Land Use Conflicts and opportunities in a Livestock Market: Case study of Garissa Market

By

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July, 2014
DECLARATION

This research project report is my original work and has not been presented to any other university or learning institution for an award of a degree.

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This research project report has been submitted for examination with my approval as the university supervisor.

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I also thank the entire Department of Urban and Regional Planning for the support they accorded me in achieving my academic goal.
ABSTRACT

Livestock is a crucial source of financial capital for the rural poor. The arid and semi arid lands are home to nearly 70% of the national herd with an estimated value of Kenya shillings 70 billion. For many, it is the only form of savings available. Therefore, its efficient production and marketing is essential for sustaining pastoral livelihoods. The existing Garissa livestock market in Central Division of Garissa District covers a total area of approximately 10 acres. It provides a range of employment and income-earning opportunities. Despite its importance, its spatial size is small compared to the large number of livestock that are traded through it thus leading to a spill over effect to the neighbourhoods and causing land use conflicts.

This study determined the major land use conflicts of the existing Garissa livestock market, estimated the population of livestock traded at the market by type and determined the appropriate market size, design and location to optimize benefits and minimize negative impacts. It also determined the social, economic and environmental impacts to its neighbourhoods and Garissa town as a whole and has proposed intervention measures to ensure efficient marketing of livestock and reduction of land use conflicts.

The first phase of the study involved literature review where information on livestock market and livestock in general was reviewed. The second phase involved collection of secondary data on animal diseases, economic, social and environmental impacts of the market and land uses. The third phase involved collection of primary data where data was collected as it existed with the source. After data collection, it was edited and analysed. Finally, a final report in the form of maps, figures, photographs, tables and charts was produced.

The findings show that there is a permanent road that passes through the livestock market that links the neighbourhoods to Garissa town. This road is mainly used by pedestrians and vehicular traffic and is the main cause of accidents within the livestock market. The main livestock traded in Garissa livestock market are cattle, goats, sheep, camels and donkeys. They have different selling prices. The size of the market is inadequate and is not well designed and thus lacks most of the facilities that are required by a livestock market. The market is the major source of employment and income. It employs thousands of people ranging from livestock herders to traders. Some government departments from Garissa County collect revenue from the market. The main social impact is that it has improved on the diversity of the people. Intermarriages between different communities and gaining knowledge from one another are also important social impacts of the market. Negative social impacts include, cultural degradation and insecurity. Some of the negative environmental impacts include, air and noise pollution and spread of zoonotic diseases.

The main recommendations of the study include; Improvement on market facilities, closure of the market road, provision of alternative parking areas outside the market, establishment of livestock market management board, fencing and relocation of the existing market. Further research can be carried out on modern ranching practices that can enhance livestock production in Garissa county. Further research can also be carried out on the improvement of the road infrastructure in Garissa County.
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<tr>
<td>AI</td>
<td>Artificial Insermination</td>
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<tr>
<td>ALLPRO</td>
<td>ASAL Livestock and Rural Livelihood support Project</td>
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<tr>
<td>ALRMP</td>
<td>Arid Lands and Resource Management Project</td>
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<tr>
<td>ASAL</td>
<td>Arid And Semi Arid Land</td>
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<tr>
<td>CBPP</td>
<td>Contagious Bovine Pleuro-pneumonia</td>
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<tr>
<td>CPP</td>
<td>Caprine Pleuro-pneumonia</td>
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<tr>
<td>CIDP</td>
<td>County Integrated Development Plan</td>
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<td>DLMC</td>
<td>District Livestock Marketing Council</td>
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<td>FAO</td>
<td>Food and Agricultural Organisation</td>
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<td>FMD</td>
<td>Foot and Mouth Disease</td>
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<td>GDP</td>
<td>Gross Domestic Product</td>
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<td>ILRI</td>
<td>International Livestock Research Institute</td>
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<td>IOM</td>
<td>International Organization for Immigration</td>
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<td>IRIN</td>
<td>Integrated Regional Information Networks</td>
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<td>KDLDP</td>
<td>Kenya Dryland Livestock Development Programme</td>
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<td>KEVEVAPI</td>
<td>Kenya Veterinary Vaccines Production Institute</td>
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<tr>
<td>Kms</td>
<td>Kilometres</td>
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<td>KRCS</td>
<td>Kenya Red Cross Society</td>
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<td>NALEP</td>
<td>National Agriculture and Livestock Extension Program</td>
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<td>NMK</td>
<td>Njaa Marufuku Kenya</td>
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<tr>
<td>RACIDA</td>
<td>Rural Agency for Community Development and Assistance</td>
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<td>RVF</td>
<td>Rift Valley Fever</td>
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CHAPTER ONE
INTRODUCTION

1.1 Background of the study
Livestock is an important and sometimes overlooked element of the livelihood strategies of the poor. Livestock is a crucial source of financial capital for the rural poor. The arid and semi-arid lands are home to nearly 70% of the national herd with an estimated value of Kenya shillings 70 billion (Kaitho, 2011). Livestock holdings are diverse and include cattle, goats, sheep, poultry, horses and camels. For many, livestock ownership is the only form of savings available. In fact, for pastoralists and often for poor women, livestock is the most important fungible asset they own. It provides a critical reserve against emergencies and decreases vulnerability to financial shocks from ill health, crop failures, and other risks. They yield direct benefits in the form of food, wool, skin, hides, and can raise farm productivity by providing manure and draught power (Sansoucy, undated).

The world's stock of chicken is almost 19 billion. Cattle are the next populous breed of animal at 1.4 billion, with sheep and pigs not far behind at around 1 billion. China's vast appetite helps make it the world leader in the number of chickens, pigs and sheep, whereas beef-loving Brazil and cow-revering India have the greatest number of cattle. New Zealand lives up to its reputation as the world's most productive shepherd. The United States is the largest producer and consumer of beef in the world (Sansoucy, undated).

Livestock production is an important economic activity in many African countries. For sub-Saharan Africa as a whole, livestock's share of the agricultural GDP averaged over 15% in 1981. Between 1963 and 1980, beef production in sub-Saharan Africa grew at 2% per annum while mutton and goat meat production grew at 3.4% per annum. Sheep and goats contributed 30% of the total meat production. There were very small increases in beef yield per productive animal, and very little change in yield per animal for sheep and goat meat. In West Africa, there were significant increases in milk yields, while in southern Africa there were declines in yield. Between 1963 and 1980 sub-Saharan Africa's total ruminant livestock population increased at 1.9% per annum. The rate of growth between 1963 and 1970 was higher than the rate of growth
between 1970 and 1980, reflecting the adverse effects of drought during the early 1970s on the major livestock-producing areas of the Sahel and parts of East Africa (Sansoucy, undated).

In Kenya, livestock production is a major economic and social activity for the communities that live in the high rainfall areas for intensive livestock dairy production and in the arid and semi-arid areas for meat production. The dairy production, which is a dynamic sub-sector in Kenya, is a major source of livelihood for small-scale farmers for whom dairy farming is a primary activity (Kiptarus, 2005). Beef production in Kenya is practiced primarily in the arid and semi-arid areas of the country (Kiptarus, 2005). Although Zebu cattle in the arid and semi-arid dominate the national beef herd, there is a significant proportion of beef coming from dairy bull calves and cull cows and camels are potentially the most valuable species of livestock for the arid and semi-arid areas of Kenya (Kiptarus, 2005). Northern Kenya is the most important camel producing area in the country (Kiptarus, 2005).

Garissa district is a predominantly nomadic pastoral area with 90% of the District supporting nomadic pastoralism (Government of Kenya, 2009). Livestock production is the main source of food and income in the District and provides 95% of household income (Government of Kenya, 2009). The existing Garissa livestock market serves Kenya, Somalia and Ethiopia. Major livestock markets in southern Somalia include Baidoa, Dinsor, Qorioley, Jowhar, Afgoi, Salagle, Bardhere and Afmadow, among others. In Ethiopia it includes Suftu, Dolo and Nagele. Traders buy cattle from these assembly markets and trek them overland to Garissa where livestock trade is highly profitable. Garissa is not only a terminal market for local consumption of the livestock from these areas, but also a major transit market, supplying other major markets in Kenya, particularly Machakos, Nairobi, Thika, Kajiado, Narok and Mombasa, as well as overseas such as Saudi Arabia and United Arab Emirates. Most of the livestock sold in Garissa market comes from Somalia and the rest come from Ethiopia and north eastern Kenya (Author unknown, undated 1).

Livestock marketing provides a range of employment and income-earning opportunities for livestock owners, herders who trek the animals to their next destination, traders, buyers, brokers, sellers of fodder and water, veterinary professionals and health service providers, local
authorities and the government who generate revenue through taxation (Author unknown, undated 1).

In October 2003, the Veterinary Department recorded the presence of rinderpest in parts of Garissa district bordering Somalia, based on blood samples collected from Amuma and Jarajila locations. These samples confirmed the presence of a low-grade virus causing a mild form of rinderpest. To prevent further spread of the disease, the government closed the Garissa livestock market on October 15, 2003. Closure of the market and disruption of cross border livestock trade had profound food security implications for pastoralists on both sides of the border. As expected, therefore, closure of the market had depressed the surrounding economy that primarily depended on the livestock sector and adversely affected different categories of the population on both sides of the border (Author unknown, undated 1).

Closure of the market had disrupted normal trade volumes and dealt a severe blow to household incomes within all livelihoods associated with livestock marketing (author unknown, undated). With no sources of income, the poor and very poor were the most affected. The market closure had a wide economic ripple effect, extending outward to major markets as far as Mogadishu, Mombasa and Nairobi. Garissa district depends on the market more than any other district in the northeastern region. It is the major employer of the local residents. The closure of the market forced people into unemployment or out of business.

1.2 Problem statement
Garissa district is a nomadic pastoral area with 90% of the District supporting nomadic pastoralism (Government of Kenya, 2009). Livestock production is the main source of food and income in the District and provides 95% of household income (Government of Kenya, 2009). The market provides a range of employment and income-earning opportunities for livestock owners, herdsmen, traders, buyers, brokers, sellers of fodder and water, veterinary professionals and health service providers, local authorities and government departments. It is not only a terminal market but also a transit where livestock are exported abroad.
Despite the highlighted importance of the market, its spatial size is small compared to the large number of livestock that are traded through the market thus leading to a spill over effect to the neighbourhoods. This has led to land use conflicts especially roads where the animals are temporarily kept.

1.3 Scope of the study
The spatial scope of the study is the existing Garissa livestock market and its surrounding. This is because most of the respondents will be at the market and the neighbourhood. The theoretical scope includes challenges, opportunities and impacts of livestock marketing in Garissa County.

1.4 Research questions
a) What are the major land use conflicts of the existing livestock market?
b) What are the population of livestock traded in the market by type?
c) What are the appropriate market size, design and location for optimal positive impacts and minimum negative impacts?
d) What are the social, economic and environmental impacts of the market to its neighbourhoods and Garissa town as a whole?

1.5 Research objectives.
a) To determine the major land use conflicts of the existing livestock market.
b) To estimate the population of livestock traded in the market by type.
c) To determine the appropriate market size, design and location to optimize benefits and minimize negative impacts.
d) To determine the social, economic and environmental impacts of the market to its neighbourhoods and Garissa town as a whole.

1.6 Justification and significance of the study
The market being the only major livestock market in the entire county is the major source of employment and income. It employs thousands of people ranging from livestock herders to traders. It serves as a terminal market for livestock from Ethiopia, Somalia and Kenya and as a transit for some East Africa and Arab countries. There are major opportunities whose raw materials will be livestock that are coming up in Garissa town and this will in essence increase
the demand for livestock. The opportunities include a multimillion modern abattoir, dairy and tannery industries. Also, there is high demand for livestock and livestock products due to high population increase. The proposed Lamu-Juba railway line that will pass near Garissa town as a gateway to South Sudan and Ethiopia will also enhance livestock exports that are sure to spur growth.

The study will try to address the existing problems and come up with solutions so as to improve the efficiency of the market. If the study will not be executed, the existing problems will be felt more because of increase in demand for livestock due to increase in population and demand for raw materials by the upcoming abattoir, dairy and tannery industries in Garissa town. Accidents that are currently experienced within the market will continue to be felt because of conflicts between vehicular and pedestrian traffic and traders and livestock. Environmental pollution that is currently experienced within the market neighbourhood will remain as is or worsen because of the anticipated increase in livestock population.

1.7 Assumptions of the study
Population increase will lead to increase in demand for livestock. In addition, the upcoming opportunities, abattoir, Lamu-Juba railway line and the dairy and tannery industries will increase livestock population hence the need for a matching market size.

1.8 Ethical implications
The main purpose of this study is for academic purpose although it could be used by interested parties such as local authorities, government departments, non governmental organisations and livestock traders associations. Any information obtained especially from the households was kept confidential. Professionalism and honesty was upheld.
1.9 Definition of terms and variables

1.9.1 Market
In common speech the term a market is often used to mean a specific location where trading takes place. In economics, the term is much wider and can refer to all the people and institutions concerned in the exchange of any commodity. A livestock market can therefore be defined as a specific location where buyers and sellers come together to exchange live animals.

1.9.2 Livestock
Livestock are farm animals regarded as an asset. They are animals that are raised. Is the major commodity for the market and include camels, goats, sheep, donkeys, horses and cattle.

1.9.3 Livestock income
Money received especially on regular basis for work or through investment or sale of livestock.

1.10 Organisation of the study
The study is organized as follows. The first chapter deals with the introduction which covers the background of the study, problem statement, scope of the study, research questions, research objectives, justification, assumptions of the study and ethical implications. Chapter two covers literature review and the conceptual framework for the study. Chapter three deals with methodology of the study and includes sections such as the study area, research design, key target population, sampling, data collection methods, cleaning and editing, data entry programs and devices, analysis, presentation, organisation and ethical implications. Chapter four deals with research findings and discussion. Chapter five presents the summary, conclusion and recommendations for adoption by stakeholders concerned with livestock market in Garissa and any other interested parties. The last section covers references and appendices.
CHAPTER TWO
LITERATURE REVIEW

2.1 Drought and livestock death in Garissa
Thousands heads of livestock have died in northern Kenya as drought conditions worsened and water shortages became more acute (IRIN, 2011). Drought monitoring and assessment reports indicated that the hardest-hit areas were Marsabit, Moyale and Mandera. Livestock farmers in the three regions have lost more than 17,000 animals, according to officials from the Kenya Red Cross Society (KRCS) and the government’s Arid Lands and Resource Management Project (ALRMP).

KRCS Marsabit coordinator, Abdi Malik, told IRIN that many families were becoming increasingly vulnerable to hunger and hardships related to the crisis. “More than 70 percent of an estimated 300,000 people were affected and the figure will rise unless it rains. We expect more animal deaths. Thousands are weak and the few water sources are drying up. Pasture has been exhausted everywhere.” He added that the water shortage has led to a mass migration of pastoralist families from Marsabit and Moyale to Forole in Ethiopia. (Ministry of livestock development, 2011).

Jirma Duba, a resident from Marsabit, said water shortages had caused deadly conflicts. Fighting between the Rendille, Borana and Gabra communities over scarce water sources and grazing areas has resulted in the deaths of many people. A number of resource-related killings were also reported along the Isiolo and Samburu borders. Mass migration of pastoralists with their livestock has led to shortage of animals in local markets, triggering a price increase and a loss of income for those whose livelihoods depended on the trade (IRIN, 2011).

2.2 Major constraints in livestock industry in Kenya
Fluctuations in weather. Droughts, floods and unpredictable weather patterns have direct effect on livestock feed and water supply and consequently the quality and quantity of production. Many farmers cannot access markets due to poor infrastructure. Some roads are impassable during the rainy season, hence a lot of waste of livestock products. Expensive breeding service
such as A.I. as well as expensive quality breeding stock and unfavourable international trade environment and trade barriers. Unavailability of suitable credits to livestock farmers especially the small-scale sector (Kiptarus, 2005).

2.3 Conflict resolution and pastoralist income in Garissa

The County experiences sporadic conflict among the three major clans. In October 2010, a skirmish led to the closure of the Garissa Livestock Market. Conflicts often hinder economic growth and development in the region (USAID, 2010). “The closure was disastrous as we lost one week’s livelihood,” Ahmed Hassan, Chairman of the Garissa County Livestock Marketing Council states. “Just imagine the earnings lost by those involved in the livestock trade”. This experience exposed the stark reality that there was no formal mediation mechanism within the market. “We feel empowered and the County livestock marketing council (DLMC) will now be associated with the success of the livestock mediation council.” Hassan Hussein, a member of the Garissa DLMC declares.

The goal of USAID-funded Kenya Dryland Livestock Development Program (KDLDP) is to enhance productivity and market competitiveness of livestock and livestock products in the Arid and Semi Arid Lands of Kenya. In 2011, it conducted a Training of Trainers on governance, leadership and management for DLMCs across the region where conflict resolution was a key topic. DLMC Garissa, contacted its counterpart in Mandera which previously held successful cross-border mediation between Kenya, Ethiopia and Somali livestock stakeholders. Throughout 2011, Kenya Dryland Livestock Development Program provided training to the mediation council and livestock market association members on basic market mediation skills. “The team from Mandera was excellent in offering the training,” declares Nimo Dubat, a member of the mediation team. “They shared their practical experience which resonated well with our own experience in Garissa,” she says. Within two weeks of the training, Garissa Livestock Market Mediation Council, resolved a dispute among livestock traders, brokers and producers.
2.4 Land-Use Change and Livestock Production Challenges in an Integrated System

Mara area in Narok County is part of the arid and semi-arid lands (ASALs) that comprise 80 percent of Kenya’s landmass, including rangelands that support extensive livestock operations and wildlife. These areas are home to pastoralists who form 20 per cent of the Kenyan population. Pastoralists occupy 74 per cent of the ASALs and own 60 per cent of cattle and 80 percent of sheep and goats (Nyariki, 2009). Livestock production is a major component of the Maasai economy and indeed the Kenyan economy, and goes well beyond direct food production.

In pastoral areas such as the Mara region, sales of livestock provide direct cash income to the Maasai pastoralists. Livestock are the living bank for most of these people and in some areas have an important role in the agricultural intensification process through provision of capital for investment. They are also closely linked to the social and cultural lives of most of the Maasai community for whom animal ownership ensures varying degrees of sustainable production and the stability of the domestic economy. Thus, livestock have a multipurpose contribution to meeting food security, agricultural production and socio-cultural obligations. Over the years, patterns of land-use have changed in the ASALs from principally, nomadic pastoralism to sedentary pastoral and agro-pastoral production, or to pure cultivation (Nyariki, 2009).

Vast areas of these lands are experiencing some degree of degradation. This has been precipitated by unprecedented population growth, excessive cropping pressure and overgrazing. Overgrazing on these lands is particularly impacting negatively on vegetation resources and biodiversity in general. That is, while moderate grazing is necessary, severe grazing affects biodiversity, productivity, carrying capacity and soil fertility, which in extreme cases lead to desertification. Recent interventions in Mara, such as land privatisation and appropriation to create ranching schemes or to give room to cropping have often generated negative rates of return, and favoured wealthier households. These interventions have largely replaced nomadic pastoralism, which in many ways has been a successful adaptation to the relatively dry and fragile ecosystem.

Herders have, as a result, lost prime grazing lands, especially in low-lying plains to create room for the cultivation of maize, wheat and other crops. Unfortunately, cropping in the Mara
ecosystem inherently increases the intensity of conflicts, as there is less compatible interaction between crops and wildlife than between livestock and wildlife. As the number of people increases, so does the need for food in terms of livestock products and grain. In the absence of increased livestock production, there is necessarily a reduction in the number of livestock per person, implying that the supply of milk and meat is reduced, increasing the need to supplement household diets. Declining livestock production and productivity is likely to have devastating implications for many aspects of the Maasai lifestyle. This community is still basically a livestock culture. Thus, if the living standards and food security of the Mara region are to be improved, then livestock productivity has to be increased. Yet, at the same time, it is important that steps taken to raise livestock productivity should be in harmony with the potentially conflicting objectives of conservation and tourism, and possibly grain production.

Various factors are negatively affecting livestock marketing in Narok (Mutai, 1986). One of the most serious is deteriorating infrastructure. The roads are very poor and are discouraging truckers to penetrate certain areas located far from market centres. Pastoralists from these areas are then forced to trek their animals over long distances to areas such as Nairobi. This has several problems. Animals lose condition and fetch low prices, pastoralists risk being attacked either before or after sales, pastoralists become price-takers when they present animals for sale as their bargaining power is reduced because of difficulties of doing turn-round treks with the animals. Another factor that reduces the efficiency of marketing is the unavailability of trucks. Pastoralists are unable to organise themselves and pool resources to buy their own trucks and this makes them weak in bargaining, so they are exploited easily.

Control over livestock disease is essential to successful animal production and marketing. This is as important in pastoral herding as in the more intensive systems of production, as poor animal health is a major constraint to livestock productivity. In pastoral areas, animal health facilities are scanty and where they exist they are concentrated in urban and peri-urban areas. In the Maasai traditional livestock production, livestock health is mainly affected by long distance movement in search of water and pasture, poor conditions of hygiene in night bomas, predatory attacks, nutritional stresses, and transmission of diseases between the livestock and from wildlife. All these factors influence one another to some extent. Lessening the effect of disease in pastoral
herds has become more difficult as cultivation and other activities have eaten into pastoral territory. In the past, pastoralists could reduce an accumulation of certain predisposing factors to disease by applying nomadic pastoral techniques such as moving between and within seasons to safe areas, and avoiding areas of high disease incidence, such as those infested with tsetse flies. As they continue being squeezed into smaller territory, they face a new situation that requires new approaches to disease control. The most common and serious diseases in Narok include Foot and Mouth Disease (FMD), Trypanosomosis, Anaplasmosis, Lumpy Skin Disease, Malignant Catarrh, Contagious Bovine Pleuro-pneumonia (CBPP), Caprine Pleuro-pneumonia (CPP), Nairobi Sheep Disease, East Coast Fever and helmenthiosis.

2.5 Land conflict
Land conflicts occur in many forms. There are conflicts between single parties (as for instance boundary conflicts between neighbours), inheritance conflicts between siblings and disputes over the use of a given piece of land (Wehrmann, 2008). These conflicts are comparably easy to solve. Those that include several parties such as group invasions or evictions of entire settlements are more difficult to deal with.

In Brazil, in the State of Amazonas, it is suspected that fully one third of its land area has been illegally appropriated. But by far the most complex land conflicts are those that include corrupt land administration and state capture. All land conflicts, no matter how peaceful or violent they are, produce negative consequences for individual people as well as for the entire society.

2.6 Livestock development in Garissa District
The district is predominantly nomadic pastoral area with 90% of the District supporting nomadic pastoralism. Livestock production is the main source of food and income in the district and provides 95% of household income (Government of Kenya, 2009). In 2012, there were about 87,110 local/beef cattle, 72 dairy cattle, 204,100 goats, 109,260 sheep, 36,220 camels, 12,400 Local poultry, 400 broilers and 19,000 donkeys kept by pastoralists within the District.
Table 1: Livestock population in Garissa district

<table>
<thead>
<tr>
<th>Livestock type</th>
<th>Number of livestock</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beef cattle</td>
<td>87,100</td>
</tr>
<tr>
<td>Dairy cattle</td>
<td>72</td>
</tr>
<tr>
<td>Goats</td>
<td>204,100</td>
</tr>
<tr>
<td>Sheep</td>
<td>109,260</td>
</tr>
<tr>
<td>Camels</td>
<td>36,220</td>
</tr>
<tr>
<td>Local poultry</td>
<td>12,400</td>
</tr>
<tr>
<td>Broilers</td>
<td>400</td>
</tr>
<tr>
<td>Donkeys</td>
<td>19,000</td>
</tr>
</tbody>
</table>

(Source: Garissa District Development Plan 2008-2012)

2.7 Livestock production in Fafi District of Garissa County

Nomadic pastoralism is the main economic activity and forms the major source of income. The main livestock kept are cattle, camels, goats, sheep, poultry and donkeys. The main potentials in the sub sector specifically include meat, milk, hides and skins production. There is no value addition in the district. There is no livestock market in the district and the regional market in Garissa municipality act as the primary market (ACF, 2012).

The greatest threats to livestock sub sector in the district include frequent drought and livestock disease outbreak. The main diseases are CBPP and CCP which affect cattle and goat population. The private sector in the district is non-existent, with no stockist for major livestock production inputs such as livestock feeds, concentrates and production equipment. Other challenges include poor road network, poor marketing infrastructure, inadequate financial services, poor marketing systems and unpredictable rainfall.
2.8 Livestock production in Lagdera District of Garissa County

Nomadic pastoralism is the main economic activity and forms the major source of the population’s livelihood. The main livestock kept are cattle, camels, goats, sheep, poultry and donkeys. Livestock figures in the district included Cattle 98,595, goats 210,000, sheep 102,932, Camels 62,000, Poultry 12,450 and Donkeys 23,200 (Government of Kenya, 2009). The main potentials in the sector include meat, milk, hides and skins production. There is no value addition meaning that animals and products are sold live. This significantly reduces the earnings for the livestock keepers. There are four livestock markets at Modogashe, Benane, Dagahley and Dertu, which act as primary market to the regional market in Garissa Municipality.

The greatest threats to livestock sector in the district include frequent severe droughts (four of which have been experienced since year 2000) and livestock diseases outbreaks the main ones being the CBPP and CCP which adversely affect cattle and goat population. These are trade sensitive diseases that have implications on livestock trade and exports. The district rarely experiences cases of notifiable diseases except for 2007 and during the 1998 El-Niño phenomenon when an outbreak of Rift Valley Fever (RVF) was reported. RVF is a disease which is only experienced during prolonged floods. In addition the sector is poorly staffed both in the livestock and veterinary departments and this ought to be addressed as a matter of urgency (Ministry of livestock development, 2011). Besides, the private sector in the district is poorly developed, with no stockist for major livestock production inputs such as livestock feeds, concentrates, production equipments as castrators, dehorners, drenchers etc.

The Ministry of Livestock development is currently partnering with stakeholders to address issues that affect the pastoralists. Through the government, three projects and programs aimed at improving the livestock situation in the district are being implemented. These programs include; the ASAL Livestock and Rural Livelihood support project (ALLPRO), the National Agriculture & Livestock Extension Program (NALEP) and the Njaa Marufuku Kenya (NMK) project.


Table 2: Livestock population in Lagdera District

<table>
<thead>
<tr>
<th>Livestock type</th>
<th>Livestock population</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cattle</td>
<td>98,595</td>
</tr>
<tr>
<td>Goats</td>
<td>210,000</td>
</tr>
<tr>
<td>Sheep</td>
<td>102,932</td>
</tr>
<tr>
<td>Camels</td>
<td>62,000</td>
</tr>
<tr>
<td>Poultry</td>
<td>12,450</td>
</tr>
<tr>
<td>Donkeys</td>
<td>23,200</td>
</tr>
</tbody>
</table>

(Source: Lagdera District Development Plan 2008-2012)

2.9 Isiolo livestock market
The county is endowed with the following species of livestock; cattle, goats, sheep, camels, donkeys, rabbits and chicken. These livestock contribute towards provision of livestock products, transport, marriage and social obligations, paying fines, capital investment/savings among other uses. Isiolo County markets more than 50,000 goats, 3,500 camels and 10,000 cattle on monthly basis. Beef industry in the county has been shrinking due to prevalence of diseases, poor animal husbandry and lack of value addition (Matheka, 2013). The average goat price in Isiolo County is good and is on an upward trend with prices ranging between Kshs 3,500 to 6,000. The average price for a camel and a cow is Ksh 60,000 and 40,000 respectively. Taking an average of Ksh 4000 per goat, the value of formerly marketed goats is 200 million per month. The value for camels is 210 million while that of cattle is estimated at 400 million per month. The qualities of animals are affected by reduced pasture, diseases and drought.

Isiolo County government is soliciting for funds to erect a perimeter wall at the proposed livestock holding ground adjacent to a modern and international standard abattoir. The construction of the holding ground is designed in a manner to make it a disease free zone so that the animals held there could be slaughtered and products exported. The perimeter wall once complete would hold 2,000 cattle and over five thousand goats and sheep at a go. The abattoir would create jobs and boost the seven counties in Northern Kenya economically.
2.10 Livestock trade in Darfur, Sudan
Before the start of conflicts in Darfur region, the region was exporting 30,000 camels to Libya and about 50,000 to Egypt each year. In economic terms, livestock has been the primary target of the current conflict. A visible outcome of the conflict is changes in livestock migration patterns. Increasing hostility between Arabs and non-Arabs, and control by the SLM (Sudan Liberation Movement) of some critical areas along the traditional migratory routes, have resulted in the restriction of access to the wet-season grazing reserves in the north for the camel herding Arabs. Similarly, cattle belonging to the Baggara cattle-herding groups have been confined to the railway line close to Nyala town and to the Nyala-Kaz Zalingi road in the west. Concentrations of livestock in confined areas in the dry season grazing reserves led to depletion of pasture and water resources and increased the risk of diseases, leading to increased livestock mortality (Abdul, 2012).

The disruption of livestock trade, both within Darfur and beyond its borders, has signaled a downward spiral of the region's economy. Important secondary market such as Mellit has been closed. In April 2003, insecurity on the livestock trade routes through north Darfur worsened with the murder of 10 camel herders and the confiscation of 3000 camels. Shortly afterwards, the border was closed by the Government of Sudan. The total value of business lost since the route was closed amounted to over US$14 million. Some Arab livestock traders attempting to establish new trade routes had to bypass the security-affected areas in the south. These routes are longer, increasing the number of days trekking and thus putting greater stress on the animals. Total and partial closures of strategic trade routes also increased the prices of basic commodities (Abdul, 2012).

2.11 Road conditions and network in Garissa District
Garissa District has a total road network of 770 kilometres. Most of the road network is poor and consists of 406 kilometres of earth surface roads which serve 70.5% of the community, 204 Kms of graveled roads serving 10% of the community and 13 kilometres of bitumen roads (Government of Kenya, 2009).
Roads form the basic mode of transport and their state has been a challenge to development. 221 kilometres of trunk roads are in good conditions while 248 kms are in very bad condition. The entire feeder roads network totaling 300 kms is in bad condition (Government of Kenya, 2009). All the roads are rendered impassable during floods thus curtailing all movements by road in the district. The district has only one bridge on river Tana and is in good condition. Movement across laghas (dry river beds) is facilitated through concrete drifts that are also rendered impassable during floods.

2.12 The design and construction of facilities for handling livestock
Well-designed facilities for veterinary work, loading trucks, sorting and other procedures will make handling more efficient and help reduce stress and injuries. Rough handling will reduce weight gains and increase shrink. Good facilities will reduce bruises and carcass damage on livestock and injuries to people (Grandin, 1980).

2.12.1 Loading ramps
The use of a ramp wider than the truck door is not recommended for loading, because it is inefficient and the animals will become bruised when they strike the door frame. The maximum recommended angle is 20' for permanent ramps and 25' for adjustable ramps (Grandin, 1980).

2.12.2 Holding pens
Long, narrow pens are recommended where animals enter through one end and leave through the other. Constructing the pens on a 60-80° angle eliminates sharp 90° corners. Flooring in holding pens should be non-slip. Indoor holding pens should have even, diffuse lighting that minimizes shadows. Cattle and sheep have a tendency to move more easily from a dimly illuminated area to a more brightly illuminated area. Facilities should be designed to minimize excessive noise (Grandin, 1980).

2.13 Bakewell livestock market
The Bakewell livestock market is located in Dale’s district of Derbyshire, England. In 2009, the market traded approximately 200,000 sheep and nearly 40,000 cattle and calves. The live auction provides a transparent and competitive system for the sale and purchase of livestock for the
benefit of vendors. The market attracts a good number of animals particularly for special sales with entries approaching 1000 cattle and 10,000 sheep at major fixtures (author unknown, 2014). The facilities at Bakewell are cattle and sheep penning and sale rings all under one roof together with offices, cafes and conference facilities and even a drop-in medical clinic for farmers. The livestock handling facilities are particularly noteworthy with extensive unloading bays, sorting and numbering races. Lorry parking is extensive with a well equipped lorry wash and wheel disinfecting tank at the exit to the market. The sale rings are designed to exhibit stock to best advantage and provide easy access for vendors and purchasers. The main ring has a spiral staircase for access to the rostrum and a viewing gallery overlooking the cattle penning area. Both main sales rings feature electronic displays of information and are linked to the office.

2.14 Tamworth selling complex
The size of the cattle selling complex is equivalent to that of four rugby league fields and includes 338 selling pens. Handler safety and animal welfare were the major focuses right from the design stage which included the use of 2D and 3D modeling. People’s safety was also a consideration during the design stage by ensuring that the operators are separated from the livestock. The floor is soft which is very good for the animals. Sheep sale yards were constructed simultaneously alongside the cattle facility. The yard area incorporates 482 uncovered pens and is equivalent in size to two rugby league fields (Lisa, 2013).
2.15 Al-Jazira animal health facility and quarantine centre
The al-Jazira animal health facility and quarantine centre is in Mogadishu. All livestock at the facility undergo evaluation and treatment to ensure they pass international health safety standards before they are approved by the government for live export. The facility is owned by private Somali investors and is managed under the supervision and guidance of the Somali Ministry of Natural Resources. The livestock after undergoing evaluation are exported to Saudi Arabia, United Arab Emirates, Bahrain and Egypt. The facility can hold 250,000 heads of cattle. It comprises of grazing grounds and water troughs for sheep, cattle and camels as well as inspection facilities staffed with veterinarians and trained support staff. The project is part of a wide range of initiatives the government is supporting to revitalize Somalia's economy (Hussein, 2012).
2.16 Livestock markets infrastructure and management in Kenya and Ethiopia
Since 2006, as part of the Livestock Marketing component of the USAID-funded Pastoralist Livelihoods Initiative (PLI), ACDI/VOCA has built 25 pieces of market infrastructure in Afar, Somali and Oromiya regions, with the overall objective of improving pastoralist livestock marketing through increased sales (ACDI/VOCA, 2007). While the type of infrastructure and services vary from market to market, majority of the market yards have been equipped with a brick fence, separate compartments for shoats, cattle and camels, loading ramps, feeding and watering troughs and shaded areas. In some markets such as Dubluk and Harobake, the small ruminant yards have also been equipped with scales for weighing shoats (Bekele and Aklilu, 2007). Harobake is a primary market where cattle, camel, sheep and goats are traded. It is located in the Borana zone in Yabello woreda, 13 km north of Yabello town and 550 km south of Addis Ababa. Dubluk is the largest market in Oromiya region with approximately 1,000 animals offered for sale per market day (ACDI/VOCA, 2007). It is located in Direworeda in the Borana zone, 635 km south of Addis Ababa along the main route to Moyale. Besides functioning as vibrant centers for livestock trade, markets in the Borana zone have also attracted a number of small-scale businesses such as shops and hotels.

Mandera livestock markets are characterized by very low trade activities. Both producers and traders complain of structural constraints significantly restraining livestock trade. There are no fences delimiting the market yards, holding grounds and partitions to separate small from big ruminants. Pastoralists in Mandera view local authorities as unresponsive, collecting taxes while consistently failing to provide services and market infrastructure (ACDI/VOCA, 2007).

In Kenya, the lack of an integrated policy and institutional framework between the Ministry of Livestock Development (MLD) and local County Councils has constrained the development of livestock marketing. Livestock markets are considered public services and the land on which they stand belong to County Councils. As such, councils manage the markets and collect taxes, leaving little incentive for the MLD to invest in the development and maintenance of livestock markets (ACDI/VOCA, 2007). Rather than perceiving livestock marketing as a vital pastoralist livelihood strategy, a significant economic activity and an important source of investment, local authorities have long regarded it as a means to control diseases and movement and as a source of
revenue. These problems are exacerbated by longstanding tensions between pastoral communities and formal institutions. Decades of inappropriate and biased national policies, protracted isolation and the lack of representation of pastoralists within the national political arena, deeply rooted misconceptions about pastoralism among national decision-makers and the neglect of pastoral areas in the provision of basic services have all led to mutual mistrust and suspicion.

In the Borana zone livestock market centers constructed under the ACDI/VOCA initiative are managed by various different authorities. Dubluk market, for instance, is run by the municipality, while Harobake is managed by Pastoralist Association (PA) leaders. Markets managed by the municipality appear to have been better looked after as municipalities collect taxes through the Revenue Office and reinvest part of the revenue in maintaining facilities and infrastructure. The PA does not have an organized structure or mechanisms to collect taxes or reinvest revenues in market maintenance (Bekele and Aklilu, 2008).

2.17 Livestock production and marketing

Livestock production is the dominant economic activity in the arid and semi arid lands, particularly in the arid counties. In Kajiado and Narok, 98% of households own livestock, which is the main source of income for the majority of people. The arid and semi arid lands are home to nearly 70% of the national herd with an estimated value of Kenya shillings 70 billion (Kaitho, 2011).

Herd mobility and accumulation are central to pastoral production. Mobility allows livestock to make opportunistic use of natural resources that are highly variable both spatially and temporally. Unfortunately, mobility in many pastoral areas of Kenya is curtailed by settlements, administrative boundaries, conflicts and competing forms of land use. Livestock production is further affected by a combination of recurrent drought, climate change and insecurity. In order to protect key species against decline, mechanisms are needed to stabilise the livestock industry and facilitate restocking after crisis. Examples of possible enterprises include breeding and multiplication centres, provision of water and feed and disease control.
Livestock health systems in the arid and semi arid lands have been under resourced since the cutbacks induced by structural adjustment programmes in the 1980s (Livestock Health Systems, GOK, 2008). Several non-governmental organisations have experimented successfully with various forms of community based animal health worker, but these do not yet operate under a clear legal framework. Meanwhile, there is limited activity by private veterinarians, particularly in the more remote counties, where there is high seasonal variation in demand for livestock drugs and where the prospects of profit are more limited.

Some of the constraints to livestock marketing in arid Countys include; Lack of organised livestock markets and market information, inadequate market outlets characterised by cartel like behaviour and poor market responses during crises, relatively low livestock producer prices associated with relatively high marketing transaction costs and under developed stock routes and infrastructure. Prevalence of livestock diseases and pests, unreasonably high market charges by local authorities when compared with the services received.

The lack of designated livestock yards and holding grounds in Nairobi and the surrounding area means that traders are often forced to accept a quick sale at disadvantageous prices. The livestock sector has been described as the most heavily taxed agricultural business in the region, subject to heavy formal and informal charges.

Moreover, herd diversity is a key survival strategy, by keeping multiple species, pastrolists achieve the twin goals of subsistence dairy production and contigency meat production. There are significant opportunities to expand the livestock market. Between 1980 and 2002 annual per capita meat consumption in developing countries doubled. It is expected to grow further, as populations become more wealthy and urbanised.

International markets are highly risk averse, with stringent health requirements that mobile livestock production in particular has difficulty meeting given the ease with which disease is transmitted across borders. Moving abattoirs and marketing infrastructure closer to producing areas would increase value addition and local employment, as part of a gradual shift towards supplying meat rather than live animals to terminal markets.
2.18 Innovations in pastoral livestock marketing

The livestock sector is increasingly important in the national economy of Kenya and livestock trade in the pastoral areas has expanded considerably. There is a network of organised livestock trade from northern pastoral areas to major urban centres. The trading partners among northern Kenya livestock traders has helped reduce trading risks and improve trade (McPeak and Little, 2006). Livestock traders in northern and north eastern Kenya face a myriad of risks and uncertainties and forge various relationships and strategies to avert and cope with these constraints. Traders in Somalia manipulate social relations to circumvent problems of insecurity and traders in northern Kenya utilize partnerships to overcome problems associated with insecurity and transport. Livestock traders who had access to diversified markets prospered more in times of political and economic volatility than those who focused only on one outlet (Aklilu and Andy, 2010).

Despite decades of political marginalization, economic hardships and climatic shocks, Somali livestock traders have innovated a range of livestock marketing approaches, including a recent innovation to link north eastern Kenya with ranches at the Kenya coast. The main aim of Somali traders cum ranchers is to add value to the commodity, before selling it on the market. The growth in the number and sophistication of Somali traders cum ranchers demonstrate the success of local based initiatives to improve marketing in high risk environment. The fatten and sell approach of the traders cum ranchers emphasizes animal quality over the quantity of animals sold on the market. This approach ensures improved marketability and minimizes trading risks.

In addition to supplying livestock to Kenya’s major urban markets, they are now procured to supply coastal ranches in Kenya where they are fattened for resale. Trekking cattle to these ranches is more cost effective, particularly if cattle numbers exceed 100. Traders alternate between trekking and trucking livestock depending on weather and security conditions and the number of animals to be transported. Price and marketing problems, insecurity, water, pasture and transportation issues are the major livestock constraints (McPeak and Little, 2006).
2.19 The growing importance of ranching among Somali livestock traders

The practice of keeping livestock on ranches is not common among Somali herders and traders. Somali herders are predominantly mobile pastoralists and have always traversed international, ethnic and clan boundaries in search of water, pasture and markets for their livestock. Sedentary ranching reflects a drastic departure from these customary lifestyles (McPeak and Little, 2006).

With successful development of ranches, Somali livestock traders supply high quality meat to the Mombasa market with competitive prices. According to livestock traders who frequently deal with ranches, cattle raised on coastal ranches yield superior quality meat because they are fattened and receive effective veterinary care. Also, ranch cattle produce more kilograms of meat per animal than those straight from Garissa and then sold in the Nairobi and Mombasa markets. The concept of Somali ranching aims to add value and increase profitability of cattle production and marketing.

2.20 Supply policy framework strategies status and links with value addition

2.20.1 Dairy industry

Livestock production is a major economic and social activity for the communities that live in the high rainfall areas for intensive livestock dairy production and in the arid and semi-arid areas (ASALS) for meat production (Kiptarus, 2005). The Dairy Production, which is a dynamic sub-sector in Kenya, is a major source of livelihood for small-scale farmers for whom dairy farming is a primary activity. Dairy sub-sector also offers employment along the milk marketing chain 365,000 jobs. It constitutes the largest share of livestock contribution to the country's GDP. Smallholder dairy production accounts for over 70% of total milk production (Kiptarus, 2005).

Milk is primarily produced from cattle, camels and dairy goats, their relative shares in the estimated total milk output being 84%, 12% and 4% respectively (Kiptarus, 2005). The country contains 70% of the dairy herd in eastern and southern Africa. As a result of liberalisation in milk processing in 1992, there are over 40 private creameries licensed countrywide for the production of milk products but only 29 are active.
2.20.2 Red meat industry
Beef production is practiced primarily in the Arid and Semi Arid Land (ASAL) areas of the country. Although Zebu cattle in the ASAL dominate the national beef herd, there is a significant proportion of beef coming from dairy bull calves and cull cows. The increase in beef consumption is higher than the increase in production and demand is expected to outstrip supply in the near future (Kiptarus, 2005). This will ultimately lead to an increase in consumer prices. The main potential markets for Kenya meat and meat products are other African countries, Middle East and Europe.

2.20.3 Camel production
Camels are potentially the most valuable species of livestock for the ASAL areas. Their value is seen both in their production and in ensuring a balanced ecosystem of the rangelands in the long term. Overall Northern Kenya is the most important camel producing area in the country, keeping over 95% of the national herd (Kiptarus, 2005). At present, camels are reared in 17 Counties in the country.

2.20.4 Sheep and goats production
The sheep and goat industry contributes about 30% of the total red meat consumed in the country (Kiptarus, 2005). In addition, the industry produces other products such as wool, skins and milk. The bulk of the sheep and meat goats are reared in the arid and semi-arid areas (ASAL) under nomadic pastoralism and limited ranching systems. Wool sheep and dairy goats are reared in the medium and high potential areas of the country under intensive/semi intensive systems.

2.21 Future of livestock industry, policies and strategies to increase livestock production
Develop a clear policy on milk production, processing and marketing emphasising health and safety standards. Promote animal health by reactivating and expanding dipping, breeding and clinical services including monitoring and control of animal diseases (Jackson, 1993).

Promote dairy goats as an emerging source of milk as well as small stock activities such as poultry farming and bee keeping. Support the development of facilities for milk handling such as collecting and cooling centres. Encourage the private sector and local authorities to establish small abattoirs and meat processing facilities and the establishment of value adding process.
Institute programmes to enhance accessibility to improved livestock technologies and inputs, finalise the reviews of the various relevant policies and legal framework to guide the livestock industry and enhance competition of livestock products processing and marketing to increase efficiency. Promote stakeholder representation in the industry, sustainable natural resource management, information management system and strengthen animal health services.

2.22 Closure of Garissa (Kenya) livestock market

The market serves Kenya, Somalia and Ethiopia. Major livestock markets in southern Somalia include Baidoa, Dinsor, Qorioley, Jowhar, Afgoi, Salagle, Bardhere and Afmadow among others. In Ethiopia it includes Suftu, Dolo and Nagele. Garissa is not only a terminal market for local consumption of the livestock from these areas, but also a major transit market, supplying major markets in Kenya, particularly Machakos, Nairobi, Thika and Mombasa, as well as overseas such as Saudi Arabia and the United Arab Emirates. Most of the livestock sold in Garissa market come from Somalia and the rest come from Ethiopia and north eastern Kenya (USAID, 2005).

In the pastoralist economy, cross-border livestock marketing and its associated service sector provide a range of employment and income-earning opportunities for livestock owners, herders who trek the animals to their next destination, traders, buyers, brokers, sellers of fodder and water, veterinary professionals and health service providers, local authorities and government.

Somalia and Kenya share a long and lightly patrolled border of about 700 kilometers. The majority of this border land is most suitable for pastoral production with limited or no farming activities. The area is therefore home for livestock, especially cattle. The porous nature of the border and, more importantly, strong clan affiliations between communities on both sides of the border facilitate unlimited livestock movement back and forth across the border in search of water and pasture. The livestock trade peaks during the rainy seasons when fodder and water is available along the trekking routes. Loss of animals due to lack of pasture and water along route is minimal at this time.

In October 2003, the Veterinary Department recorded the presence of rinderpest in parts of Garissa County bordering Somalia, based on blood samples collected from Amuma and Jarajila locations. These samples confirmed the presence of a low-grade virus causing a mild form of
rinderpest. To prevent further spread of the disease, the government closed the Garissa livestock market on October 15. Closure of the market and disruption of cross border livestock trade had profound food security implications for pastoralists on both sides of the border. The livestock trade had a multiplier effect on the local economy in both southern Somalia and Northeastern Kenya through the creation of wealth and employment opportunities. As expected, therefore, closure of the market had depressed the surrounding economy that primarily depended on the livestock sector and adversely affected different categories of the population on both sides of the border (USAID, 2005).

Closure of the market had disrupted normal trade volumes and dealt a severe blow to household incomes within all livelihoods associated with livestock marketing (author unknown, undated 1). With no sources of income, the poor and very poor were the most affected. The market closure had a wide economic ripple effect, extending outward to major markets as far as Mogadishu, Mombasa and Nairobi. Information from Somalia indicated noticeable price decrease for export quality cattle across the main markets in southern Somalia despite high seasonal demand. More importantly, these price decreases were quite significant even after considering seasonal price declines that normally occurred at the end of the rainy season. The main implications were; Loss of revenue to local authorities, families of the direct beneficiaries had no cash to make ends meet. Purchasing power of the community had declined sharply as market activity remained sluggish.

The closure had resulted in low demand for cattle in major markets in the south. Price of cattle, especially bulls, dropped well below normal levels. To offset loss of income from the sale of bulls, pastoralists had taken the unusual and desperate step of selling cows and female calves, which fetched relatively good price because of high demand for local re-restocking. This step however affected future herd sustainability, especially for the poor households who no longer had their reproductive animals. Normally, proceeds from cattle trade were used to pay for imported commodities from Mogadishu's Bakara market to other main towns in the south. Closure of the market had seriously curtailed traders' ability to bring imported commodities into the rural areas in to the Lower Juba Valley and reduced the supply/availability of consumer goods from Mogadishu. As a result, price of imported commodities like sugar, rice, wheat flour
and vegetable oil increased in many rural markets, such as Qoqani, Tabto, Doble, Salagle and Afmadow. Garissa County depends on the market more than any other County in northeastern region. It is the major employer of the local residents. The closure of the market forced people into unemployment or out of business (Author unknown, undated 1).

2.23 International Organization for Migration support livestock development initiative in Garissa

Like other parts of Northern Kenya, Garissa is often hard hit by incidences of drought that leaves them devastated when their livestock die due to lack of water and pasture, coupled with livestock diseases. When IOM started operations in Garissa in 2010, the communities were grappling with serious livestock diseases and majority of them did not have sufficient knowledge to be able to manage them, especially those that could be prevented. The community called on IOM for support and through the Ministry of Livestock Development and funding from the Government of Japan, IOM supported livestock vaccination and deworming initiatives to control and prevent disease outbreak. This improved the health and helped to reduce the number of livestock deaths. In 2012, the Ministry of Livestock Development and IOM treated 42,217 livestock (goats, sheep, cows and camels) and vaccinated 18,355 livestock, consequently benefiting 350 households (IOM, 2011).

To empower communities to prevent/treat livestock diseases and adapt to climate change with minimum losses, 200 herders received basic skills training on animal management (IOM, 2011). The training that linked the herders with the Ministry of Livestock Development covered issues on disease surveillance, identifying symptoms of various diseases and administering first aid. For sustainability, IOM also linked the community health workers trained in 2011 with the government to ensure rapid support and successive interventions should the need arise.

2.24 Railroad infrastructure and Middle East loans for livestock development

Garissa’s future is based on three tightly interwoven strands; livestock, a railway and the prospect of Middle East loans (Emman, 2013). To start with, an organised livestock economy is
sure to bring in wealth. It will be given a boost by the proposed Lamu-Juba railway line as a gateway to South Sudan and Ethiopia and the potential for exports that are sure to spur growth.

The Government’s decision to allow counties to negotiate for loan directly with foreign governments has enormous potential to create new roads, sewers and power lines for Garissa. Garissa has good relations with all the governments in the Middle East. The businessmen of Garissa are in constant touch with their counterparts in the Arab states and they fly to the Middle East as frequently as Nairobians visit Mombasa. Already, Saudi Arabia is funding a Sh900 million sewerage system in Garissa Town (Emman, 2013), an indication that even better things are on the way when the county is free to source its own loans from overseas. Such a liberal law on borrowing is likely to make Garissa, Wajir and Mandera counties negotiate loans singly or jointly with the Arab world. They would create infrastructure, build industries, and help to lobby for investors, thereby creating wealth. The livestock economy is based on the huge numbers of cattle and camels that might help to transform the county.

2.25 New age agriculture, the hanging fruit for the unemployed
Every year, about 800,000 young Kenya’s reach working age. The job market can only accommodate 50,000 of them (Kantaria, 2013). It is a situation aptly captured in the numerous studies that show five out of every ten Kenyan youths are unemployed, majority with impressive academic competencies. Where do the rest go or do? The net effect is spiraling crime. The World Bank called them a disaster in waiting, a ticking time bomb.

But, the same researches identify agriculture as untapped goldmine in job creation capable of absorbing the unemployed millions (Kantaria, 2013). So, where is the disconnect? For starters, ‘the man with the hoe’ still remains an apt description of the average Kenyan farmer. This average farmer remains indigent, regarded by today’s youth as anathema. Surveys point to a considerable decline in interest by African youths in agriculture at all levels, from farming to research and extension. Kenya’s horticulture policy 2010 recognises a negative attitude towards agriculture aggravated by the education system and social perceptions, limited access to and ownership of land for farming and lack of funds to invest in commercial horticulture as the biggest turn offs for youth.
2.26 Water for livestock and employment in Kenya
For the last five years, Fatuma Mohamed and her five children have been living in Jalango village, some 20km from Modogashe in Lagdera County of Garissa County. It is made up of arid and semi-arid lands and is mainly inhabited by pastoralists. However, the area has been systematically ravaged by recurrent droughts, forcing long-distance trekking of livestock in search of water and resulting in the death of countless animals. “The only source of water in both wet and dry seasons is scooping holes for both humans and livestock, but it is unsustainable since during the dry season one has to dig holes as deep as three metres and even deeper at times in order to access water. Sometimes you dig and cannot find water and it is very tiresome work. I used to buy a 20 litre jerry can of water for as much as 80 Kenya shillings during the drought,” Fatuma says (Author unknown, undated 3).

In January 2013, a nongovernmental organization known as Adeso started implementing the Water for Livestock project in Garissa County with funding from Swiss Development Cooperation. The project’s aim was to strengthen the capacities of local communities in sustainable management of water and rangeland resources, improving water access and availability. Activities in Jalango village include the construction of a subsurface dam and shallow well in order to increase the volume of water, and training for the water users association and rangeland management committee to improve water usage and maintenance.

Fatuma is one of the community members participating in water for livestock’s cash for work activities. “The project has created employment for youth, women and men who have been idle in the village and therefore the peoples’ incomes have improved, leading to improved livelihoods.” she says. It is this positive attitude and determination that drives Fatuma and the community of Jalango to continue working in the 40 degree heat.

2.27 Livestock production in Ethiopia
Ethiopia has the largest livestock population in Africa (Author unknown, undated 2). The livestock sector is a large contributor to the Ethiopian economy as well as a mainstay in the livelihoods of many Ethiopians. The livestock subsector comprised 11 percent of national Gross Domestic Product between the years 2005/06, and was a source of revenue for 60–70 percent of
the population (Author unknown, undated 2). In highly populated areas, smaller livestock such as sheep and goats are preferred over large animals that require large expanses of grazing land. In the highlands where crop production requires intensive tillage, draft animals such as oxen or mules are necessary. This spatial variation in livestock population, coupled with other factors such as population density, grazing land availability, and access to markets has implications in grazing land management and livestock markets. Understanding spatial variations within the livestock economy is crucial in order to devise a feasible, more geographically targeted livestock policy.

According to national statistics, livestock population in Ethiopia continues to grow, with the highland regions accounting for the largest share. In 2007/08, Oromiya region produced the largest share, 38 percent of livestock within Ethiopia, while Amhara and Southern regions produced 26 and 16 percent of livestock shares respectively (Author unknown, undated 2). Approximately, 10 percent of overall production is found in the agro-pastoralist regions of Afar and Somali. A majority of Ethiopia’s livestock production is focused in the highlands due to availability of crop residues for feed and less risk of diseases.

2.28 Livestock production in Botswana
Botswana protects some of Africa's largest areas of wilderness. It is sparsely populated, because it is so dry. The Kalahari desert, home to a dwindling band of bushmen hunter-gatherers, makes up much of the territory and most areas are too arid to sustain any agriculture other than cattle (ILRI, Undated). Cattle production remains an important factor in the rural economy as a source of income, employment and investment opportunities. It also has strong linkages with the rest of the economy as a supplier of inputs for meat processing, leather and other industries. Export of animal products from Botswana is mainly in the form of fresh meat which account for 17 percent of the gross domestic product (GDP) and almost one half of the value of exports. Before the recent expansion in the mining industry, the livestock sector was very important to the economy. The success which has been achieved in beef marketing is largely due to a history of effective disease control, particularly foot and mouth disease, and the absence of rinderpest and pleuropneumonia (ILRI, undated).
Two broad cattle production systems are practiced. The first which accounts for approximately 80% is the traditional system where cattle are grazed on unenclosed, tribally administered land with no individual security of land tenure and a traditional right to grazing of unlimited cattle numbers. The second which accounts for approximately 20% is a freehold farming system with fenced ranching (ILRI, undated). The traditional system has changed through time, undoubtedly there has been radical changes in the comparatively recent past, particularly due to the opportunity to exploit groundwater resources by mechanical bore-hole drilling and consequent extension of the grazing area. This process has been accelerated and has been responsible in part for the increase in the cattle population. The extension of grazing areas and the widely held fear of degradation of the range resources from overgrazing has led to the introduction of the national tribal grazing land policy. The aims of tribal grazing land development are to stop overgrazing and degradation of the rangeland, to promote greater equality of incomes in the rural area, and to encourage growth and commercialization of the livestock industry on a sustained basis.

2.29 Contribution of livestock sector to the national economy
The livestock sector contributes about 12% of Kenya’s Gross Domestic Product and employs 50% of agricultural labour force (KEVEVAPI, undated). About 60% of Kenya’s livestock herd is found in the arid and semi-arid lands, which constitute about 80% of the country (KEVEVAPI, undated). It is estimated that 10 million Kenyans living in the ASALs derive their livelihood largely from livestock. The stakeholders in the sector have recognized the role that a vibrant livestock industry can play to reverse the poverty levels and contribute to the nation’s economic growth. The recognition is emphasized in various government policy documents such as the ninth National Development Plan, 2002-2008, Poverty Reduction Strategy Paper (PRSP), Economic Recovery Strategy for Wealth and Employment Creation (ERSWEC) 2003-2007, Strategy for Revitalizing Agriculture (SRA) 2004-2014, Kenya Vision 2030, Millennium Development Goals (MDGs) and the National Livestock Policy (NLP).

Kenya possesses one of the best livestock industries in East and Central Africa. However, diseases which exist either in enzootic or epidemic states are the major constrains in livestock production. Nevertheless, these diseases can either be controlled by vaccination or treatment. Vaccination is the most sustainable method of control and covers large proportions of animal
KEVEVAPI contributes to the food security and sustainable livelihoods of Kenyans by provision of vaccines used in control of major diseases in cattle, small ruminants and poultry. Rabies and Rift Valley Fever are two important diseases of animals that are transmissible to man. The Institute manufactures both RVF and rabies vaccines. The wide usage of vaccine against rabies disease has resulted in the dramatic reduction of human cases in Kenya.

2.30 Livestock- a driving force for food security and sustainable development

Although food availability has increased along with the growing human population, there are still many people suffering from malnutrition (Sansoucy, undated). This problem is not only the result of insufficient food production and inadequate distribution, but also of the financial inability of the poor to purchase food of reasonable quality in adequate quantities to satisfy their needs.

2.30.1 Livestock as a source of energy

Cattle, mules, horses, elephants and buffaloes are used as a source of energy. Compared with the use of tractors, animal power is a renewable energy source in many developing countries and is produced on the farm, with almost all the implements required made locally. Animal traction, therefore, avoids the drain of foreign exchange involved in the importation of tractors, spare parts and fuel. Draught animals remain the most cost-effective power source for small and medium-scale farmers. Draught animal power can be even more economical when one bullock is used instead of a pair since it reduces the cost of maintaining the larger herd necessary to satisfy both replacement and milk production requirements (Sansoucy, undated).

2.30.2 Livestock as a source of fuel

In many countries, cow dung is highly valued as fuel for cooking and heating, reducing expenditures for fuelwood or fossil fuels. It represents the major fuel supply for household use by millions of farmers in Asia, Africa and in parts of the Near East and Latin America. In India alone, 300 million tonnes of dung are used for fuel every year (Sansoucy, undated). The collection and drying of dung for cooking generates income for women. It is also used as building materials, while its ash is used as fertilizer.
2.30.3 Livestock as a source of fertilizer and soil conditioner
Nutrient recycling is an essential component of any sustainable farming system. The integration of livestock and crops allows for efficient nutrient recycling. Animals use the crop residues, such as cereal straws, as well as maize and sorghum stovers and groundnut haulms as feed. The manure produced can be recycled directly as fertilizer. The chemical composition of manure varies, however, according to the animal species and also to the nature of their diet. For example, farmers in Cambodia and the Niger have observed that they obtain more rice grain when they use manure from animals fed on urea-treated straw (because of its higher nitrogen content) than when they use that derived from animals fed on untreated straw (Sansoucy, undated). In addition to the direct contribution of plant nutrients, manure provides important organic matter to the soil, maintaining its structure, water retention and drainage capacity. The value of manure is so well-recognized that some farmers keep livestock primarily for this purpose. In systems using sugar cane as livestock feed, for example, in Colombia and Viet Nam, it has been demonstrated that the recycling of dead leaves into the soil (instead of burning them) favours the fixation of nitrogen by bacteria and reduces weed growth and water evaporation, thus increasing the yield of the subsequent harvest.

2.30.4 Livestock and weed control
Livestock, particularly sheep, are efficient in controlling weeds. They are used in many countries in the Mediterranean basin to reduce forest undergrowth so that the risk of fire during summer is diminished. In rubber and oil-palm plantations in Malaysia, the integration of livestock to utilize the vegetative ground cover under the tree canopy has been shown to increase overall production. Such system also safeguard the environment and avoid chemical pollution while supplying additional organic material to the soil.

2.31 Kapkwen cattle market in Bomet County
According to the market’s chairperson, Joseph Kirui, there are at least 1000 cows either being bought or sold every tuesday when the market is held. This translates into millions of shillings exchanging hands every week. The prices of cattle range from Sh60,000 for the cheapest and over Sh100, 000 for the very good ones ( Mibei, 2012). “Over ten million shillings is spent here
every Tuesday on buying cattle, goats and sheep. This makes our market very important in the economy of the county and the region at large,” Kirui revealed.

There are two main categories of traders in this market, the locals who buy for their own farming and those from outside the county who purchase livestock in bulk for bigger markets in Nairobi and other big cities. Although these groups are the real financiers of this market, most of the times, they depend on hundreds of middlemen who throng the market every Tuesday to act as intermediaries between them. The middlemen earn a lot of money from livestock bargains and have been a source of controversy every now and then when a seller realises that he has been ‘duped’ into selling his animal for a pittance by the broker. However, the brokers cannot be wished away because they are the only people who have the trust of the buyers from outside the county. Their word is taken by the buyers and thus they decide which livestock are to be bought (Mibei, 2012).

2.32 Livestock sub-sector in West Pokot County

Livestock plays an important economic and socio-cultural role among the Pokot community. The livestock sub-sector contributes to the food and cash needs of the pastoralists and provides employment opportunities. It makes significant contribution to West Pokot County’s economy. The estimated annual income from livestock in the county is about Kshs 1,113,571,000. The stakeholders in the livestock sub sector have recognized the role of livestock industry to reverse poverty levels and contribute to the county’s economic growth (Akoyo, 2013). The sector is facing many challenges which include low livestock productivity occasioned by recurrent droughts, insecurity, land tenure system, poor breeds and breeding practices, endemic livestock diseases and poor livestock husbandry. The marketing of livestock and livestock products is constrained by poor infrastructure, insecurity, livestock diseases and pests, quality of products, distance to the markets, insufficient market information and lack of value addition initiatives.

There exists livestock facilities in the county that support marketing and production. However they are not adequate to sustain the livestock population. The available ones are: 1 livestock improvement center, 15 sale yards, 1 abattoir, 180 vaccination and animal handling crushes, 6 holding grounds and 76 Dips.
2.33 Livestock market access and opportunities in Turkana, Kenya
The nomadic pastoralist economy of Turkana, which has one of the highest numbers of livestock in the country is based on goats, sheep, cattle and camels in declining order of numerical importance. The majority of their wealth is held in the form of livestock and virtually all their cash earnings come from either sales of livestock or livestock products. In addition to their economic value, livestock, particularly cattle and sheep have a significant cultural value. In Turkana, systems of natural resource management primarily evolved around the common tenancy of land, organized for the efficient utilization of available resources for livestock herding (Watson, 2008). The development and sustainability of livestock markets and marketing activities have been a major challenge in Turkana region as a whole. Like other development and support areas where external agencies have been involved in the region, the level of enthusiasm from the local pastoral communities has been low. The communities have viewed livestock marketing support and penetration as an external agents’ intervention rather than an opportunity to actively contribute towards a significant improvement and sustenance of their livelihoods.
Figure 1: Conceptual framework

- Optimal market
  - Sufficient space allocation
    - Inadequate land
  - Provision of enough facilities
    - Insufficient facilities
  - Adequate environmental management
    - Environmental degradation

(Source: Author, 2014)
3.1 Study area

The study area is the existing Garissa livestock market. It is in Central Division of Garissa District. The total area of the market is approximately 10 acres and it is two kilometres away from the central business district of Garissa town. The market is defined by (573424E 9951750N, 573460E 9951513N, 573388E 9951451N, 573236E 9951458N and 573208E 9951609N) coordinates (Field survey, 2013).

Map 1: Study area

(Source: Survey of Kenya, 2009)
Generally the sub-county covers an area of 5,688 km$^2$ and lies between latitude 1$^0$ 25’N and 0$^0$ 45’S and longitude 39$^0$ 45’E and 38$^0$ 45’E. It borders Garbatula sub-county to the Northwest, Lagdera sub-county to the North, Fafi sub-county to the East and South and Tana River County to the West. The sub-county is basically flat without hills, valleys and mountains. It rises from a low altitude of 200m above sea level on the southern sides through bush-covered plains to about 400m above sea level on its northern regions (Government of Kenya, 2009).

The major physical features are seasonal laghas\(^1\) and the Tana River basin in the western side. The soils range from sandstones, dark clays to alluvial soils along the River Tana basin. These soils have potential for arable farming. The rest of the sub-county has sandy soils that support scattered shrubs and grass (Government of Kenya, 2009).

The district records high temperatures ranging from 20 to 38 degrees centigrade. The hottest months are September and January to March, while the months of April to August are relatively cooler. Strong winds are also experienced between April and August with the rest of the months getting calm winds (Government of Kenya, 2009).

**3.2 Research design**

Decisions regarding what, where, when, how much, by what means concerning an inquiry or a research study constitute a research design. A research design is the arrangement of conditions for collection and analysis of data in a manner that aims to combine relevance to the research purpose with economy in procedure. In fact, the research design is the conceptual structure within which research is conducted. It constitutes the blueprint for the collection, measurement and analysis of data (Kothari, 2004). As such the design includes an outline of what the researcher will do from writing the hypothesis and its operational implications to the final analysis of data.

The first part of this study involved literature review where information on livestock market and livestock in general was reviewed. The sources included; the internet, journals, existing projects, \(^{1}\)

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\(^{1}\)Dry river beds.
government documents and magazines. The second phase involved collection of secondary data on animal diseases, economic, social and environmental impacts of the market and land uses. Existing maps and plans covering the study area were also examined and data necessary to the study collected. The third phase involved collection of primary data where data was collected as it existed with the source. Methods such as direct observation, instrument administration and interviewing were used in conducting the research. After data collection, it was edited and analysed. Finally, a final product in the form of report, maps, figures, photographs, tables and charts were produced.

Figure 2: A schematic diagram of research design

<table>
<thead>
<tr>
<th>First phase</th>
</tr>
</thead>
<tbody>
<tr>
<td>Literature review on livestock concepts.</td>
</tr>
<tr>
<td>Sources included: Internet, journals, books, existing projects and magazines.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Second phase</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collection of secondary data on animal diseases, economic, social and environmental impacts of the market and land uses.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Third phase</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collection of primary data on household income, socio-economic and environmental impacts.</td>
</tr>
<tr>
<td>Sources: Direct observations, interviews and questionnaire administration.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Fourth phase</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data compiling, editing, analysis and presentation using tables, charts, photographs and plates.</td>
</tr>
</tbody>
</table>
3.3 Key target population

The key target population for this study included households, livestock and veterinary officials, traders, suppliers, buyers of livestock, the sub-county livestock marketing council, the sub-county public health officer, middlemen and the county government. The sub-county livestock, public health, veterinary, county government officials and County livestock marketing council were the key informants. For the sub-county livestock officer, information on livestock types and population, challenges and opportunities on livestock within the sub-county were sought.

3.4 Sampling

Where time and resources allow, a researcher should take as big a sample as possible. With a large sample, the researcher is confident that if another sample of the same size were selected, findings from the two samples would be similar to a high degree. The danger with small samples is that they do not reproduce the salient characteristics of the accessible population to an acceptable degree (Mugenda and Mugenda, 2003). The rule of thumb should be to obtain as big a sample as possible. However, resources and time tend to be major constraints in deciding on the sample size to use. In social science research, the following formula can be used to determine the sample size (Mugenda and Mugenda, 2003).

\[
n = \frac{Z^2pq}{d^2}
\]

where

- \(n\) = the desired sample size (if the target population is greater than 10,000).
- \(Z\) = the standard normal size deviate at the required confidence level.
- \(p\) = the proportion in the target population estimated to have characteristics being measured.
- \(q\) = 1-p
- \(d\) = the level of statistical significance set.

Generally, a researcher would need a minimum of 30 subjects in each group for co-relational and descriptive research but may be able to get by with 15 subjects per group in experimental or quasi-experimental designs. In general, selection of respondents depends on the nature of analysis to be performed, the desired precision of the estimates one wishes to achieve, the kind and number of comparisons that will be made, the number of variables that have to be examined.
simultaneously and how heterogeneously a universe is sampled. Gay is of the opinion that 10 percent of the total population of a category can make a good sample size.

Table 3: Showing categories of units, population and sample size

<table>
<thead>
<tr>
<th>Category</th>
<th>Population</th>
<th>Sample size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Households</td>
<td>1235</td>
<td>40</td>
</tr>
<tr>
<td>Traders</td>
<td>200</td>
<td>20</td>
</tr>
<tr>
<td>Suppliers</td>
<td>80</td>
<td>10</td>
</tr>
<tr>
<td>Clientele</td>
<td>Dynamic</td>
<td>20</td>
</tr>
</tbody>
</table>

(Source: KLMC, Garissa Municipal Council, 2013)

By using the method of 10 percent, the sample size for the traders is 20. The arithmetic calculation is as follow 200*10/100=20. Using the same approach, the sample size for the suppliers is 8 but a sample size of 10 was adopted. For the households, the approach of 30 subjects in a group was utilised although a sample size of 40 was adopted. For the key informants and the middlemen, census survey was used because the population for each is small. Sampling units included households, traders, suppliers, buyers of livestock and key informants as mentioned above. Purposive sampling was used in identifying relevant stakeholders who had information on the subject matter. They included livestock and veterinary officers, non governmental organisations, sub-county livestock mediation council, sub-county livestock marketing council members, county government surveyor, traders, suppliers and buyers of livestock.

The study area is served by four major routes that included Nasib, Iqra, Mazuri and Sigarai. With the assistance of the area chief, all households in the neighbourhoods were recorded. The total population of the households was 1235. Systematic random sampling method was used for selecting the samples where every nth household was included in the sample. Along each route, 10 households at an interval of 10 was selected adding up to 40 for the entire neighbourhood. Simple random sampling was used for selecting the starting point of the systematic random sampling through balloting. If, for example 5 was selected, then the subsequent numbers were 15, 25, 35, 45, 55. The sampling frame was lists of households along the four routes.
The market operates on daily basis although the main market day is on Wednesday. Purposive sampling was used for the traders. Interviewing the respondents was done on daily basis.

### 3.5 Data collection methods

There are generally two types of data, primary and secondary. Secondary data is data that exists and the sources include internet, journals, magazines, books, government documents, existing projects, maps and plans. Primary data is data that is directly collected from the field and methods such as instrument administration, interviewing and observations are generally employed.

For this study, the data collection methods used were instrument administration, observation and interviewing. The method of instrument administration was used in capturing data from some of the key informants. They included local authorities where data such as the revenues collected per month, the services they provided specifically to the market and the challenges they faced were collected. Data was also collected from livestock and veterinary officials. The data includes; the major livestock types that are sold at the market, their population, the major diseases that affect livestock and the level of revenues collected per month by government departments. Unstructured interviews were used in capturing data on the households, traders, buyers, suppliers of livestock and middlemen.

Direct observation was used for capturing additional data. Data such as livestock types, condition of the livestock, livestock traffic flows, movement of livestock within the town neighbourhoods, encroachments and activities taking place within the market was captured using photography. Tools such as field notebooks and digital camera were used.

Three research assistants, one female and two male who were fluent in English, Kisomali and Kiswahili were hired. They were trained to fully understand the purpose of the study and its objectives. The researcher conducted all the interviews of the key informants.
Table 4: Data needs matrix

<table>
<thead>
<tr>
<th>Objectives</th>
<th>Data needs</th>
<th>Sources of data</th>
<th>Data collection methods</th>
<th>Data analysis</th>
<th>Data presentation</th>
<th>Expected data output</th>
</tr>
</thead>
<tbody>
<tr>
<td>To determine the major spatial constraints of the existing livestock market.</td>
<td>- The acreage of the market.</td>
<td>- Field survey</td>
<td>-Photography</td>
<td>-Content analysis</td>
<td>-Report</td>
<td>A comprehensive report on the major spatial constraints</td>
</tr>
<tr>
<td></td>
<td>- Occurrence of traffic accidents.</td>
<td>- Veterinary institutions</td>
<td>- Interviews</td>
<td>-Quantitative and qualitative analysis</td>
<td>-Photos</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Level of encroachments of human activities into the market land and the</td>
<td>- Physical planning department</td>
<td>- Questionnaire administration</td>
<td></td>
<td>-Tables</td>
<td></td>
</tr>
<tr>
<td></td>
<td>reasons for such encroachments</td>
<td>- Roads department</td>
<td>- Literature review</td>
<td></td>
<td>-Bar graphs</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Type of diseases and their occurrence.</td>
<td>- Police department</td>
<td>- Observations</td>
<td></td>
<td>-Pie charts</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Road condition and networks.</td>
<td>- Municipal council/county government</td>
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<tr>
<td></td>
<td>- Provision of services such as toilets and water.</td>
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<tr>
<td>To determine the environmental impacts of the market on its neighbourhoods</td>
<td>- Health conditions in the neighbourhood</td>
<td>- Field survey</td>
<td>-Photography</td>
<td>-Use of spatial analysis tools</td>
<td>-Reports</td>
<td>A comprehensive report of the environmental impacts of the market to its</td>
</tr>
<tr>
<td></td>
<td>- Method of disposal of animal waste.</td>
<td>- Key informants</td>
<td>- Interviews</td>
<td></td>
<td>-Photos</td>
<td>neighbourhood</td>
</tr>
<tr>
<td></td>
<td>- Environmental degradation of the neighbourhood</td>
<td>- Municipal council/county government</td>
<td>- Questionnaire administration</td>
<td></td>
<td>-Maps</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Ministry of health</td>
<td>- Observation</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>- Literature review</td>
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</tbody>
</table>

Data presentation methods:
- Photography
- Interviews
- Questionnaire administration
- Literature review
- Observations
To determine the socio-economic impacts of the market on Garissa town.

- Income levels of the households within the neighbourhood of the market.
- Security issues within the market and its neighbourhood.
- The number of traders, suppliers and middlemen and their respective dependants.
- Social vices attributed to the market.
- Revenue collection by the various institutions.
- Interactions between the various stakeholders.

| Field survey | Key informants | Municipal council/county government | Garissa livestock mediation council | Police department | Veterinary and livestock department |
| - Interviews | - Questionnaire administration | - Literature review |
| - Quantitative and qualitative analysis |

| Photos |

To determine the population of livestock traded at the market by type

- the type of livestock, sex, age
- the price of livestock

| Livestock department | Veterinary department |
| - Field survey | - County government |
| - Observation | - Questionnaire administration |
| - Interviews | - Literature review |
| - Bar graph | - Pie chart |

A comprehensive report on livestock population traded in the market
To determine the appropriate size, design and location

| -The appropriate market size | -Livestock department | -Photography |
| -Design options | -Physical planning department | -Questionnaire administration |
| -Appropriate location | -County government | -Interviews |
| | -Field survey | | -Quantitative and qualitative analysis |
| | | | -Reports |
| | | | -Photos |
| | | | A comprehensive report on the appropriate size, design and location of the market

(Source: Author, 2014)
3.6 Data cleaning and editing
Data cleaning was carried out by thoroughly searching through the collected data to remove redundant or incomplete data. Editing improves quality of data for coding. This was done by looking for non-response and inadequate information for the questions asked. Telephone numbers of respondents were recorded on the questionnaires so that further probing could be carried out if necessary. If the information was not very necessary, such question was discarded provided it would not affect the validity of the results.

3.7 Data entry programs and devices
The following programs were utilised for different purposes. They include, the Statistical Package for Social Sciences (SPSS) and AUTOCAD.

3.8 Data analysis
After data cleaning and editing, it was entered into the computer in the SPSS programme and then analysed. Techniques such as descriptive statistics were utilised where averages, median, mode and range on quantitative data was calculated. Statistical Package for Social Sciences (SPSS) which is a program for analysis was used. This program produced all the aforementioned tests with many variables within a very short time.

3.9 Data presentation
After the data had been cleaned, edited and analysed, it was finally presented inform of graphical piecharts, bar graphs, maps, tables, plates and schematic diagrams. Frequency tables were utilised for showing income levels of the various households and livestock sales.
CHAPTER FOUR
STUDY FINDINGS AND DISCUSSIONS

4.0 Overview
This chapter provides the findings on main livestock traded and their means of transport, challenges faced by livestock traders, gender of respondents and ethnicity of individuals in the neighbourhood. Other information covers occupation of respondents in the neighbourhood, livestock buyers, traders, suppliers, attractions to the market, positive and negative social economic and environmental impacts and the corresponding mitigation measures.

4.1 Demographic and socio-economic characteristics of the respondents

4.1.1 Gender of the respondents and ethnicity of the neighborhoods
From the household questionnaires, 72% of the respondents were male and 28% were female. As pertains to ethnicity, majority were from the Somali ethnic group with 88%, Kamba 8% and Borana 4%. In terms of the form of education, 76% of the respondents went through the secular education whereas 24% went through the Islamic Education. Education is important in livestock trade since it assists in the smooth running of transaction between traders.

Figure 3: Ethnicity of the respondents

(Source: Field survey, 2014)
4.1.2 Occupation of persons in the neighbourhood

The main occupation of people in the neighbourhood is business as shown in figure 4 below. Others are civil servants, nurses, farmers, cobblers, police officers, teachers, students and drivers. In terms of location of these occupations, 88% are located in Garissa town, 8% in Masalani and 4% in Bura. Through the various types of occupation, people get income and this assists in the purchasing power of livestock and livestock products. It also helps to understand the nature of the occupation the people of Garissa rely on apart from livestock keeping and livestock trading.

Figure 4: Main occupation

![Bar chart showing the distribution of different occupations in Garissa](Image)

(Source: Field survey, 2014)

Figure 5: Salary as source of income to the people in the neighbourhood

![Bar chart showing the distribution of salary income per month](Image)

(Source: Field survey, 2014)
From the graph above, 20% of respondents in the neighbourhood earn an average income of between Kenya shillings 25,001-30,000 per month, 16% earn 15,001-20,000, 12% earn below 5,000, another 12% earns between 40,001- 45,000 while 8% earn above 50,000 per month.

The livestock market provides employment opportunities to some of the persons in its neighbourhood. They are involved in trade of live animals and their products, water and fodder crops. Some of the neighbourhoods keep live animals such as goats, cattle and sheep while others keep livestock products such as milk, hides and skin. They sell their products at the livestock market on daily basis and get income.

Figure 6: Livestock sale by the neighbourhoods

Figure 6 above shows livestock sale income per month of the neighbourhoods of the existing livestock market. 8% of the respondents in the neighbourhood earn an average income of between Kenya shillings 5001-10000 per month. Another 8% earns between 15001-20000 per month. 60% of the respondents confirmed that they do not sell livestock to the market.

(Source: Field survey, 2014)
Per month, the total average income of the respondents, that is salaries and other income from other sources are as follows. Upto 40% of the population earn above Kenya shillings 45,000. 16% earn between 25,001-30000, 4% between 40,001-45000 and 8% between 30,001-35,000. This indicates the economic impact of the livestock market to its neighbourhood.

(Source: Field survey, 2014)
4.1.3 Livestock buyers
Livestock buyers include both male and female although majority are male as indicated by the chart below. Organizations such as Young muslim association and Najah childrens’ home are also regular livestock buyers from the market.

Figure 9: Livestock buyers

(Source: Field survey, 2014)

4.1.4 Livestock traders
Majority of the livestock traders are male as shown by the chart below and constitute 86%. As pertains to their places of residence, 47% reside in Garissa town and 28% in the Bullas. Others live in Thika, Nairobi, Mombasa and Masalani.

Figure 10: Gender of livestock traders and place of residence of the traders

(Source: Field survey, 2014)
4.1.5 Livestock suppliers
Most of the livestock suppliers interviewed were male and constituted 82% while the rest 18% were female. Their places of residence are varied such that 55% of the suppliers come from Garissa County. Others come from Wajir, Mandera, Afmadow and Kismayu as was indicated during the interview.

Figure 11: Gender of livestock suppliers

(Source: Field survey, 2014)

4.2 Major land use conflicts and challenges of the livestock market
The study found mainly three major land use conflicts. They include, a permanent road that passes through the livestock market, parking within the market and inadequate spatial size of the market.

4.2.1 Observed traffic related incidents
There is a permanent road that passes through the livestock market that links the neighbourhoods to Garissa town. This road is mainly used by pedestrians and vehicular traffic and is the main cause of accidents within the market. The traffic related incidences/accidents that occur within the market as shown by figure 12 below include: humans being hit by vehicles, animals hit by vehicles, accidents involving vehicles only and traffic jam. The three main incidences are, humans hit by vehicles at 45%, animals hit by vehicles at 22% and traffic jam at 22%.
In order to minimize traffic related incidences/accidents within the market, the following options are proposed: closure of the road that passes through the livestock market that links the neighbourhood to the town since it is the major cause of accidents. Alternative roads that are in
existence should be used in order to link the neighbourhoods to the town. Other options include, increasing the size of the market and creating parking areas outside the market.

4.2.2 Parking within the market
The vehicles that are used for transporting the livestock to other destinations are parked within the market. In essence, they occupy large spaces which could have been used by the traders and the livestock. Appropriate alternative area that is outside the market which is not far from it should be used for parking purposes.

4.2.3 Inadequate spatial size of the market
The spatial size of the existing livestock market is small compared to the large number of livestock that are traded through it thus leading to spill over effect to the neighbourhoods. This has led to land use conflict especially roads in the neighbourhoods where the animals are temporarily kept by the livestock traders.

4.2.4 Main challenges faced by the livestock traders
Just like any other trade, livestock traders face many challenges in their business. Some of the challenges include high competition, high cost of transport, animal diseases, night travel ban which has led to loss of some animals, drought and insecurity.

Figure 14: Challenges faced by livestock traders

<table>
<thead>
<tr>
<th>Challenge</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Competition from other traders</td>
<td>19.0</td>
</tr>
<tr>
<td>Night travel ban</td>
<td>9.5</td>
</tr>
<tr>
<td>Water shortage</td>
<td>4.8</td>
</tr>
<tr>
<td>Insecurity</td>
<td>9.5</td>
</tr>
<tr>
<td>Theft of animal within the market</td>
<td>4.8</td>
</tr>
<tr>
<td>High cost of transportation</td>
<td>19.0</td>
</tr>
<tr>
<td>Running losses especially dry seasons</td>
<td>9.5</td>
</tr>
<tr>
<td>Animal diseases</td>
<td>19.0</td>
</tr>
</tbody>
</table>

(Source: Field survey, 2014)
Generally, high cost of transport, competition and animal diseases are the main challenges faced by the livestock traders as shown in figure 14 above. The high cost of transport is due to the poor condition of the roads especially during the rainy seasons when such roads are impassable.

Figure 15: Mitigation measures to the challenges

(Source: Field survey, 2014)

Some of the mitigation measures to the challenges faced by the livestock traders as proposed by the respondents include; trekking of the animals to the market in order to cut transport cost when the distance to the market is not too far, employment of more security personnel so as to curb insecurity both at the market and on the stock routes, vaccination of the animals so as to minimize the occurrence of diseases that affect the animals and use of high capacity vehicles that can carry more animals hence reduce transportation cost per animal.

4.3 Population and type of livestock traded
The main livestock traded at Garissa livestock market are cattle, goats, sheep, camels and donkeys. They have different selling prices. The selling price of a cow ranges between Kenya shillings 15,000 to 35,000, a goat 4,000 to 6,000, a sheep 3,500 to 5,000 while that of a camel is between 65,000 to 70,000.
Table 5: Population and type of livestock traded at the market on Wednesdays

<table>
<thead>
<tr>
<th>Type of livestock</th>
<th>Cattle</th>
<th>Goats</th>
<th>Sheep</th>
<th>Camels</th>
<th>Donkeys</th>
<th>Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of livestock</td>
<td>3000</td>
<td>1800</td>
<td>2800</td>
<td>600</td>
<td>200</td>
<td>8400</td>
</tr>
</tbody>
</table>

(Source: Field survey, 2014)

The population and type of livestock traded at the market on Wednesday is as shown in table 5 above. The main source of these livestock includes Garissa, Wajir, Mandera, Somalia, Moyale and Ethiopia. The main means of transporting these livestock are by use of trucks and trekking. The animals are mainly trekked during the rainy seasons due to the availability of water and pasture along the stock routes. Trucks are mainly used for transporting the livestock during the dry seasons due to lack of water and pasture along the stock routes. They are also used for transporting the animals from the Garissa market to major towns such as Thika, Mwingi, Mombasa, Nairobi, Kajiado and Narok.

Figure 16: Means of transporting the livestock

(Source: Field survey, 2014)

The peak times of the market is during the IDD seasons where the muslim communities slaughter many animals. The off peak is during the dry seasons since the animals loose weight and hence dont fetch good prices.
4.4 Market size, design and location

4.4.1 Adequacy of the market
From the field survey, 82% of the respondents reported that the current size of the market is not adequate while 18% reported that it is adequate. All the key informants concurred that the market size is inadequate. As pertains to the design of the market, all the key informants reported that the market is not well designed and thus lacks most of the facilities that are required by a livestock market.

Figure 17: Adequacy of the market

(Source: Field survey, 2014)

Plate 2: Herd of cattle at the market

(Source: Field survey, 2014)
Plate 2 shows a section of Garissa livestock market. As seen, cattle is among the animals traded at the market. As earlier indicated by the respondents, the market cannot sustainably hold the large number of livestock in the market hence there are incidences of animal congestion.

Figure 18: Recommendation for market adequacy

(Source: Field survey, 2014)

Many respondents recommended that the current size of the market be doubled so that it could accommodate all the facilities that are required for a standard livestock market.

4.4.2 Alternative market location
Most respondents suggested that the current market be relocated to either Modika, Bor Algi or any place outside Garissa town where land is available. Modika is around 7 kilometres away from the existing livestock market whereas Bor Algi is around 12 kilometres away. The reasons for proposing alternative locations were: availability of land in the proposed areas, avoid spread of diseases, human-livestock conflicts and the proposed areas especially Modika has good road network. Many respondents proposed that the market be relocated to Modika as shown in figure 19 below.
4.4.3 Conditions of facilities provided at the market

The existing livestock market does not have toilets and water taps. Currently, there are two toilets which are under construction and this will not be adequate due to the large number of the traders. For such services, the traders seek assistance from the neighbours of the market. There is only one small holding pen which is in use and is in poor condition.

(Source: Field survey, 2014)
The existing livestock market has only one loading bay which is in use and is in poor condition as shown by the chart above. There is one that is under construction but has taken many months to be completed. There are no facilities/rooms where people can rest or transact their business. Absence of such rooms can expose the traders to incidences of insecurity especially when they exchange the goods and the money in the open air. The market is not fenced and this has led to problems such as encroachments and evasion of taxes by some of the livestock buyers and traders who use the many openings of the market.

(Source: Field survey, 2014)
Map 2: Existing facilities at the livestock market

(Source: Field survey, 2014)
4.4.4 Attraction to the livestock market
Some of the factors that attract buyers to the market are as shown in figure 22 below. Proximity of the market to Garissa town has the highest percentage implying that the market is not far from the town and thus ensures less transportation cost. Large herds of livestock from Kenya, Ethiopia and Somalia are served at this market since it is the only market of its kind within the region. Due to different varieties of livestock such as camels, goats, sheep, donkeys and cattle that are traded at the market, a buyer can quickly transact business.
Figure 22: Attraction to the market

<table>
<thead>
<tr>
<th>Reason</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proximity to the town</td>
<td>27.3%</td>
</tr>
<tr>
<td>Cheaper animals</td>
<td>9.1%</td>
</tr>
<tr>
<td>Variety of animals</td>
<td>18.2%</td>
</tr>
<tr>
<td>Large number of animals</td>
<td>4.5%</td>
</tr>
<tr>
<td>It's the only livestock market</td>
<td>22.7%</td>
</tr>
<tr>
<td>Good service from traders</td>
<td>13.6%</td>
</tr>
<tr>
<td>Quality animals</td>
<td>4.5%</td>
</tr>
</tbody>
</table>

(Source: Field survey, 2014)

### 4.5 Socio-economic and environmental impacts

#### 4.5.1 Positive social impacts of the market

The existing Garissa livestock market has several social impacts to its neighbourhoods. The main impacts are; intermarriages between different communities, gaining knowledge from one another and improved diversity of the people. It serves as a place where people interact and exchange experiences and ideas concerning the day to day running of their activities. The market has also led to intermarriages between communities with different cultural backgrounds.
4.5.2 Negative social impacts of the market

The market has negative impacts to the people of Garissa town. One of the main impacts is the problem of cultural degradation, for instance the use of bad or abusive language among the people within the market. Stealing of properties both from the neighbourhoods and the livestock traders is also a negative impact the market has brought to the people. Insecurity is a major social problem caused by the market. Most of the livestock are brought from very far places and in case such animals are not bought on a market day which is normally on Wednesdays, they are grazed at the suburb of Garissa town to await the following market day and this causes conflicts between the residents and the owners of the livestock. The market acts as a den by drug users and robbers who either strike in the middle of the night and steal from the neighbourhoods or rob those who pass through the market.

4.5.3 Mitigating factors to the negative impacts

Some of the mitigating factors to the social problems reported by the respondents are as follows: informing concerned authorities, offer employment opportunities and educate youth on good morals. Among the respondents, 46% reported that they informed the authorities concerned about the negative impacts they observed at the market and its environs. On incidences of theft and drug abuse, 27% reported to have educated the youth on having good morals. Another 27% reported that they offered employment opportunities to the youth so as to discourage them from getting involved into social problems.
4.5.4 Positive economic impacts to the neighbourhoods
The market has positive economic impacts which include: offering employment opportunities for shopkeepers, water and fodder sellers, cobblers, middlemen, hoteliers and availability of animal products like meat and milk.

4.5.5 Positive economic impacts to Garissa town
Twenty eight percent of the respondents reported that the market helps in improving other businesses within the town such as hotels, lodges, shops and the transport industry particularly on wednesdays when large volumes of livestock are traded at the market. The County government of Garissa collects revenue from the market as taxes. For example, on wednesdays, on average, the number of livestock traded at the market with the charges indicated against each type of livestock are as shown in table 6 below. The total revenue collected is Kenya shillings 1,318,000. The veterinary department also collects revenue from the market. It provides stock traders license at Kenya shillings 600 per year, movement permit at shillings 100 per leaf and screening of small animals for fattening at shillings 50 per head.
Table 6: Showing total revenue collected

<table>
<thead>
<tr>
<th>Type of livestock</th>
<th>Cattle</th>
<th>Goats</th>
<th>Sheep</th>
<th>Camels</th>
<th>Donkeys</th>
<th>Totals</th>
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</thead>
<tbody>
<tr>
<td>Number of livestock</td>
<td>3000</td>
<td>1800</td>
<td>2800</td>
<td>600</td>
<td>200</td>
<td>8400</td>
</tr>
<tr>
<td>Charge per animal (Kshs)</td>
<td>290</td>
<td>40</td>
<td>40</td>
<td>400</td>
<td>120</td>
<td>890</td>
</tr>
<tr>
<td>Total Amount (Kshs)</td>
<td>870,000</td>
<td>72,000</td>
<td>112,000</td>
<td>240,000</td>
<td>24,000</td>
<td>1,318,000</td>
</tr>
</tbody>
</table>

(Source: Field survey, 2014)

Plate 4: Goats and sheep at the market

![Goats and sheep at the market](image)

(Source: Field survey, 2014)

The image above show some of the animals traded at the market. In addition, the market creates employment opportunities to people such as shopkeepers, hoteliers, middlemen, herders, loaders, fodder sellers and truck, matatu, taxi and boda boda operators.
Plate 5: A trader selling fodder

(Source: Field survey, 2014)

The livestock market provides employment opportunities to traders who sell fodder crops at the market. On average, small scale fodder seller gets Kenya shillings 1000 on a market day.

4.5.6 Negative environmental impact of the market
The existing livestock market has some negative environmental impacts which include: air and noise pollution and spread of zoonotic diseases. From figure 25, it is evident that air pollution has the highest percentage of negative environmental impact followed by noise pollution.
Figure 25: Negative environmental impact of the market

(Source: Field survey, 2014)

4.5.7 Waste disposal

Methods of solid waste disposal generated in the neighbourhoods of the existing livestock market include; collection of the waste by the County government, compost pit and through burning. In liquid waste disposal, 42% of the respondents reported that they dispose their waste in the open drainage, 37% use septic tanks and 21% use pit latrines.

The waste generated by traders especially food kiosks and shops are collected by the traders themselves. The waste generated by the traded animals are collected by the Garissa County government.
The main effects of solid waste in Garissa market and its neighbourhood include bad smell, litters swept by wind into the neighbourhood especially the light wastes during transportation and air pollution.

(Source: Field survey, 2014)
CHAPTER FIVE
CONCLUSION AND RECOMMENDATIONS

5.1 Conclusions
The main types of livestock that are traded at the Garissa livestock market are cattle, goats, sheep, donkeys and camels. The market is mostly dominated by the Somali community and thus do not engage themselves in the emerging livestock such as ostrich and guinea fowl. On wednesdays, which is a market day for the livestock market, on average, 3000 cattle, 1800 goats, 2800 sheep, 600 camels and 200 donkeys are traded at the market.

The veterinary department offers extension service to the traders. They provide vaccination to sick animals suffering from anthrax at approximately Kenya shillings 7 per head.

The main challenges faced by livestock traders are; insecurity, diseases, drought, lack of communication facilities especially in the remote areas, no official stock route, lack of water, in sufficient pasture, night travel ban, increased levies by traversing through different counties, no ready market, high cost of transport, lack of information and holding grounds. The veterinary department assists in mitigating the challenges through vaccination and carry out stock route inspections to ensure that they are safe.

All the key informants concurred that the size of the existing livestock market is inadequate and suggested that its current size be doubled. They are not happy with the current location of the market and thus suggested it to be relocated to Modika because of; availability of land, no human-livestock conflict and reduction in the spread of zoonotic diseases because in a congested area, diseases spread faster.

The livestock market has several positive impacts to its neighbourhood which include: income generation for hoteliers, shopkeepers, miraa sellers, cobblers, middlemen, herders, water and fodder sellers. The major negative impacts of the market to the neighborhood are: air and noise pollution, spread of zoonotic diseases, destruction of properties such as fences and utensils, insecurity, drug abuse, theft cases and animal waste. The major economic impacts of the market to Garissa town are that, it is the backbone of the town where many people use the proceeds from
it for paying school fees and hospital bills, upkeep for the family and income for the County government. It has also led to intermarriages between different communities. The positive impacts can be enhanced through training where basic skills are imparted to the people, employment of more veterinary personnel, provision of up to date market information and markets both regionally and internationally and provision of adequate facilities at the market such as holding pens, water troughs, toilets and tapped water.

As pertains to the design of the market, all the key informants concurred that the design of the market is not standard. The veterinary officer suggested that it should be relocated because the size of the existing market is not adequate if all the facilities are to be put in place.

5.2 Recommendations

From the findings of the study, the following are some of the recommendations that will enhance the efficiency of the market.

5.2.1 Closure of market road

There is a permanent road that passes through the livestock market that links the neighbourhoods to Garissa town. This road is mainly used by pedestrians and vehicular traffic and is the main cause of accidents within the market. Alternative roads that are in existence should be used in order to link the neighbourhoods to the town so as to minimize accidents within the market.

5.2.2 Improvement on market facilities

The current market facilities are in adequate and in poor conditions. There is only one holding pen which is in poor condition. There are no toilets which are currently in use although there are two which are under construction. There is only one deplorable loading bay in use although there is one under construction. Quicker operationalization of the facilities under construction can improve on the efficiency of the market although they will be in adequate. There are no facilities/rooms where people can rest or transact their business. Absence of such rooms can expose the traders to incidences of insecurity especially when they exchange the goods and the money in the open air. There is no tapped water at the market and this has made some of the traders get water from the neighbourhoods. This is a potential source of conflict.
Figure 28: Proposed design of Garissa livestock market

(Soure: Field survey, 2014)
The proposed Garissa livestock market should have facilities such as office block, holding pens, loading bay, toilets for both male and female, veterinary clinic, human clinic, gates, parking area, vehicle washing facilities and shop and eateries.

Holding pens are enclosures for holding livestock. The livestock market should have different holding pens for each type of livestock that are traded at the market. In essence, the market should have a holding pen for cattle, camels, goats, sheep and donkeys.

The market should have a veterinary clinic that should provide the highest standard of veterinary care for the livestock. It should also have human clinic that provides health services to the traders.

The office block should contain rooms where the livestock traders can transact their business. It should also consist of offices manned by the market workers.

5.2.3 Alternative parking areas outside the market
Currently, the vehicles that are used for transporting the livestock to other destinations are parked within the market. In essence, they occupy large spaces which could have been used by the traders and the livestock. An appropriate alternative area that is outside the market which is not far from it should be used for parking purposes. A land that is sandwiched between the main Kismayu-Daadab road and Spencon which is 150 metres from the existing livestock market can temporarily be used for parking.
Map 3: Existing livestock market and proposed parking area

(Sourse: Field survey, 2014)
5.2.4 Livestock market management board
One of the main problems that have led to the poor condition of the market and lack of the basic facilities is due to inefficiency by the employees of the former Municipal Council of Garissa. There was no transparency and accountability in the collection of revenues especially on Wednesdays when the collections were high. Establishment of a livestock market management board with people of good integrity may improve on the day to day running of the market.

5.2.5 Fencing of the market
The existing livestock market is not fenced and this has led to many problems which include; encroachments on to the market which has ultimately led to reduction in its spatial size, evasion of taxes by some of the livestock buyers and traders who use the many openings of the market, acts as a den by drug users and robbers who either strike in the middle of the night and steal from the neighbourhoods or rob those who pass through the market. Proper fencing of the market will minimize these problems and enhance the revenue collected by the County government. It will also reduce the incidences of insecurity within the market and its neighbourhood.

5.2.6 Relocation of the market
This is a long term solution of solving the challenges facing the market. Many respondents proposed that the existing market be relocated to Modika because of availability of spacious land, to avoid human-livestock conflict currently experienced at the existing market, avoid spread of zoonotic diseases and to reduce air and noise pollution. Also, Modika is only seven kilometres from the existing livestock market and it has a good road network.

5.3 Further research
Further research can be carried out on modern ranching practices that can enhance livestock production in Garissa county.

Further research can also be carried out on the improvement of road infrastructure in Garissa County.
LIST OF REFERENCES


3. ACF (2012). Dadaab and Fafi Districts host community assessment Garissa County; Action Against hunger-USA.


APPENDICES

Appendix A: Household questionnaire

Name of interviewer………………………………………    Telephone number…………………………
Questionnaire number…………………………………….    Date of interview……………………………
Respondent’s telephone number…………………………

SECTION 1: RESPONDENT’S INFORMATION

<table>
<thead>
<tr>
<th>1.1 Name</th>
<th>1.2 Age(Yrs)</th>
<th>1.3 Gender</th>
<th>1.4 Relationship</th>
<th>1.5 Ethnicity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>1: Male</td>
<td>With HH head</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>2: Female</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1.6 Marital status: Married [   ] Single [   ] Divorced [   ] Widow [   ] Widower [   ]
1.7 Religion: Islam [   ] Christianity [   ] Other, specify [   ]

SECTION 2: DEMOGRAPHIC CHARACTERISTICS OF MEMBERS OF HOUSEHOLD

2.1 What is your household size?........................................................................................................

(None=0, Pre-primary=1, Primary level=2, Secondary level=3, Tertiary=4), (Form of education, Secular=1, Islamic=2)

<table>
<thead>
<tr>
<th>2.2 Members of HH</th>
<th>2.3 Gender</th>
<th>2.4 Age</th>
<th>2.5 Form of education</th>
<th>2.6 Highest level of education</th>
<th>2.7 Main occupation</th>
<th>2.8 Location of occupation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1: Household</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2: Wife</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3: Son</td>
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<tr>
<td>4: Daughter</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5: Daughter and</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2: Son in law</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6: Grandchildren</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7: Other relatives</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1=Household 2=Wife 3=Son 4=Daughter 5=Daughter and son in law 6=Grandchildren 7=Other relatives
SECTION 3: LAND TENURE AND HOUSING CHARACTERISTICS

3.1 Size of HH land……………. 3.2 Do you own the land? Yes [   ] No [   ]

3.3 If yes to 3.2 above, how did you acquire the land?

<table>
<thead>
<tr>
<th>Inheritance</th>
<th>Allocation by national government</th>
<th>Allocation by county government</th>
<th>Purchased</th>
<th>Others (specify)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3.4 What ownership documents do you have?

<table>
<thead>
<tr>
<th>Title deed</th>
<th>Temporary Occupation License</th>
<th>Letter of Allotment</th>
<th>None</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3.5 For how long have you lived here?...............................years

3.6 Housing characteristics

<table>
<thead>
<tr>
<th></th>
<th>Main house</th>
<th>Kitchen</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of rooms</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Foundation Materials</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Floor Materials</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wall Materials</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Roof Materials</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

SECTION 4: SOCIO- ECONOMIC CHARACTERISTICS

4.1 What is your average income per month on the following?

<table>
<thead>
<tr>
<th>Source</th>
<th>Salary</th>
<th>Livestock sale</th>
<th>Livestock products sale</th>
<th>Livestock related business e.g. grass</th>
<th>Other business</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amount Kshs</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1=Less than 5000, 2=5001-10000, 3=10001-15000, 4=15001-20000, 5=20001-25000, 6=25001-30000, 7=30001-35000, 8=35001-40000, 9=40001-45000, 10=45001-50000, 11=Over 50000
4.2 What is your estimated household expenditure on the items below per month?

<table>
<thead>
<tr>
<th>Item</th>
<th>Food</th>
<th>Clothing</th>
<th>Health</th>
<th>Education</th>
<th>Rent</th>
<th>Water</th>
<th>Energy</th>
<th>Transport</th>
<th>Other</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost Kshs</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

4.3 Do you save any cash for investment? Yes [    ] No [    ]

4.4 If yes, where? 1=Bank, 2=Chamas, 3=Mobile banking, 4=Others (specify)

4.5 Approximately how much do you save per month?.................................................................

4.6 Are there any social problems caused by the existing livestock market to you?  a) Yes b) No

4.7 If yes, list them i)……………………………………….. ii)………………………………………..

iii)……………………………………….. iv)………………………………………..

4.8 Are there any social problems caused by the existing livestock market to Garissa town? a) Yes b) No

4.7 If yes, list them i)……………………………………….. ii)………………………………………..

iii)……………………………………….. iv)………………………………………..

4.9 Do you own livestock? a) Yes b) No

If yes,

<table>
<thead>
<tr>
<th>4.10 Type of livestock</th>
<th>4.11 No. of livestock</th>
<th>4.12 Where are they kept</th>
<th>4.13 Where do you sell them?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

4.14 What are the economic impacts of the livestock market to you?(i)……...

(ii)……………………………………………………………………………………………………

(iii)……………………………………………………………………………………………………

(iv)……………………………………………………………………………………………………
4.15 What are the economic impacts of the livestock market to Garissa town?
(i) ..................................................
(ii) ....................................................................................................................
(iii) .....................................................................................................................

SECTION FIVE: INFRASTRUCTURE FACILITIES AND UTILITIES

5.1 WATER

5.11 Where do you get water for the following uses?

<table>
<thead>
<tr>
<th>Source</th>
<th>Domestic</th>
<th>Animal consumption</th>
<th>Others (specify)</th>
<th>Distance (km)</th>
</tr>
</thead>
<tbody>
<tr>
<td>River</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Well</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Piped</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Others (specify)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

5.12 How many litres of water do you use per day for domestic.? ........................................

5.13 How many litres of water do you use per day for livestock.? ........................................

5.14 What challenges do you face in water use?

<table>
<thead>
<tr>
<th>5.14 Challenges</th>
<th>5.15 Proposed solutions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

5.16 How much do you pay per month? .................................................................
5.2 TRANSPORT

5.21 What is the mode of transport to the following service points?

<table>
<thead>
<tr>
<th>Mode/Activities</th>
<th>Walking</th>
<th>Matatu</th>
<th>Motorcycle</th>
<th>Taxi</th>
<th>Distance</th>
<th>Reason</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Religious facilities</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primary School</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Secondary school</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Work</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Market</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shops</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hospitals</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Others</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

5.22 Have you observed traffic related incidences/accidents within the neighbourhood caused by livestock related activities from the market? 1=Yes 2=No

5.23 If yes, what kind?........................................................................................................................................
....................................................................................................................................................................

5.24 How can such accidents be avoided?...........................................................................................................
....................................................................................................................................................................

5.3 SANITATION

5.31 How do you dispose of solid waste from your house?
1=Bury, 2= Burn, 3= Compost pit, 4= Garbage collection, 5= Other (specify)

5.32 How do you dispose of liquid waste?
1= Pit latrine, 2= Septic tank, 3= Open drain, 4= Others (specify)

5.33 Does solid waste from the market affect you in any way? 1= Yes 2= No

5.34 If yes, what kind of effect? (i)...........................................................................................................................
(ii)...............................................................................................................................................................................
(iii).........................................................................................................................................................................

5.35 Does liquid waste from the market affect you in any way? (a) Yes (b) No
5.36 If yes, what kind of effect?
(i)................................................................................................................
(ii)...................................................................................................................
(iii)................................................................................................................

5.37 What are the authorities concerned doing about the effect of solid waste?
(i)................................................................................................................
(ii)...................................................................................................................
(iii)................................................................................................................

5.38 What solutions do you suggest to minimize the effect?
................................................................................................................
...................................................................................................................
...................................................................................................................

SECTION SIX: ENVIRONMENT

6.1 Are there new invasive species of insects that have emerged which were not found in this area in the past? 1 = Yes 2 = No

6.2 If yes, list them

<table>
<thead>
<tr>
<th>Insects</th>
<th>Year noticed</th>
<th>Impacts(specify)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

6.3 What kind of environmental challenges does this area face?

<table>
<thead>
<tr>
<th>Challenge</th>
<th>Most frequent</th>
<th>Least frequent</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Water pollution</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Air pollution</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Noise pollution</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Quarrying</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Harvesting sand</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Harvesting soil</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Others</td>
<td>(specify)</td>
<td></td>
</tr>
</tbody>
</table>
6.4 What have been the effects of the above environmental challenges?

<table>
<thead>
<tr>
<th>Effect</th>
<th>Most frequent</th>
<th>Least frequent</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Water borne disease</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Air borne disease</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Damage to the ears</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Conflicts between neighbourhoods/livestock traders</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Others</td>
<td>(specify)</td>
<td></td>
</tr>
</tbody>
</table>

6.5 What intervention measures as an individual have you put in place to mitigate the above environmental challenges?

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

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

6.6 Are there agencies/stakeholders that are involved in environmental conservation in this area?

a) Yes  b) No

<table>
<thead>
<tr>
<th>6.6 Agency</th>
<th>6.7 How it is involved</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

6.6 How is your relationship with the livestock market users? 1= Good  2= Poor

6.7 Do you assist the livestock market users?  1= Yes  2= No

6.8 If yes, how?...................................................................................................................................................................................

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

6.9 Is the market size adequate? (a) Yes  (b) No

6.10 If no, what size could be adequate? (a) Double  (b) Triple  (c) Others, specify
Appendix B: Interview schedule: county government

Interviewer name………………………………….. Telephone number…………………………..

Interviewee name…………………………………. Telephone number…………………………..

Date………………………………………………

Q1. Which are the main types of livestock that are traded at the market?..................................................

Q2. On average, how many heads of livestock are traded at the market per week?.................................

Q3. How much do you charge per head of the following a) Camel… b) Goat…… c) Sheep…… d) Cow…… e) Donkey…… f) Others (specify)………

<table>
<thead>
<tr>
<th>Type of livestock</th>
<th>Total number of livestock traded per week</th>
<th>Charges per head</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Q4. How many toilets are there at the livestock market?.................................................................

Q5. What are their conditions? a) Very good  b) Good  c) Poor  d) Very poor

Q6. Is water provided for at the market? a) Yes    b) No

Q7. If yes, how much do you charge for the water?.............................................................................

Q8. Who pays for the water?..................................................................................................................

Q9. How much water is used per day?....................................................................................................

Q10. Environmentally, what is the relationship between the livestock traders and the
  neighbourhoods of the market? a) Good    b) Poor

Q11. Socially, what is the relationship between the livestock traders and the neighbourhoods of
  the market? a) Good    b) Poor


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Q12. Economically, what is the relationship between the livestock traders and the neighbourhoods of the market? a) Good   b) Poor

Q13. Is the size of the livestock market adequate? a) Yes b) No

Q14. If no, what size could be adequate? (i) Double (ii) Triple (iii) Others, specify

Q15. Are you happy with the current location of the market? a) Yes b) No

Q16. If no, where would you want to locate the livestock market?..........................................................

Q17. Why..................................................................................................................................................

Q18. What are the positive/negative impacts of the market to its neighbourhoods and Garissa town as a whole?........................................................................................................................................

a) Positive impacts to the neighbourhood (i).................................................................................................
   (ii)..........................................................................................................................................................
   (iii)..........................................................................................................................................................
   (iv)..........................................................................................................................................................

b) Negative impacts to the neighbourhood (i)..............................................................................................
   (ii)..........................................................................................................................................................
   (iii)..........................................................................................................................................................
   (iv)..........................................................................................................................................................

c) Positive impacts to Garissa as a whole (i)..............................................................................................
   (ii)..........................................................................................................................................................
   (iii)..........................................................................................................................................................
   (iv)..........................................................................................................................................................

d) Negative impacts to Garissa as a whole (i)..............................................................................................
   (ii)..........................................................................................................................................................
   (iii)..........................................................................................................................................................
   (iv)..........................................................................................................................................................
Q19. What are the possible solutions to the negative impacts? (i)...........................................................
(ii)........................................................................................................................................
(iii)........................................................................................................................................
(iv)........................................................................................................................................
Q20. How do you handle solid waste from the market?........................................................................
Q21. How do you handle liquid waste from the market?....................................................................
Q22. What are the major challenges of the existing livestock market? (i)......................................
(ii)........................................................................................................................................
(iii)........................................................................................................................................
(iv)........................................................................................................................................
Q23. What do you think should be done to address the challenges?
(i)........................................................................................................................................
(ii)........................................................................................................................................
(iii)........................................................................................................................................
(iv)........................................................................................................................................
Q24. Why have they not been done earlier?
(i)........................................................................................................................................
(ii)........................................................................................................................................
(iii)........................................................................................................................................
(iv)........................................................................................................................................
Appendix C: Livestock traders

Q1. Name of the respondent……………………………….. Telephone number………………..

Q2. Gender of the respondent a) Male    b) Female

Q3. Where do you live?................................................................................ .....................................

Q4. Where do your customers come from?...................................................................................

Q5. What attracts your customers to this market?..............................................................................

Q6. Is the market size adequate? a) Yes    b) No

Q7. If no, what size could be adequate?..........................................................................................

Q8. Are you happy with the current location of the market? a) Yes    b) No

Q9. If no, where would you want to locate the market?......................................................................

Q10. Have there been any previous attempts to improve the market? a) Yes    b) No

Q11. Have you observed any traffic related incidences/accidents within the market? a) Yes    b) No

If yes, list them.................................................................................................................................

Q12. How can such accidents/incidents be minimized?........................................................................

Q13. What are the positive impacts of the market to its neighbourhood?...........................................

Q14. What are the negative impacts of the market to its neighbourhood?........................................

Q15. What are the positive impacts of the market to Garissa town?.................................................
Q16. What are the negative impacts of the market to Garissa town?..

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

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

Q17. As an individual, what have you done to mitigate the negative impacts?.................................

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

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

Q18. How do you manage the solid wastes from this market?.................................................................

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

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

Q19. What is the quantity of solid waste generated from this market?.....................................................

Q20. Where do you get livestock from?........................................................................................................

Q21. What are the peak times during the year?.........................................................................................

Q22. What are the off peak times during the year?.....................................................................................

Q23. Which licenses must you have for the operations, how much do you pay for them and where do you get them from?

<table>
<thead>
<tr>
<th>Type of license</th>
<th>Amount paid</th>
<th>Source of license</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Q24. Are livestock supplied to you on credit or cash terms?.................................................................

Q25. What facilities are provided at the market and what is their condition?

<table>
<thead>
<tr>
<th>Facilities</th>
<th>Conditions (1=Good  2=Poor)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Q26. What type of charges do you pay, whom do you pay and how much do you pay per animal.

<table>
<thead>
<tr>
<th>Type of charge</th>
<th>Whom to pay</th>
<th>Type of animal</th>
<th>Amount per animal</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
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<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Q27. Approximately how many animals do you sell per month at the market?

Q28. Approximately how much do you earn from sale of such animals?

<table>
<thead>
<tr>
<th>Type of livestock</th>
<th>Number of livestock</th>
<th>Amount in shillings</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Q29. What challenges do you face in undertaking this business?

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

Q30. How do you deal with the challenges?

..........................................................................................................................
..........................................................................................................................
Appendix D: Suppliers of livestock

Q1. Name of the respondent ........................................ Telephone number .........................

Q2. Gender of the respondent a) Male b) Female

Q3. Where do you live? ........................................................................................................

Q4. Which types of animals do you trade in?

<table>
<thead>
<tr>
<th>Type of animal</th>
<th>Frequency</th>
<th>Unit price</th>
<th>Total amount</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Q5. Are you satisfied with the size of the market? a) Yes b) No

Q6. What challenges have you witnessed about the market?
   i) .....................................................................................................................
   ii) .....................................................................................................................
   iii) .....................................................................................................................
   iv) .....................................................................................................................

Q7. Have there been any previous attempts to improve the market? a) Yes b) No

Q8. Have you observed any traffic related incidences/accidents within the market? a) Yes b) No
   If yes, list them (i) ..............................................................................................
   (ii) .....................................................................................................................
   (iii) .....................................................................................................................

Q9. How can such accidents/incidents be minimized? (i) ................................................
   (ii) .....................................................................................................................
   (iii) .....................................................................................................................
Q10. Which of the following social problems are experienced by the neighbourhoods of the existing livestock market? What are their effects and possible solutions?

<table>
<thead>
<tr>
<th>Social problem</th>
<th>Effect</th>
<th>Possible solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Stealing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Insecurity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Prostitution</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Others, specify</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Q11. Which of the following social problems are experienced by the residents of Garissa town due to the existing Garissa livestock market? What are their effects and possible solutions?

<table>
<thead>
<tr>
<th>Social problem</th>
<th>Effect</th>
<th>Possible solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Stealing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Insecurity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Prostitution</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Others, specify</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Q12. What are the positive/negative impacts of the market to its neighbourhoods?

Positive impacts

Economically

1.  
2.  
3.  

Socially

1.  
2.  
3.  

Environmentally

1.  
2.  

Negative impacts

Economically

1.  
2.  

Socially

1.  
2.  
3.  

Environmentally

1.  
2.
Q13. What are the positive/negative impacts of the market to Garissa town?

<table>
<thead>
<tr>
<th>Positive impacts</th>
<th>Negative impacts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Economically</td>
<td>Economically</td>
</tr>
<tr>
<td>1.</td>
<td>1.</td>
</tr>
<tr>
<td>2.</td>
<td>2.</td>
</tr>
<tr>
<td>3.</td>
<td>3.</td>
</tr>
<tr>
<td>Socially</td>
<td>Socially</td>
</tr>
<tr>
<td>1.</td>
<td>1.</td>
</tr>
<tr>
<td>2.</td>
<td>2.</td>
</tr>
<tr>
<td>3.</td>
<td>3.</td>
</tr>
<tr>
<td>Environmentally</td>
<td>Environmentally</td>
</tr>
<tr>
<td>1.</td>
<td>1.</td>
</tr>
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<td>2.</td>
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</tbody>
</table>

Q14. As an individual what have you done to mitigate the negative impacts?

(I) ...........................................................................................................................................

(ii) ...........................................................................................................................................

(iii) ...........................................................................................................................................

Q15. Where do you get livestock from? .....................................................................................

Q16. What means do you use to get to the market? a) By trekking    b) By trucking

Q17. How long do you take to get to the market? a) Number of days   b) Number of hours

Q18. What are the peak times of the livestock trade during the year? ..................................

Q19. What are the off peak times during the year? .................................................................
Q20. Which licenses must you have for the operations, how much do you pay for them and where do you get them from?

<table>
<thead>
<tr>
<th>Type of license</th>
<th>Amount paid</th>
<th>Source of license</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
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</tbody>
</table>

Q21. Are the animals supplied to you on credit or cash terms? ..............................................

Q22. Approximately how many animals do you sell per month at the market? .........................

Q22. Approximately how much do you earn from sale of such animals? .................................

<table>
<thead>
<tr>
<th>Type of animal</th>
<th>Number of animals</th>
<th>Unit price</th>
<th>Total amount</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grand total</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Q23. What challenges do you face in undertaking this business? (i) .................................

(ii) .................................................................

(iii) ................................................................

Q24. How do you deal with the challenges? (i) .............................................................

(ii) ................................................................

(iii) ................................................................
Appendix E: Livestock buyers

Q1. Name of the respondent…………………………………… Telephone number………………

Q2. Gender of the respondent a) Male     b) Female

Q3. Where do you live?........................................................................................................

Q4. What attracts you as a customer to this market?................................................................

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

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

Q5. Do you pay charges for using this market? a) Yes      b) No

Q6. If yes, to whom?………………………………….  How much………………………………

Q7. Is the market size adequate? a) Yes    b) No

Q8. If no, what size would you recommend? (i) Double  (ii) Tripp[e (iii) Other, specify

Q9. Are you happy with the current location of this market? a) Yes    b) No

Q10. If no, which location would you be happy with?.................................................................

Why?........................................................................................................................................

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

Q11. Have you observed any traffic related incidences/accidents within the market? a) Yes   b) No

Q12. If yes, what type of incidences/accidents were they?.........................................................

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

Q13. How can such incidents/accidents be minimized?...............................................................
Q14. Which of the following social problems are experienced by the neighbourhoods of the existing livestock market? What are their effects and possible solutions?

<table>
<thead>
<tr>
<th>Social problem</th>
<th>Effect</th>
<th>Possible solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Stealing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Insecurity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Prostitution</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Others, specify</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Q15. Which of the following social problems are experienced by the residents of Garissa town due to the presence of the existing Garissa livestock market? What are their effects and possible solutions?

<table>
<thead>
<tr>
<th>Social problem</th>
<th>Effect</th>
<th>Possible solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Stealing</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>4. Others, specify</td>
<td></td>
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</tr>
</tbody>
</table>

Q17. What are the positive/negative impacts of the market to its neighbourhoods and Garissa town as a whole?

a) Positive impacts to the neighbourhood (i)...........................................................................
   (ii)...........................................................................................................................
   (iii)...........................................................................................................................
   (iv)...........................................................................................................................

b) Negative impacts to the neighbourhood (i)...........................................................................
   (ii)...........................................................................................................................
   (iii)...........................................................................................................................
   (iv)...........................................................................................................................

c) Positive impacts to Garissa as a whole (i)...........................................................................
   (ii)...........................................................................................................................
   (iii)...........................................................................................................................

d) Negative impacts to Garissa as a whole (i)...........................................................................
   (ii)...........................................................................................................................