

Annex 2: DAIRY GOAT PROJECT IMPACT ON 2007/8 PEV VICTIM HHs' FOOD SECURITY
INDIVIDUAL QUESTIONNAIRE

Qnre No.	District	HH	Date	Interviewer

1.0 DEMOGRAPHIC		
1.1	Sex of the respondent	
	1. Adult male 2. Adult female 3. Child male 4. Child female	|___|
1.2	Who is the head of the household	
	1. Adult male 2. Adult female 3. Child male 4. Child female	|___|
1.3	What is the level of education of the head of the household?	
	1. Graduate 2. Secondary level 3.Primary level 4.Lower primary level 5.None	|___|
2.0 HOUSEHOLD		
2.1	Household status	
	1. Resident 2. IDP 3. Refugee 4. Other	|___|
2.2	How many people are currently living in this household	
3.0 FOOD AVAILABILITY		
3.1	What is the MAIN source of household Income	
	1) No Income 2) Sale of livestock 3) Sale of livestock products (milk), 4) Sale of crops, 5 Casual labor 6) Remittance- support from others, 7] Salaries employment 8] Local brewing, 9] Informal trade (sale of charcoal) 10] Others (specify)……	|___|
3.2	What is the MAIN source of household food?	
	1] Own production 2] Market- buying, 3] Food aid, 4] Support from others, 5] Hunting, gathering, fishing 6] others (specify]	|___|
3.3	If by own production in 3.2, in the last two years, does the harvest last your household to the next one?	
	1] Yes, 2] No	|___|
3.4	How long does it last month?	[___]
3.5	Flock dynamics	
	• How many goats were originally received • How many in total are alive • How may new kids are from the original gift (number of new kids on direct line) • If new goat acquired, what kind 1] Diary 2] Local	|___|
3.6	How much milk is used in your house per day in liters	
		[ ]
3.7	What is the source of milk used in your house	
	1. Own goat 2. Own cow, 3. Bought, 4 shared/given	[___]
3.8	If any what is the income obtained from milk sales used for?	
	1. Food purchase, 2.Education fee/materials, 3. HHs medication, 4. Water, 5. Livestock health, 6.	[____]
3.9	How long did the goat take before kidding?	
	1. Within first 6 months, 2. After six months 3. After one and half years	[____]
3.10	How much did you spend the goat upkeep before realizing benefits- before the	

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	goat kidded	
	Ksh.	[____]
3.11	What is the approximate current monthly expenses for caring for the goat(s): Food- supplementation/salt licks, water, treatment (medicine), mating/breeding-male, shelter/rope)	
	Ksh.	[___]
4.0 ACCESS TO DAIRY GOAT EDIBLE PRODUCTS BY HHs MEMBERS		
4.1	How is the milk from the dairy goat/s used in the HH	
	1. Drunk 2. Sold 3. Processed / Value addition- specify	|___|
4.2	How is the milk shared among HHs members?	
	a) 1. Adult more 2. Children more 3. All equally shared b) 1. Males more 2. Females more 3. All equally shared	|___| |___|
4.3	Other products realized from the dairy goat/s	
	1. Meat 2. Kids 3. Skin 4. Manure Others (Specify) …… …… ……	|___| |___|
4.4a	Were the above products sold?	
44b	1. Yes 2. No What was the cash obtained used for? 1. 2.	|___|
4.5a	Has any goat been sold?	
	1. Yes 2. No Why:	|___|
4.5	What is the current cost of milk per liter per species in the market?	
	<table><tr><td>Species</td><td>Goat</td><td>Cattle</td></tr><tr><td>Ksh per liter of milk</td><td></td><td></td></tr><tr><td></td><td></td><td></td></tr></table> 4.5b If there is a difference in prices why?	
4.6	Are there specific benefits attributed to goat milk compared to that of other animal species?	
	1. 2. 3.	
5.0 UTILIZATION OF DAIRY GOAT PRODUCTS IN THE HHs		
5.1	Are you aware one can get disease from livestock and livestock products?	
	1. Yes 2. No If yes which ones? 1. 2.	|___|

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5.2	Is the milk consumed at home boiled prior to drinking?	
	1. Yes 2. No	|___|
5.3	If some milk is sold, is it boiled before selling?	
	1. Yes 2. No	|___|
5.4	How is the boiling done?	
	1. Direct fire to the sufuria 2. Indirect/using a water bath (pasteurization)	|___|
5.5	Why is milk boiled?	
	1. Kill germ 2. Preserve/keep longer 3. Just warm it 4. Improve taste 5. Don't know	|___
___	
5.6	What other food is milk consumed with?	
	1. 2. 3.	
5.7	Have any of your goats aborted?	
	1. Yes 2. No	|___|
5.8	If aborted at which stage of the pregnancy?	
	1. Early months 2. Late/ near term	|___|
5.9	Has any member of the HHs been diagnosed with any of these diseases?	
	1. Brucellosis (*Ugonjwa wa maziwa*) 2. Tuberculosis	|___|
5.10	*Has there been a case of malnutrition in the HHs?*	
	1. Yes 2. No	|___|
5.11	If yes above, when in the project period?	
	1. Before the project 2. Early in the project 3. Late in the project	|___|
6.0 KNOWLEDGE, ATTITUDE AND PRACTICE		
6.1	How does goat milk compare to cattle milk?	
	1. Not good 2. As good 3. Better	|___|
6.2	Any reason why not good or better?	
6.3	What do you do to milk from an animal which has been treated with an antibiotic and anthelmintic within the last 3 days and meat within 28 days?	
	1. Consume at home 2. Boil/cook and consume 3. Sell uncooked 4. Pour away 5 Feed to the kid/calf	|___
___	
6.4	What other products do you prepare from goat milk?	
	1. Fermented milk 2. Cheese 3. Yoghurt 4. Other (specify)	|___
___	

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6.5	Who herds (providing feed, water etc) the goat/s	
	1. Man 2. Woman 3. Child(ren)	|___| |___|
7.0 COMPLEMENTARITY		
7.1	Which other support did you get from the project?	
		|___|
7.2	How did the above support help in achieving/getting the benefits realized from the goat supplied?	
		|___|
7.3	Which <u>other</u> good/positive aspects have you realized by having a dairy goat on the farm?	
	1. 2. 3.	|___|
7.4	Having joined a dairy goat owners' group, how has it benefited you?	
	1. 2. 3.	|___|
7.5	What in the project do you think could have been done differently? How?	
		|___|
8.0 SOCIO-ECONOMIC ENVIRONMENT		
8.1	Have you received any other support towards food security in HH from other sources during the period?	
		|___|
8.2	Do you think the new constitution can help you to secure your source of food in future?	
	1. Yes 2. No 3. Don't know	|___|
8.3	If yes to question 8.2 above, how?	
8.4	Do you think there is enough food in the market for you to buy when you need to?	
	1. Yes 2. No	|___|
8.5	Can you afford food in the market anytime you want?	
	1. Yes 2. No	[____]

Questionnaire frame adapted from unknown source

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Appendix 3: University Recommendation letter

ST. PAUL'S UNIVERSITY

Private Bag 00217 LIMURU, KENYA
Email: bps@spu.ac.ke
Website: www.spu.ac.ke

Tel Office: +254(0) 20-2020505/10
Mobile: +254(0) 728- 669000
(0) 728- 062420
(0) 736- 424440

BOARD OF POSTGRADUATE STUDIES

NATIONAL COUNCIL FOR SCIENCE AND TECHNOLOGY
P.O. BOX 30623-00100
NAIROBI

10/1/2014

Dear Sir/Madam

Re: Recommendation Letter for Douglas Machuchu – MD/069/2009 to conduct a Masters of Development Studies (MDS) research.

This letter confirms the above named person is a Second (final) Year Student of the MDS Programme at St. Paul's University, a Private University.

The final year consists of a Major Research work leading to a dissertation comprising 20,000 words of a Masters Degree.

The student's selected topic is 'EVALUATION OF A DAIRY GOAT RESTOCKING INTERVENTION ON HOUSEHOLD FOOD SECURITY IN MOLO AND KIPKELION SUBCOUNTIES, KENYA'

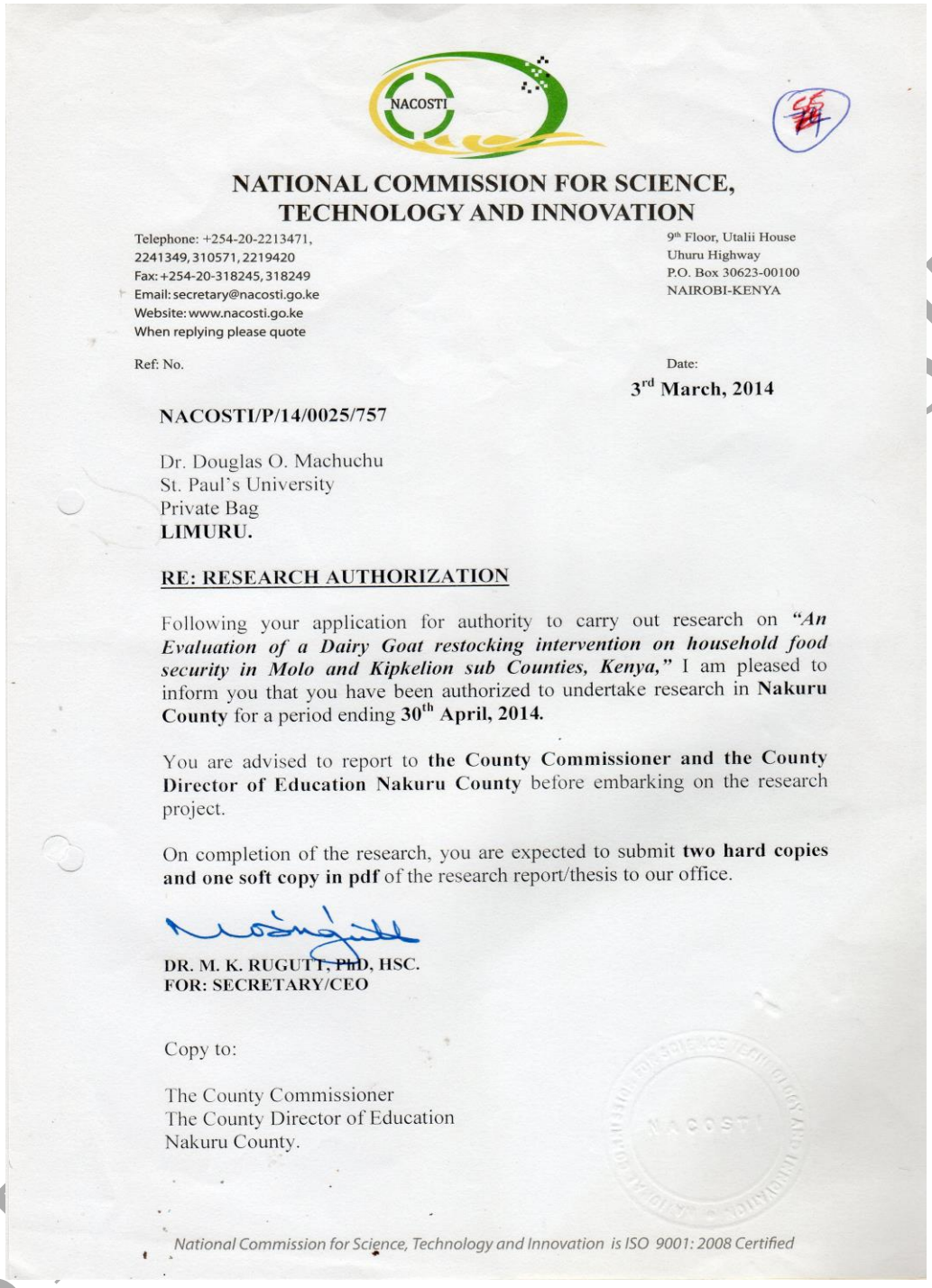
The research will take place in Molo and Kipkelion sub counties from January 2014 to February 2014.

Kindly grant this student the required permit.

Yours Faithfully,

Dr. D.C. Chemorion
DIRECTOR, Postgraduate Studies

Appendix 4: Ministry Research Permit



NACOSTI

NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY AND INNOVATION

Telephone: +254-20-2213471, 2241349, 310571, 2219420
Fax: +254-20-318245, 318249
Email: secretary@nacosti.go.ke
Website: www.nacosti.go.ke
When replying please quote

9th Floor, Utalii House
Uhuru Highway
P.O. Box 30623-00100
NAIROBI-KENYA

Ref: No.

Date:
3rd March, 2014

NACOSTI/P/14/0025/757

Dr. Douglas O. Machuchu
St. Paul's University
Private Bag
LIMURU.

RE: RESEARCH AUTHORIZATION

Following your application for authority to carry out research on ***"An Evaluation of a Dairy Goat restocking intervention on household food security in Molo and Kipkelion sub Counties, Kenya,"*** I am pleased to inform you that you have been authorized to undertake research in **Nakuru County** for a period ending **30th April, 2014.**

You are advised to report to **the County Commissioner and the County Director of Education Nakuru County** before embarking on the research project.

On completion of the research, you are expected to submit **two hard copies and one soft copy in pdf** of the research report/thesis to our office.

DR. M. K. RUGUTT, PhD, HSC.
FOR: SECRETARY/CEO

Copy to:

The County Commissioner
The County Director of Education
Nakuru County.

National Commission for Science, Technology and Innovation is ISO 9001: 2008 Certified