

# Investigating the economic potential of pastoralism

The case of Maasai pastoral beef chain in  
Kajiado District Kenya



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# **Investigating the economic potential of pastoralism**

**The case of Maasai pastoral beef chain in Kajiado District Kenya**

**Research Project submitted to Van Hall Larenstein University of Applied Sciences in partial fulfillment of the requirements for the awards of master degree in Agricultural Production Chain management, specializing in livestock production chains.**

**By**

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### ACRONYMS

FAO	Food and Agricultural Organisation
IFAD	International fund for Agricultural Development
GDP	Gross Domestic Product
IIRR	International Institute of Rural Reconstruction
KEBS	Kenya Bureau of Standards
KIT	Tropical Royal Institute
KMC	Kenyan Meat Commission
KSH	Kenya Shilling
MOLD	Ministry of Livestock Development
PESTEC	Political, Economic, Social, Technological, Environmental and Cultural
1EURO =	130.60 KSH

## **SUMMARY**

This research investigated the economic viability of pastoral cattle producers in the Rift Valley Province Kajiado District of Kenya, with the aim to make recommendation for possible improvement strategies and contribute to the debate about pastoralism at KIT. The main research problem was low productivity of Maasai pastoral cattle in which, over 75% of the herd size usually has low body weight at point of sales. Low body weight of cattle in the region is attributed to poor management, insufficient feeding and deficient water supply, consequently pastoralists are offered low price per animal.

Therefore, survey questionnaires were administered to 45 pastoral producers as the primary method to gather data. A case study was also implemented with three pastoralists to gather more in-depth information as well as in-depth interview with 15 other stakeholders amongst which were, traders, butchers, transporters, restaurants and services providers.

From the findings, it can be argued that cattle production in Kajiado is one of the main economic activities in the region, and pastoral producers have not only been able to transformed ways in which production is conducted, through migration in search for water and forage but also to mitigate production risks irrespective of age. It was also observed that, pastoral producers have become resilient to climate change based on their flexible and opportunistic life style. Some have succeeded in diversifying along the beef chain by taking on trading and butchering function, that in the past many have had to abandon cattle production. Diversifications was observed to be possible as a result of embedded trust pastoralists have in their social networks and relationships, which had help them to reinforced the adoption of risk-minimizing strategies such as sharing/swapping of production resources, donations of cattle to poorer members of the family and search for more profit activities around livestock production. It can be conclude that, pastoralists are able to deal with some major production challenges with their own efforts.

Even though pastoralist might be able to deal with effects of climate change locally as observed, pastoral systems of production will never be the same again. This is based on current Kenyan policy on land tenure, sales of land by some pastoralists and the increasing population that is resulting in urbanization. Therefore, pastoral producers might soon completely shift from a life style and production system characterised by extensive seasonal movement and intensive short-duration grazing of successive areas, entangled with crops cultivation in some cases, to a system that is based on intensive, long-term grazing of private parcels where households have ostensibly fewer options for mobility.

Though the pastoral production system appeared to be changing, it was seen that cattle production is an economically viable venture. Irrespective of the fragmented nature of the beef chain, insufficient information flow and low on average price offer to pastoral producers, extra income can still be generated from sale of at least 4 cattle per year, when interest on land and opportunity cost for family labour income is not calculated. It can further be concluded that pastoral producers can indeed generate more income with the least improvement in management and development of the beef chain.

For such improvement to be achieved to overcome current and future challenges, as well as reduce ongoing debate about pastoralism at KIT, three main suggestions proposed included, upgrading of the production function of the beef chain by promoting improved breed production and forage management, facilitate the formation of pastoral farm family and

friends marketing cooperative and finally facilitate the establishment of local marketing quality standards to ensure that marketing of cattle is more transparent.

## CHAPTER 1: INTRODUCTION

Pastoralism, the way of live livestock producing people like the Maasai in Kenya have enjoyed for centuries, is fast becoming unattractive to practitioners as they seek new ways to improve their economic benefits (Blend, 2001). The Maasai pastoralists have not only been affected by factors such as changing climate (FAO, 2010), Kenyan policy on land tenure and an increasing population that is resulting in urbanization, (Mizutani et al. 2005) but also by land sales, which results in inequality within the livestock economy, disease outbreaks and high production cost (FAO, 2001 and Valk, 2008).

Even though the main problem with pastoral livestock is low productivity (over 75% of the herd sizes usually have low body weight), the Maasai pastoralists have great knowledge of different climate zones and local management and they remain the largest producers of livestock in Kenya (Valk, 2008).

The demand for meat is generally increasing and the Food and Agricultural Organisation (FAO, 2001) predicted a twofold increase in global demand over the next twenty years. This is as a result of increasing income level, changing food patterns from traditional starchy staple food to more protein sources and population growth (Valk, 2008). The role of the pastoralists in meeting the predicted increase in demand for meat is crucial, and they seem to be aware of this as they diversified both horizontally into other species of animal or crops and vertically, by adopting functions along the meat chain (Luig, 2010). Investment in further pastoral development by support institutions, which reached a high point in the 1970s, in most developing countries, crumbles gradually every year and today pastoralists have become more dependent and are unable to seek financial assistance or resources by themselves for their development (Blend 2001). Therefore, the beef chain in particular, which has experienced many changes in the last decade, is attributed to individual pastoralists' effort to diversify.

However, the debate about the economic viability of pastoral cattle production system is still ongoing given global arguments presented by researchers on the level of green-house-gas emission produced from the system, which has been proven to be higher in the extensive than in the intensive system and low cattle performance (Padgham, 2009., Burton and Sauv , 2006, and Reid et al 2004). This global arguments stem from large number of poorly managed local breeds of cattle owned by pastoralists, extensive land requirement and varied pastoral grazing systems (IFAD, 2009). In this light, the pastoral system may also not be environmentally and economically sustainable in the long term (Hatfield and Davies. 2006).

Even though the pastoral cattle production is characterised by varied limitations, Blend (2001) cited that its contribution to the national economy of countries like Kenya, at family, village, regional and national levels, is unavoidable'. Pastoralists at the village level depend on cattle for milk take-off and extra income for their family, and others who are actors in the beef chain can hardly survive given that there are limited economic opportunities in cattle production regions, notwithstanding the increasing demand for beef in cities (IFAD 2009). Therefore Blend (2001) pointed that this important role of pastoralists is hardly recognised by governments.

The time seems appropriate then, for a view on pastoral cattle production from an inclusive value chain wide perspective. Despite numerous studies on pastoralism in Kenya, data on the beef chain is surprisingly limited, especially from the value chain perspective, which is needed to recognise that pastoralist producers may above all be driven by the benefit they realised from sales of their cattle.

In order to contribute to further understanding of the economic viability of pastoral beef production to provide recommendation to pastoralists and contribute to the on-going debate about pastoralism at the Tropical Royal Institute (KIT), this was study. This research intends to provide an outline of the current situation, out of which implications for the future can be drawn.

The core methodologies used, are desk research, which provides secondary data about the concept, systems and trends in pastoralism; and interviews that provide further information about the existing beef chains and its economic potential. Additionally three main activities are involved in the research. Firstly, is mapping out the value chain and identifying the main actors and the flows of products, money and information. It will often be important to understand where along the chain most value is created and how profit is made by different actors. Secondly, this work maps the key supporters and influencers in relation to inclusion or exclusion of pastoralist beef producers. And finally, this study depicts the key trends, issues and drivers affecting chain actors, especially pastoralists in the region. Trends are the directions and changes that have been taking place in the chain, such as system of pastoralism, livestock population, prices or marketing channels. The issues are the negative or positive implications of the trends, while drivers are considered the main external factors influencing changes in actor's roles in the chain.

**Paper structure;** in the introductory part of this paper, the research problem, objective and questions are presented. In the second chapter, the pastoral livestock and value chain concepts is presented. Under this chapter, livestock trends, pastoral production systems and diversification in Kenya are examined. Chapter three presents methodologies which include the research area, design, approach, methods and data processing. In Chapter four, the result and analysis of the findings are presented while chapter five is about the chain map that resulted from the field study. Chapter six presents some discussions points and under chapter seven, conclusions and recommendations are presented.

### **1.1. Research problem**

The main problem with pastoral production system is low productivity of animals in which, over 75% of the herd size usually has low body weight at point of sales (Valk, 2008). Low body weight of cattle in the region is attributed to poor management, insufficient feeding and deficient water supply. Consequently, farmers are offered low price per cattle, which reduces the economic viability of beef cattle production by Maasai farmers.

### **1.2. Objective of the research**

The objectives of this research are:

- to investigate the economic viability of cattle production amongst Maasai in the Kajiado region, in order to recommend possible improvement strategies, and
- to contribute to the debate about pastoral productivity.

Having some insight in pastoral cattle production system and the changes that have taken place in the beef chain, one can predict whether further changes in the subsector would have a positive impact on the income levels of pastoralists.

### **1.3. Research Question**

*What can be done to improve on the economic viability of pastoral cattle production in Kajiado District?*

- a) *What is the current cattle production system in Kajiado District?*
- b) *How is pastoral production system organised in relation to the beef value chain?*
- c) *What forces are promoting or hindering pastoralists in their participation in the beef chain and how are they dealing with challenges?*
- d) *How can pastoral beef production be improved for the benefit for producers?*

#### 1.4. Definition of terms

**Pastoralism:** there are several definitions for pastoralism. Given that this research tries to follow-up previous studies, the one that is adopted in this research is that of Zaal (1999).

*“Pastoral societies consist of interacting groups, households and individuals who define themselves as such, base most of their livelihoods on livestock production on natural pastures, using grazing, water, livestock, labour and immaterial resources which they own or have access to and who are characterised by a partial and variable engagement or incorporation in imperfect markets beyond their direct control. When only part of their livelihood is based on pastoralism and most on other activities, these societies may be called agro-pastoral (in the case of cultivation), urban-pastoral (in the case of urban-based activities), or other similar combination of terms.”*

The proposed definition covers all forms of pastoral livelihood from the traditional form (in which pastoralists struggle for survival and turn to migrate often in search for pasture and water), to the modern form in which commercial and more market oriented livestock rears the dominant production (FAO 2001). The definition provides a complete picture of pastoral farm families given that most others differed in terms of who should be included in the definition of pastoralism. In order to provide a general depiction of the economic viability of the pastoral system, any analysis must consider both the traditional and the commercial market oriented forms of pastoralism.

**Economic viability;** this can be defined as the financial and social benefits that are derived from livestock and by-product for producers (FAO, 2001). In pastoralism, not all values generated by livestock can be transformed directly to economic benefits and attaching a price tag to some of livestock services such as ‘blood off take for food’ and the joy of ownership (blend 2001) is hardly possible. Therefore the term goes beyond the fulfilment of basic physical or monetary needs to include an expansion of people’s freedom to do the best for themselves and for their societies, with their knowledge and resources that allow them to live long and healthy lives (Hatfield and Davies. 2006).

**CHAPTER 2: PASTORAL LIVESTOCK AND VALUE CHAIN CONCEPT**

**2.1. Pastoralists and livestock production in Kenya**

In Kenya over 75% of the country’s surface area is occupied by pastoralists, hosting about 10 million people, 70% of the national livestock population and 90% of the wildlife population (MOLD, 2010). This area is known as the arid and semi-arid lands (ASAL) and has less economic alternatives and thus low opportunity costs for pastoralists who live in this area, according to MOLD (2010). The pastoral communities are very diverse in terms of culture, religion and the form of pastoral production system practiced (Kiuluku, 2008). Some communities, especially in the northern part of Kenya, are more specialised in their farming system, keeping only one species (cattle or camels). Others, mostly in the southern part, are involved in more than one species (cattle, goats and sheep) in combination with crops (Hatfield and Davies. 2006). Initially purely pastorals, in recent years the Maasai have become known for vertical and horizontal diversification of their production systems, sometimes in combination with tourist enterprises developed around the culture and wildlife parks (FAO, 2001). The livestock sub-sector in Kenya contributes about 10% to the Gross Domestic Product (GDP) (MOLD, 2010). The table below shows the population of livestock in Kenya.

Table 1: Livestock population (\*1000)

Year	Cattle		Goats	Sheep	Chicken	Camels	Pigs	Rabbits
	Zebu	Improved breed*						
2009	14.100	3.100	27.700	17.100	25.000	2.900	415	470

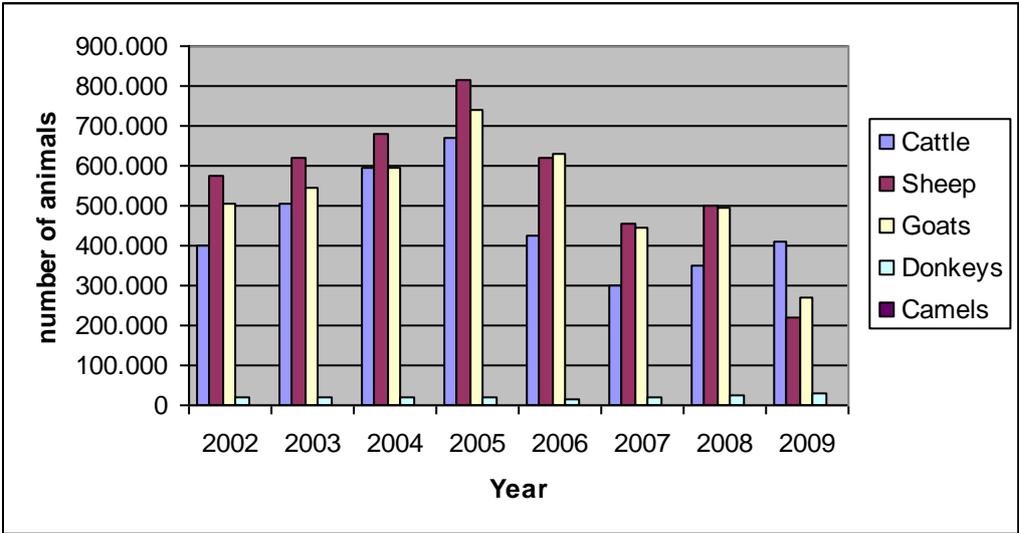
Source: Adapted from KenyaOpenData, 2009

The Kajiado district located in the Rift Valley province is one of the most important cattle production areas in the country, based on the population of livestock produced in this region. In the Rift Valley province about 1.5 million zebu and 5.9 million improved breeds are currently produced (KenyaOpenData, 2009).

**2.2. Trends in pastoral livestock production in Kajiado districts**

Kajaido, being one of the largest districts in the Rift Valley province is noted for pastoralism in the country. In this district, the pastoral livestock trends show an indication of the direction the beef chain may follow in the next decade. The district pastoral livestock population trends and profile is presented on the table below.

Figure 1: Livestock production trend

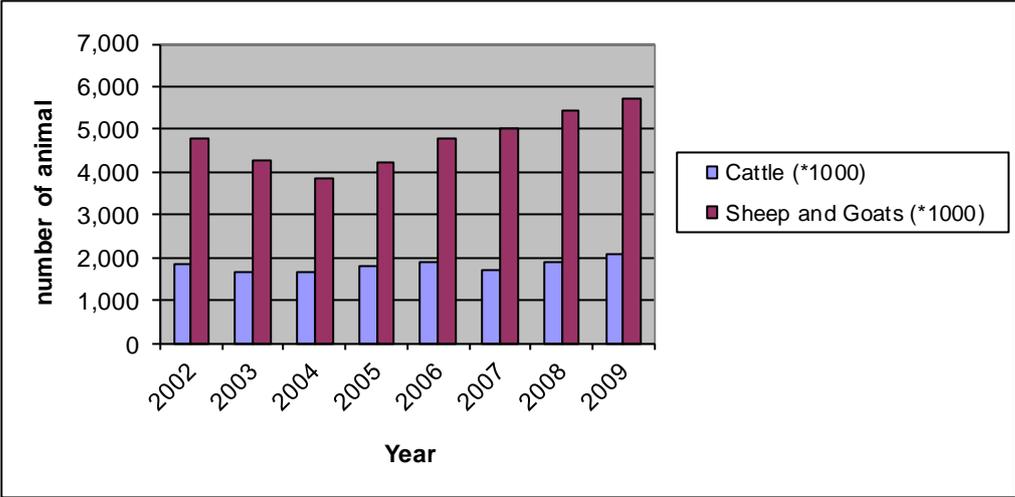


Source: Adapted from KenyaOpenData, 2009 latest census.

The trends presented on figure 1 may not reflect the real situation given that censuses are done once a decade (KenyaOpenData, 2009). According to MOLD (2010) the trends in livestock production are constantly fluctuating due to a number of development challenges, which include disease outbreaks and recurrent droughts, which are responsible for the highest mortality in cattle on yearly basis, high costs and low quality inputs, insufficient feed and water availability and low adoption of appropriate technologies. In the fourth quarter of 2006, there was an outbreak of Rift Valley Fever that led to a high mortality that was estimated to be over 100,000 cattle, while in 2009 there was again severe drought that swept away much more of the livestock (Huho, Ngaira and Ogindo 2011).

Even though cattle production is constrained by the above factors, the supply and consumption is not only on the Kenyan market, but also on the international markets. Through bilateral agreements, Kenya exported 22,059 cattle and 9,211 goats to Mauritius between 2004 and 2008, 600 goats and 400 sheep to Dubai in 2005, and 5,000 camels to Egypt in 2003 (MOLD, 2010). According to MOLD (2010), export market is not stable as a result external factors, such as unfavourable terms of trade, high cost of inputs and limited value addition. The fluctuating livestock production and consumption trends are also strongly attributed to the external factors. The general beef consumption in the country is presented in table 3.

Figure 2: Pastoral livestock purchases for slaughter by licensed Kenyan abattoirs 2002 – 2009



Source: Adapted from Kenya National Bureau of statistic: 2010

The statistical data provided above strongly indicates that the beef value chain in Kenya and especially the Kajiado district has great economic potential for actors.

Luig (2010) points out that current cattle production systems in the country and the attitude of pastoralists calls for concern about the future of the beef chain and its economic impact on pastoralists. In the next part of this chapter, current pastoral production systems are examined.

**2.3. Pastoral cattle production systems**

The definition of pastoralism suggested by Zaal (1999) covers not only the degree of movement of pastoralists, but also the classification of systems practiced. However, Blend (2001) argued that classification of pastoralism must be treated as a simplification, given that pastoralists are by their nature flexible and opportunistic, and can rapidly switch management systems as well as operating two or more systems in one overall production as

a coping strategy to improve economic performances. The most common system in Kajiado district includes transhumance, agropastoralism and ranching. While transhumance is considered the oldest form of pastoralism still commonly practiced in Kenya and Kajiado district especially, agropastoralism is older and can be considered as a strategic move of pastoralist to cope with the ever decreasing farm family income levels and changing weather conditions (FAO 2001). The ranch system or concept, which is considered the most recent, was introduced by the Kenyan government in various districts in the country in the mid-1960s and early 1970s and aimed at overcoming some of the problems related to pastoralism, especially sharing land resources and improving livestock production (Zaal, 1999). The introduction of this system gave individual members benefits depending on herd size. In view of unequal herd sizes and disproportionate access to communally owned resources and benefits, most of the group ranches resolved to subdivide and this subdivision yet to go to completion (MOLD 2010). The first system to be considered is the transhumance.

### **2.3.1. Transhumance**

Agnew et al. (2001) pointed out that transhumance is the regular movement of pastoralists with their herds from one fixed climate zone to another, to allow animal benefit from fresh pasture and water, while avoiding some of natural forces that may be hindering animals production. In the Rift Valley area of Kenya, especially Kajiado, such movement follows regular ancient routes. Due to favourable precipitation in the different climate zones and the development of modern transportation methods, some pastoralists in the region afforded to develop permanent relations with particular sites, by building houses, so that members of their families can travel from one site to the other (Agnew et al. 2001). Blend (2001) observed that transhumant pastoralists often have a permanent homestead and base at which women and older members of the family remain throughout the year. Farm family members who remain behind are usually left with lactating cows to supply them with milk for consumption, even though surpluses are sometimes sold. Transhumance in Kajiado district is therefore characterised by herd splitting, in which not only the lactating cows are left behind. Pastoral producers with large herds' sizes usually split them into small groups for proper management during movements and stay in different climates zones (Agnew et al. 2001).

Due to land reforms and tenure, as well as conflicts of interest between pastoralists, this form of pastoralism is disappearing. While some Maasai are diversifying into small ruminants, others are focusing on the production of less resistant improved breeds. It is also noted that a majority of pastoralists are today involved in crop cultivation (FAO 2010).

Agnew et al. (2001) argued that, transhumance is enhanced by sales of land portions by a few to acquire more cattle in order to maintain the system and way of life they enjoy, and land sales are strongly attributed to extensive drought periods that cause loss of livestock and poor management techniques associated with transhumance. In consequence pastoralists with limited or no land are forced to cease from cattle production (Blend 2001). Maasai pastoralists who have managed to stay in this system are faced with marketing problems, they often have to trek for several days to the market, and animals will change hands many times due to considerable insecurity (dead due to long trekking and loss of animals left behind), leading to low on averaged market prices (Valk, 2008).

### **2.3.2. Agropastoralism**

Agropastoralism is another system that can be considered as an economic move from traditional form of pastoralism in which horizontal diversification into crop production has been adopted by pastoralists. According to FAO (2003), this system of pastoralism is common in Kajiado district where pastoralists have integrated crops and animals production given that they have sufficient area of land for cropping. Blend (2001) added that, agropastoralists hold land rights, use hired or own labour to cultivate land and grow not only staple food but also vegetables for marketing. The agricultural activities amongst pastoralists in Kajiado area had been increased since 1994 to 2000 when the first pastoralists started

greenhouse farms for vegetables in the area (Campbell et al. 2003). The increasing agropastoral activities have been attributed to individuals' decisions to allocate certain portions of land, which are scattered in bushes, for cropping. Activities in this system do not easily reveal implications for cattle production, except that the pattern of cultivation and expansions with fragmented habitats have shown some disruption of cattle movements and reduced access to water (Campbell et al. 2003). On the other hand Rössler (2010) argued that pastoralists benefit more from crops residues and application of animals dropping as fertilizers, even though the competition between livestock and cultivation for access to reliable water has increased and led to conflict in some minor cases. Marketing of cattle by pastoral producers in this system could only be better than the former system due to the form of settlement practices and relationships of pastoralists with traders, and this system also provided pastoralists the opportunity to reduced food cost or financial need, therefore they take time to market their cattle (Blend, 2001).

### **2.3.3. The ranching system**

Since the introduction of this system in the mid-1960s and early 1970s in Kajiado district, thanks to the Government of the country, some major changes have taken place. Researchers have pointed out that due to disagreements amongst ranch members, as a result of ineffective management abilities of group ranch committees, which led to members unwilling to properly manage and maintain water pumps engines and pastures, as well as failure to observed stock quotas, including non-repayment of loans invested in creating group ranches, members for each group requested for subdivision (Zaal 1999, FAO 2001, and Nyssen et al. 2009). The division and land reforms measure gave pastoralists the opportunity to truly own land and thus to become more sedentary and commercially oriented (FAO 2001).

The introduction of this system was also the beginning of land reforms and tenure in which factors such as herd size, network and capital were the determinants for land allocation per individual (FAO, 2001). In today's ranching system, a few pastoralists in Kajiado district are limited within their fenced and confined ranch boundaries for grazing their animals and their herd's sizes are determined by the area of land owned. However, with the drought of 2009, some pastoralists in this system were forced to move their herds beyond the limits of their ranch areas, because prepared hay was not enough for their herds (FAO, 2010). The trend towards this system implies dramatic changes in pastoral land use, which is from a system predicated by extensive seasonal movement and intensive short-duration grazing of successive areas of the pastoral Maasai landscape, towards one based on intensive, long-term grazing of private parcels where households have ostensibly fewer options for mobility (BurnSilver and Mwangi 2007). Hay preparation was therefore introduced in 2008 and a few pastoral farm family are today trying to preserved forage (FAO, 2010). Nevertheless, pastoralists in Kajiado district are yet to control or organise grazing patterns effectively in order to observe ranch boundaries (Nyssen et al. 2009). The ranches seem to have increased livestock management and numbers in Kajiado District, yet demand for beef remains unattainable in the country and beyond (Valk, 2008).

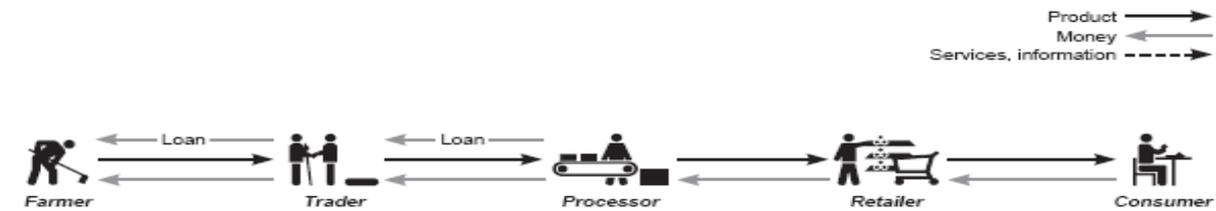
After looking at the pastoral production systems in Kajiado district, it is important to examine the value chain concept and how it is significant to the economic viability of pastoral cattle production in Kajiado.

### **2.4. The value chain concept**

The value chain concepts combined value chain analysis and development for understanding of competitive challenges, and to identify vertical coordination mechanisms with the aim to improve access to markets and increase productive efficiency, while ensuring that all actors including the resource-poor benefit (KIT and IIRR 2008).

The concept points to a specific view on economic production and distribution networks that is demand driven as opposed to supplied driven productions (Roduner, 2007). This concept points out that products are produced through a sequence of activities carried out by different actors, who add value at every stage or function. Some important functions include producing, transporting, trading, processing, wholesaling, retailing and finally consuming (KIT and IIRR 2008).

Figure 3: Structure of a chain map



Source: KIT and IIRR 2008

These functions tied well with the pastoral beef chain in Kajiado, in which some pastoralists have diversified vertical and are involved in trading and processing where value is added (Luig 2010).

Apart from the key functions of actors in the concept, there are also support functions, such as input supply, financial services, transport service, packaging and promotion (Roduner, 2007). Such support functions may be direct or indirect to actors at all stages in the chain and are aimed at enhancing value and profit share amongst actors for the proper functioning of the chain (KIT and IIRR 2008). In the Kajiado beef market, support functions are provided by limited number of external supporters, thus the management of the entire chain seems non-existent as actors are striving for survival, sometimes at the detriment of pastoralists' producers (Luig 2010). The level of development of the most regions' beef chain is still low, characterized by insufficient data availability, limited and poor information flow amongst actors especially producers given that there are hardly chain coordinators with a vision for the development of the chain (KIT and IIRR 2008).

Luig (2010) points out that the beef value chain in Kajiado has the capacity to meet market requirements with regard to volume, quality, price, dependability and speed of delivery, but is far from this reality given the diversified role pastoralists have adopted to increase their profit share in the chain.

## 2.5. Pastoralists and economic diversification along the beef chain

Apart from the ability of pastoralists to diversify from one system to another, they are also most likely to add more functions to their primary producing function. As noted by Blend (2001), due to the flexible and opportunistic approach and work of pastoralist, it is not important separating the different systems. It is more interesting to examine how diversified pastoralists have been in the last decades in order to increase farm family income. Some forms of horizontal (agropastoralism and productions of other species of animals) and vertical diversifications were observed by Zaal (1999) in Kajiado district. Other researchers have stressed vertical diversification in recent years, in which pastoralists take on additional activities along the chain, like trading and transporting, with the same goal of increasing profits margins per cattle (Ellen and Piters, 2010) and (Luig 2010).

### 2.5.1. Trading function of pastoralist

The Maasai pastoralists involved in trading function in the beef chain usually are not by choice, but because they have realised that cattle production may be more economically viable when they are carrying out trading themselves (Mahmoud, 2008). Trading of beef cattle is currently conducted on ad hoc basis by pastoralists, middlemen or brokers, and they operate at various levels in the chain (Mahmoud, 2008). The major factors that appear to have significant roles in cattle trading networks include socio-economic (wealth) status,

ethnicity and age of traders (Valk, 2008). Traders with stronger socio-economic power are more likely to enter into personalized trading relationships than poorer traders, especially when language is not a problem, while older traders are more trusted by farmers (Mahmoud, 2008). Based on these factors, some traders are limited to the local market in the district while other trade cattle in other parts of the country. The Maasai pastoral traders who are limited to the district sometimes further trade cattle to wealthier traders (mostly non-Maasai traders who come from other districts). Such ad hoc collaboration is based on mutual understanding, and wealthier or large traders usually have detailed knowledge of certain markets such as that in Nairobi (Valk 2008).

It is argued that the value share of large traders is usually larger than that of smaller traders but comparing value share alone is not enough, given that small and larger traders are dealing with different market dynamics such as volumes, road infrastructures and varied beef chains (KIT and IIRR, 2008). Thus larger traders find themselves in a certain power position within the chain, which raises doubt about equality in value shared by actors in the chain (Luig, 2010). Therefore, trading is merely one of the different activities employed by pastoralists to manage risks as well as to improve welfare, and the need to trade has resulted in some pastoralists handing over the production function to other family members; as they have specialised in the trading function. (Murithi et al. 2007).

### **2.5.2. Transporting function of pastoralist**

Participants in the district beef chain who are involved in transporting include trekkers who are hired by producers to move animals to the market, and lorry or truck drivers, who are also hired by traders to transport animals (Legese et al., 2008; Umar and Baulch, 2007).

Zaal (1999) pointed out that mostly the young pastoralists are the ones responsible for the transport of cattle or carcasses to the markets, slaughter houses and butcheries. This function is closely linked to the trading function. The majority of cattle traded are transported on-the-hoof by trekkers to slaughter houses, while a few traders hire trucks for transportation (Sara, 2010). On-the-hoof transport is sometimes combined with movement of sheep and goats over great distances, while trucking transport is mainly for cattle and to some extent small stocks and; trucks is licensed even though some are yet to obtain licenses for their trucks (Luig, 2010). In recent years, motorbikes have been employed in Kajiado especially to transport beef carcasses from the slaughterhouses to butchers. Just like trucks or lorries, such bike must be licensed (Sara, 2010).

Other participants in the district beef chain are butcher, retail and in some case supply as wholesalers to institutional buyers and restaurants, feedlot operators, who fatten animals for sale in domestic or export markets, loaders, who operate at major market places and are in charge of loading animals onto trucks, and workers in market sales yards, who brand or mark animals after sale to prove new ownership (Legese et al., 2008; Umar and Baulch, 2007)

## CHAPTER THREE: METHODOLOGY

### 3.1 Study Area

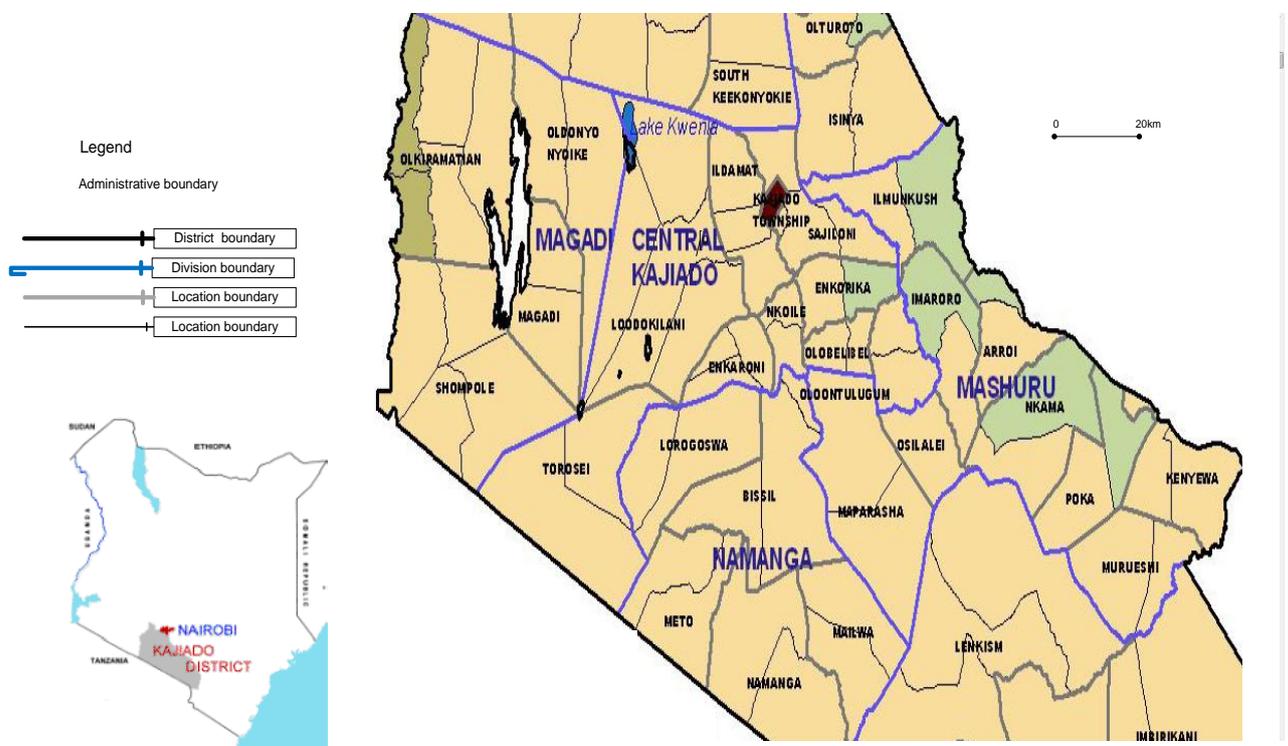
For the purpose of investigating the economic potential of pastoral beef production, the Kajiado District in southern Kenya is very suitable. The people living in the area are predominantly Maasai pastoralists. The district is located in the Rift-Valley Province between Nairobi and the border to Tanzania to the southwest. Narok district is found to the northwest and along the Northern border are Nakuru, Kiambu and Nairobi, and Machokos districts. The southeastern border of the Kajiado district is Taita Taveta (Luig, 2010). The district covers 15,546.9 square km and consists of seven administrative divisions, namely Central, Isinya, Loitokitok, Magadi, Mashuru, Namanga and Ngong. The entire district has about 446,585 people as of 2009 (population density of 28.73 persons per km<sup>2</sup>) (Luig, 2010)

The annual rainfall varies between 500 and 750 mm and rain comes over two periods (bi-model distribution) and the crop growing period is 3-6 months (FAO, 2010).

This area has the largest population of pastoralists and cattle in Kenya. With the increasing population pastoralists and immigrants and the effects of climate change, the available grazing land is fast decreasing and pastoralists need to find ways to deal with this pressure in an economically viable manner.

The choice for the Kajiado central and Namanga division was partly based on pastoral population and previous findings on pastoral livelihood by Zaal (1999) for accessibility of respondents who might have participated in earlier studies. Also the closeness of the region to the main slaughtering facility in Bissil and livestock market for accessibility of other stakeholders was another reason for selecting the region.

Figure 4: Map of research area



Source: Adapted from Osunga (2009)

The areas that were researched in this study were the Central Kajiado division, including the villages Ildamat, Kajiado, Nkoile, Loodokilani and Enkaroni. Additional villages located in Namanga division include Lorogoswa, Bissil and Meto were also included. These villages were randomly selected through a lot in which the first eight villages picked out of the lot became the areas for study.

**Analysis unit:** In this research the main unit used in the analysis is the pastoralist. To make the concept more applicable, the following definition for pastoralist is proposed, based on that suggested by Zaal (1999): *'A pastoralist is considered as an individual who undertakes one or more functions in the beef chain as an actor or supporter in relation to other actors in order to meet their individual needs (socio-economic or cultural) based on their respective abilities as well as contributes to the development of the beef value chain.'*

The research on pastoralism and the beef chain was confronted with difficulties, mainly due to the definition of the term pastoralist in relation to the chain, since people who are considered pastoralists are constantly changing to adapt to the external pressure posed on their way of life and production. Drought, population growth, land tenure and marketing of cattle are some of the factors that are influencing the pastoral production system and therefore, the people.

This unit of analysis is taken from the concept of value chain which emphasizes a cyclic process of production in which actors function in collaboration with others. A pastoral farm family is considered one actor in the chain that is participating in profit shares together with other actors, depending on the available market for cattle.

**Sampling pastoralists:** Initially, the intention of this research was to select only the pastoralists that participated in the research carried out by Zaal (1999) and Seevinck (2004) on pastoral livelihood diversification strategies from an inclusive value chain wide perspective. However, at the beginning of the fieldwork, it became clear that tracking down only those pastoralists would be too time-consuming and costly. It was decided to expand the research area to include more villages for the survey and limit the interviews to stakeholders in the Kajiado central division. Due to this change, the envisaged research structure had to be redefined and questions modified. Amongst the 8 villages located in the Central and Namanga divisions, 45 pastoralists were selected for the survey.

Therefore, the stratified sampling method was used, given that this method is argued to be superior to random sampling because it reduces sampling error (Verschuren, and Doorewaard, 2010). Given that the population of Maasai pastoralists is large in the area and they have diversified their production systems, the main characteristic for sample selection was livestock ownership with a focus on beef cattle producers. To select the respondents, a distance of one kilometre was taken as the appropriate distance to avoid getting two respondents from the same family, since it is common that family members are living near each other and in some case, the oldest person or head of the family is regarded as the owner of all available livestock. Therefore, the minimum numbers of respondents selected from each village were five; with the maximum of six given that the diameter of each village is between 5 and 7 kilometres.

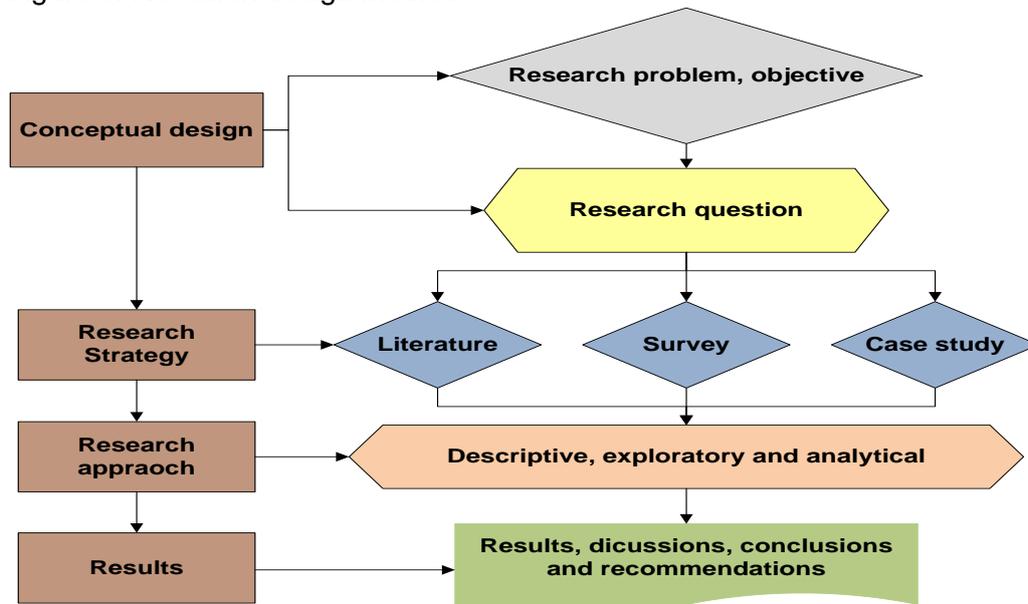
### **3.2. Research design and approach**

The research was designed following the research project designed by Verschuren and Doorewaard (2010). The following figure gives an overview of how the research is designed. The research line had qualitative and quantitative research elements that accumulate secondary data about cattle production and economic performance in the study area focusing on the pastoral systems. This research depicted the current economic status of pastoral cattle production in relation to low weight of animals that has been pushing pastoralist to sell at low prices, see figure 2.

**Research approach:** The main aim of this research was to investigate whether pastoral beef production is economically viable from the value chain perspective. In other words, are different pastoral beef producers (irrespective of capacity) able to benefit the same in the

current beef chain in the region? In attempting to answer this question a series of activities were apparent. These activities were firstly, mapping out the value chain and identifying the main actors and the flows of products, money and information. Another attempt tried to understand where along the chain most value is created and how much profit is made by different actors, with a focus on producers. The first activity was completely descriptive, focusing on obtaining information about the current situation and trends of cattle production.

Figure 5: Research design method



Source: Verschuren, and Doorewaard, 2010. p.18.

Secondly, was mapping the key supporters and influencers in relation to inclusion or exclusion of pastoralist beef producers in an explorative manner. In other words, a vein diagram was drawn showing the relationship pastoralists have with other stakeholders. Finally depicting the key trends, issues and drivers affecting chain actors, especially pastoralists in the region was the last activity and this was more of analysis. Trends are the directions and changes that have been taking place in the chain, such as the system of pastoralism, prices and marketing channels. The issues are the negative or positive implications of the trends, while drivers are considered the main external factors influencing changes in actors' roles in the chain.

### 3.3. Research methods

There are two main methods that were used for this research as described below.

#### 3.3.1. Desk research and secondary data review:

This was the initial method that laid the foundation for the rest of the findings. In this method, materials used included latest books on the subject, journals and online publications. Books and journals were taken from the University library, other publications like, articles and reports as well as other journals were taken from the internet.

Also, some of the data collected by Seevinck (2004) and Zaal (1999) were examined for the diversifications strategies of pastoralists, especially vertical diversification. Data from these sources were exclusively about cattle production and pastoral economic situation in the research area.

With regards to the secondary data collected from desk research, it was made difficult due to limited data availability. Given the value chain concept is also a pretty new concept in the region, data about the entire chain was almost non-existent. Even though is it part of the duty

of extension workers in the region to collect and keep production data, because of the limited finance and available means, it is apparent that one can hardly find data. Also, because of the recent changes in administrative boundaries, updating old statistical information about cattle production and actors in the beef chain is yet to be realised, even at the level of the municipality of Kajiado district. Due to this insufficient and, in some cases, absence of data, making comparisons with data from year to year or village to village was rather difficult. Therefore, a cautious and critical attitude is advocated, wherever secondary (livestock) data is used in this research.

### **3.3.3. Field research**

This method was divided into three: surveys of pastoral cattle producers, three case studies and interviews with actors and supporters of the chain. The was carried out during the months of July and August during which the climate in the region was mild, with an average temperature of 27 degrees during the day and 18 degree at night.

#### **Survey**

45 pastoralists interviewed in the region. This was done using structured questionnaires that were prepared in the Netherlands, and that were adjusted after being tested with five pastoralists on arrival in the study field. Some of the respondents could read and write and did fill the questionnaires themselves, while others were assisted by a translator who translated into Kimaasai and back to English for the researcher to fill. This was rather a slow, but steady and sure process. For questions that dealt with the level of agreement or disagreement and scores, five small stones were used to elucidate the level of agreement or any given score. The high the number of stones the more respondent agreed and vice versa. For example, allocating all five stones meant agreed completely or the highest score of five.

The information obtained from the survey includes pastoral household situations, production systems and trends, marketing and economic situations as well forces promoting or hindering pastoralists and their coping strategies.

All selected villages were easily assessed by public transport of taxi from Kajiado town and some of the respondents were found on the cattle market at Bissil and Mile 46. This was done in the afternoon when pastoralist were through with trading their livestock. The survey questionnaire is presented in annex 2.

#### **Case study (In-depth interviews)**

Three cases were studied, and these cases were chosen from the ones in the survey. They were again different from the ones identified because it was not possible to relocate respondents as initially plan. However, the livelihood model used by Seevinck (2004) to depict the level of success of pastoralist was used to make sure cases from all three levels (small specialising, large diversifying and traditional pastoralists) were studied. This was only possible by a quick scan of surveyed pastoralists focusing level of education, total number of animals owned and sources of extra income. Cases that were finally studied were those of Elijah Memosi from Kajiado, Loody Ole Kiria from Meto and Daniel Molina from Loodokilani. From these cases, in-dept information about the pastoral household situation, production systems and trends, including marketing and economic situation as well as forces promoting or hindering pastoralists and their coping strategies, were drawn. Transcripts of case study and other ind-depth interviews are available.

#### **Semi-structured interviews**

This part of the interviews was conducted amongst stakeholders in the beef chain. The list of interviewees is presented in annex 2. The list was limited to butchers, traders, service providers and processors, each of which were three except restaurants, slaughter houses/processors and transporters that were two in numbers. These interviews were necessary to partly make up limited data about the chain and to explore the functions of stakeholders of the beef chain (mapping the chain) and the possible influences they might

have on the profitability of beef production for pastoral producers. In order to calculate value shares and identify the actors that create the most value, information gathered from the interviews included a general profile of the stakeholders, systems of management and functions in the chain, input, marketing and economic situation and forces influencing stakeholders.

### **3.4. Data processing**

To process the data, the steps that were taken included:

- Data cleaning and merging. This was the first step that was taken to merge together questions that directly answered the research question or else, to put them in one group, while those that provided background information were gathered in another group. In this same step, similar questions or leading questions were merged before moving on to the next step, which was the coding of the questions.
- Coding was done with all the questions for proper analysis using the computer tool SPSS. All close-ended and some of the open-ended questions were coded. Some answers to open ended question were first summarised before being categorised, after which they were ascribed a code. One coder was used to code one question each in order to ensure consistency of interpretation.
- Summarising was used for others open-ended questions to put answers of respondents together in a consistent way. However, this method was mostly applied to in-depth interviews with the beef chain stake holders.

Finally, to analyze the data obtained, SPSS was used in addition to the summaries that were made from the in-depth interviews. With the tool, the significance in the samples to a normally distributed set was tested at 95% confidence level using ANOVA test. The test was carried out to find out if there is any significant difference in management of cattle by pastoralists' indifference system as well as to find out if the prices received by pastoralists the same in the various systems. In this test, the number of months on migration was used to group pastoralists into two groups.

To analysed relationships between area of land owned and grazing pattern in relations to age, including prices received by producers in the different systems, a spearman test was carried out.

To further analyzed the data, cross tabulations where computed with ages against level of education for better understanding of pastoralists profiles as well as local and improved breeds of cattle owned. Bar charts of different categories of migration patterns were also produced to compare the difference productions.

There were two models that were integrated in the analysis, the PESTEC (political, economic, social, technological, environmental and cultural) model. This model assisted to provide a based line to analyze both the external and internal forces influencing the economic viability of pastoral Maasai from the value chain perspective. The model was particularly chosen because it is decision making model used in analysing production and marketing from the stand point of pastoralists and it helped in understanding growth or decline in pastoralism showing future directions based on the internal and externals environments.

**CHAPTER 4: RESULTS AND ANALYSIS OF THE KAJIADO BEEF CHAIN**

**4.1. The pastoral systems in Kajiado**

The survey results and some part of the in-depth interviews in presented in this chapter. Data presented include; profile of pastoralists, land ownership, cattle populations and marketing of cattle are presented and analysed.

**4.1.1. The profile of Maasai pastoralists**

It is apparent to look first at the profile of pastoralists from the perspective of age and level of education. These two elements are pre-conditions needed for the understanding of current status of pastoral cattle production and to draw out implications for the future.

Five age groups were formed including, 15-25, 26-35, 36-45, 46-55 and 65 upward. In terms of the levels of formal education, four categories (or levels) of education were also formed: never been to school, primary, secondary, and diploma upward. There is clear variation in the levels of formal education among pastoralists and age as shown on table 4.

It was observed that pastoralists all 24 respondents (N=45) who never been to school were 36 years and older. 9 respondents completed primary level, while 7 did secondary and 5 did a diploma and higher education and this 5 were between 36 and 55 years old. A cross table of age and educational level was used for the analysis.

Table 2: Age and level of education cross tabulation

	Level of education				Total
	Never been to school	primary	secondary	Diploma and above	
Age 15-25	0	0	2	0	2
26-35	0	3	3	0	6
36-45	7	2	2	3	14
46-55	9	2	0	2	13
55 and above	8	2	0	0	10
Total	24	9	7	5	45

Source: Compiled from survey

**4.1.2. Land ownership and grazing pattern**

For the sake of simplicity the land ownership areas were divided into four categories of acres ('1-200', '201-400', '401-600' and '601 and above'). By asking pastoralists the surface area of land they owned, it turns out that, about 40% (n=45) of pastoralist own between 1-200 acres, 51% own between 201-400 acres while only about 9% own between 401-600 acres, the highest limit indicated. Land ownership and location of grazing were considered as one of the determining factors of which system of production practiced and may be closely related to age. Therefore a spearman test was carried out to find out whether there is a significant relationship between area of land owned and grazing pattern in relations to age. The result was negative given that the significance level was only 30% less than the expect 95% confidence level (table A, in annex). Thus grazing pattern does not depend on area of land owned or age.

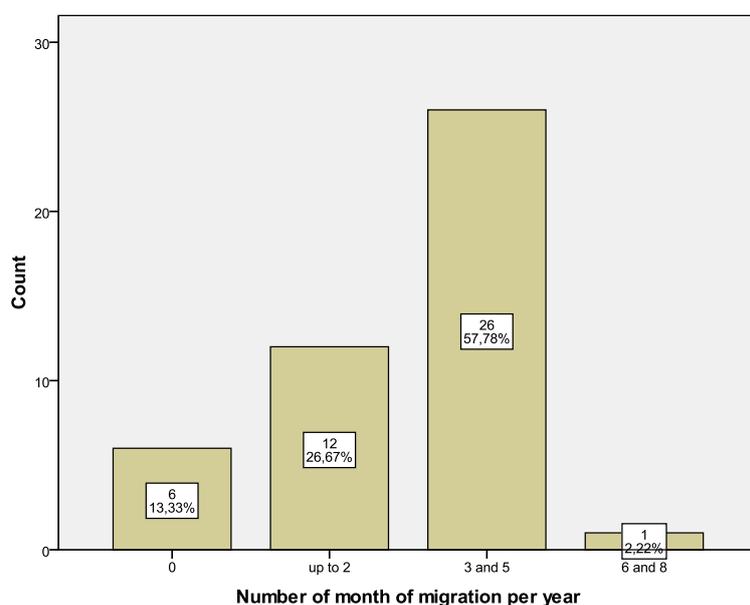
When asked where pastoralists are grazing their cattle, only 13% indicated private land as the only area while 87% indicated both private and community land<sup>1</sup>. While about 90% of

<sup>1</sup> Private land was inclusive relatives own areas (fathers, in-laws, uncles,) while community land was inclusive (age-mates, stock associates and clan-mates) owned areas since crossed boarder migration was not common.

respondents argued that their grazing pattern has not change positively since 2009, about 10% claimed there has been a positive change. The main reasons advanced for change were the introduction of hay production and the smaller herd size as compared to the years before 2009. On the other hand, reasons against were principally drought and sales of land to acquired livestock.

When pastoralists were asked to indicate the number of months they move to another climate zone with their animals as the second indicator of the production system, it was observed that, 12 out of 45 move for up to 2 month per year, 26 move 3-5 months while 1 move for between 6 to 8 months. Only 6 do not migrate to different zones. During migration, 4 of the respondents take their family with them, while 27 do not. Only 8 takes their family partly and in that case mostly young above 12 are taken away in order to be teaching them pastoral life and production.

Figure 6: Migration charts



Source: Compiled from survey

Pastoralists explained that, migration and grazing pattern is as a result of; shortage of land, pasture and water. It was seen from the survey and in-depth interviews that, current migration and grazing of cattle occurs between parcels owned by members of extended families (fathers, in-laws, uncles,) and between friends' network (age-mates, stock associates and clan-mates). Sharing or swapping of pastures occurs with the understanding that movement between parcels is based on need and reciprocal action in time and reflects efforts at rotational grazing between pastoral shared spaces in the Maasai-land. Some form of leasing arrangements also occur (based on monetary exchange or payment for pasture with animals), but these purely economic arrangements was reportedly only by one case. However, sharing being one of the values of pastoralists was also seen with cattle to a lesser extent. Out of the 45 respondents, 12 indicated that they had received cattle from family members in the last two years, 8 of which received one cattle each, 2 of which got two cattle each and the remaining 2 also indicated they had received three each also from family. Also four pointed out that, they had given two cattle each to other family members after drought of 2009.

#### 4.1.3. Cattle ownership and population

The numbers of cattle own showed great diversity as pastoralists are increasingly specialising by upgrading their stock with improved breeds or increasing their small ruminant stocks. From the seven categorise set during the research to find out the current production

capacity of pastoralist, it was observed that, about 20 pastoralists (N=45) in the region are producing between 1-15 local zebu breed, 11 are producing between 16-30 cattle and 7 between 31-45 cattle. It was observed that 7 pastoralists have specialised into producing only improved breeds as show on the table 5. The trend in the number of improved breed of cattle own is similar to that of the zebu breed even though up to about 26 of pastoralists are yet to introduce improved breeds into their herds. However, about 15 own between 1-15 improved breeds, , about 3 was found to fall within the range 16-30 herds while only 1 was producing 31-45 improved breeds of cattle (table 5).

Table 3: Number of zebu \* Number of improved breed cattle own in 2011

		Number of improved breed cattle own in 2011				Total
		only local breed	1-15	16-30	31-45	
Number of zebu cattle own in 2011	only improved breed	4	2	0	1	7
	1-15	14	6	0	0	20
	16-30	6	3	2	0	11
	31-45	2	4	1	0	7
Total		26	15	3	1	45

Source: Compiled from survey

In addition to that, about 70% of pastoralist (N=45) who are producing both improved and local breed indicated that, the growth rate of improved breeds is almost double that of local breed and fetches a better market price. For the 70%, cattle production in the region is profitable. Even though the cited that, the necessity to produced drought tolerance and disease resistance or fast growing cattle is a decision left in their hands. A distribution graph of local and improved breeds is presented in Annex Figure A.

Table 4: Sheep and goat off-take and prices offer per animal.

		What was the price (KSH) you receive per goat/sheep?					Total
		5000	6000	7000	8000	9000	
How many goats and sheep did you sell in the last 12 months?	1	6	9	3	3	4	25
	2	3	4	2	3	3	15
	3	0	2	0	0	0	2
	4	2	0	0	0	1	3
Total		11	15	5	6	8	45

Source: Compiled from survey

Further diversification of pastoral livestock producers into other species (principally sheep and goats and some few donkey) was also investigate and the average number of other species owned by pastoralists was 30 (sheep, goats and donkey) with the maximum was 82 other species, even though 3 respondents indicated that they do not have other species (see table B in annex). For goats takeoff, and prices received by pastoralist table 4 above shows

the maximum number of sheep and goats sold per year was 4 and only 2 respondents indicated that they usually sell that number per year. As was observed, only 8 respondents indicated that they sold their small ruminants of about 25 kilogram for the highest 9,000.00KSH and 11 respondents sold for 5,000,00 KSH which was the lowest price indicated.

It was further noticed from the survey that, the Maasai pastoralists had diversified into crop production and this was the last indicator of the system of cattle production practice. In this aspect, after discussions with some of the pastoralists, it was also considered that when a close member of the pastoral farm family that is living under the same roof (wife, son and/or daughter) was involved in cropping then, that pastoralist is involved. Thus, 26 respondents agree that some members of their families are involved in cropping while 19 did not agree. The 26 who are involved in cropping included pastoralists who do not migrate. To understand the extent to which cropping by members of pastoral family was able to meet family staple food need, respondents were asked to indicate the extent to which they agreed or disagreed with buying of extra stable food items, a total disagreement with the statement was noticed reasons being insufficiency of rains and water for irrigations and limited land resources.

In an attempt to classified current pastoral production system in Kajiado, the only base will be the extent to which migration in search of water and pasture as well as diversifications into crops productions is practiced. For simplicity, the 6 pastoralists who indicated that they do not migrate any longer may be considered as those practicing the commercial ranching system integrated with cropping; those that migrate (20) and are the same time involved in crop production may also be considered as either under traditional or shifting agropastoral system while the remaining (19) may be considered as practicing either the traditional or shifting transhumance system, see figure B in annex. However, to confirm that some pastoralists are indeed in the ranching system which is believed to have better management than other systems, this had be proven by a one-way ANOVA. Therefore, an ANOVA test (see annex table C) was carried out to find out if there is any significant difference at a confident level of 0.05 between, pastoralists who may be classified under and the ranching systems and other systems in regards to the management practice. It turned out that, there is a significant difference given that the confidence level was 0.20. The results of the test may have been affected by the sample size given that classifying the systems was problematic and the size of farmers considered as ranching system was relative small.

#### **4.2. Beef marketing in the Kajiado region**

Pastoralist indicated that, marketing of cattle in the region is done through two main outlets. One is at the local cattle market in which majority of pastoralists (96 % where N=45) take the animals to for sales and in this cases, their main buyers were traders, while the other outlet is at farm gate where only 4% of the respondents used for sales. Pastoral producers who use the farm gate outlet claimed that, their main buyers were other pastoral producers. It was observed that, pastoralist who used the farm gate outlet were the ones who have completely diversified into producing only improved breed. An interested reason advanced for using the farm gate outlet apart from better prices was that, it is an indirect strategy to reproduce the breed so that in case of diseases out breaks, they may be able to easily buy replacement from other farmers.

For pastoralists, livestock remains the main sales out given that there is no other option. The maximum number of cattle sold per pastoralists was 5 as reported and minimum 1 while the average number reported was 3 and to pastoralists, traders seems to be offering better prices than KMC. Amongst the number sold per year, it was observed that, there are 2 zebu on average per pastoralist as compared to about 1 improved breed as shown on table 6.

Table 5: Averages of animals breeds sold per year and price pastoral farm family

	N	Minimum	Maximum	Mean
Number of zebu	45	0	5	2,40
Number of improved breeds	45	0	3	,49
Price of a bull of say 250kg in KSH	45	20.000,00	50.000,00	34.422,27

Source: Compiled from survey

Prices offered to pastoralists for cattle of about 250kg according to information provided was 34420 KSH on average and this is based on marketing conditions such as the weight, age, breed, health status of animals and connection with traders. Some producers termed these conditions '*Bargaining conditions*'. To producers, these conditions are used for grading and hardly are they interpreted in the same way. Pastoral producers also pointed out that, only traders understand the market and the location where cattle will finally be taken. Nonetheless, prices are lower for less healthy or older cattle and well as lower for Zebu compared to improved breeds of the same weight according to 80% of respondents.

It was interesting to notice that, pastoral producers are fully aware of the marketing power of traders due to the presence of traders union in every village, as they indicated but do not have any of such a group. Therefore farmers marketing cooperatives is accepted 97% that such an institutions could assist them gain better prices per cattle. The main reason advanced by pastoralists for the positive impact of marketing cooperative was that their low bargaining power will be increased.

About 96% of pastoralists claimed that information flow in the chain is not sufficient and in some case absent. The few that agreed with sufficiency of information flow are fortunate to be traders therefore are members of traders unions in the village where they reside.

On the other hand, the main reasons advanced for disagreeing with information flow were first, due to the absence of a regular information source, second was limited or no coordination of sales at the livestock market and finally no generally accepted standards to use in determining prices. Even so, about 91% agreed that forming such cooperative is not feasible, reasoning being, some other organisation like Kenya Livestock Marketing Council have tried form such an institution for marketing and failed as a result of little participations and involvement of pastoralists in decision making. More also pastoral producers are still unable to get over the history of failed ranch system. Therefore implication for the future can be drawn by conducting an analysis to show the independence between the variables marketing price and production system which had to be proven and this was demonstrated by performing another one-way ANOVA. No significance significant difference between market prices and production systems was observed (annex table D). In addition to that, from Table G. in the annex showing goats and sheep off-table by pastoral cattle producers, there seems to be no difference in the average numbers of cattle sold per year compared to sheep and goats whose average is also 3.

### 4.3. Cattle production cost

The survey did not provides enough data on the cost incurred on production, however, it was noted that cost depended on herd size, breed, farm locations and climate as reported by pastoralists and will increased with increasing dependent factors. Some of the cost item that were pointed out included; feed supplements (vitamins, salt etc.), services (advice, vaccinations, de-worming, dipping, hoof treatment), market fees / entrances, medication (vaccines, pesticides) and recently forage have been included in the list. Due to the absence of records, inabilities of pastoralists to remember investment made per year and difficulties estimated certain cost such as; own labour, figures were generally hard to get the real figures thus in-depth interviews provided some figures as shown in Box 1.

### Box 1. Case study

#### Introduction

Loody O. Kiria is a 54 years old Maassai pastoralist who is married to one wife and has five children. He lives with his family in Meto and has been involved in cattle production since when he was 10 year old. His first child is a male of 18 years old, the second and third is females of 15 and 12 while the last two are males of 11 and 9. Only the last three children are attaining school while the first managed to complete primary school and did not further study. The wife is a house wife responsible for household activities, while the older children are supporting him to manage his cattle. The 18 old is fast getting into trading of livestock with support from his father.

#### Production system

Kiria owns about 350 acre of land in Meto and have two different species of pastoral animals namely cattle and four donkeys. The first sun rears a few goats and sheep. Apart from grazing only on his piece of land, he usually allow his animals to grazed on family and friends parcels of land who also in turn grazed their own animals in his own parcel. He hardly migrates and when he does, he never stays away for more than three months. He does not invest in pasture and believe much in natural pasture for his animals. He is keen on handling his animals and twice a year, he is inviting veterinarian for vaccination and inspection. Due to the drought of 2009, he lost almost half of his herd and is today re-group and expanding the herd size.

Every year, he sells 4 cattle for extra income needed to keep his family and his wife produces crops like maize, beans and potatoes for family consumption. Death rate of his cattle is about 2% while he record at least 6 calves every year.

He is considered an average pastoralists based on his number of livestock, family situation and activities and was chosen to find out more about the economic viability of the pastoral system.

Zebu calves	5
Zebu cows	9
Zebu steers	3
Improved breeds calves	1
Improved breeds cows	2
Improved breeds steers	3
Improved breeds bulls	1

#### Cost of production

Given that Kiria do not record investment made on his stock, he could remember some of the figures and presented on below.

Variable cost (VC)	Amount in KSH
Feed supplements (vitamines, Salt etc.)	3.000,00
Vaccines	3.500,00
Pesticides	4.000,00
Services (advice, AI, vaccinations, de-worming, dipping, hoof treatment)	9.500,00
Market fees / entrances	100,00
Water for cattle	7.000,00
Hired labour	5.000,00
Replacement stock	0,00
Transport	300,00
<b>Total VC per year</b>	<b>32.400,00</b>

In regards to the price he receives for a cattle for about 3 years the weights about 250kg, he indicated that 40,000 KSH was the most recent figure he received. That means his total revenue (TR) is 160,000.00

This implies his gross income (GI) is 127,600.00. ( TR-VC)

Given that he already has land title to the area owned, other estimated fixed cost (OFC) included;

Permanent labour (PL)	84.000,00
Calculated interest of PL	8.400,00
Others	5.000,00
Total OFC	97.400,00
Pastoral income (GI-OFC)	30.200,00

However, when interest of land and opportunity cost for family labour income is calculated to get the net pastoral income from the pastoral income, the result may not be promising as it seems. More also taking the average price of 34.422. KSH as found, will also means reductions in pastoral income.

#### 4.3.1. Other sources of income

Of 45 individuals, only 3 indicated a reliance on cattle as a first/main source of income, while the rest indicate small ruminants. A total of 31 including both educated and uneducated indicated that they have a second source of income. The uneducated (19) diversify into unskilled, low status activities with low returns and little or no job security mainly transporting of livestock to cattle markets and charcoal production and sales.

The educated (12) have diversified into skilled and well-paid jobs such as services provisions for different institutions, sales of household needs in retail stores and vegetable production (French beans and cabbage).

#### 4.4. Forces promoting or hindering pastoral cattle producers

The economic viability of pastoral cattle production depends on many forces. Some of these forces like prices, weather, land for grazing and marketing information resulted from the survey. However, pastoralist were asked to rate these forces and many others in the survey with a score. These score are summarised and converted into percentage as presented on the following table. The table is divided into three colours, the golden colour shows are hindering factors, the grey shows promoting forces while the light green indicates forces that are either promoting or hindering pastoralism. The model that was used to analyse these forces is the PESTEC model. The forces were grouped into four categories (1, 2, 3 and 4). On one hand were forces hindering pastoralist, that is 1 which meant the force need attention, 2 meant the force need urgent attention on the other hand 3 meant the force is supporting to a small extent while 4 meant force is supporting to a larger extent. Forces who percentage was between 45 and 50 on either sides were considered as neutral forces.

Table 6: Forces affecting cattle production

Force category	Forces	Score in % of respondents per category			
		1	2	3	4
Political	Government policy	40	50	10	
Economic	Prices of cattle	10	80	10	
	Marketing information	70	25	5	
	Access to finance	80	10	10	
	Cost of input (medication, salt etc)	30	60	10	
	Land availability	30	50		10
	Labour availability			10	90
Social/cultural	Husbandry abilities and skills		20	20	60
	Thieves		60	40	
Technological	Improved breed availability		30	70	
	Stakeholders support (training and social services provision)		45	55	
Environmental	Forage availability	20	80		
	Predators		60	40	
	Weather condition	100			
	Disease outbreak	40	40	20	

Source: Compiled from survey

From table 6, some forces promoting, others hindering. However, there are some forces that did not appear to be affecting pastoralists like stakeholders support based on score percentages, given that the Maasai pastoralists are still very traditional and depend on family support for livelihood.

#### 4.4.1. Forces promoting pastoralists in Kajiado

Three main forces with score above 70% included, improved breed and labour availability as well as husbandry skills. Reasons for indicating these forces included the fact that 7 out of 45 pastoralists are specialised on producing only the improved breed of beef cattle in Kajiado and these breed are also spreading across the district even though they are limited. While some pastoral producers indicated that, they can purchase improved but lack capital other said, it their choice to hold on to the local more resistant breed.

The average pastoral farm family still has enough family labour to contribute to production, and splitting of herds in transhumance, diversification in agropastoral or specialisation in the ranching systems is enhanced by available family labour, or relatively cheap labour from friends or less wealthy other pastoralists. Given that the production system is handed over from generation to generation and from family to family so are management abilities and skills. Handing over a part of the herds to a family member, friend or another pastoralist may be easier given that the knowledge and skill are cultivate from childhood and is not any problem they said.

#### 4.4.2. Factor hindering and coping strategies

Although cattle are prestigious and highly valued in the market, they are vulnerable to different forces. However from the survey, pastoralists have difference ways of dealing with the varied forces as presented on table 6.

Table 7: Forces hindering cattle production and coping strategies

<b>Force categories</b>	<b>Forces</b>	<b>Coping strategies</b>
Political	Government policy	Avoidance
Economic	Prices of cattle	Sale of livestock before onset of droughts Introduction of improved breeds Networking with traders
	Marketing information	Networking with traders Discussing with peer producers
	Access to finance	Sales of land Sales of small ruminants
	Cost of input (medication, salt etc)	Ethno veterinary medicine applications Use of local input (salts)
	Land availability	Purchase of land Inter-grazing pattern
Social/cultural	Thieves	Employing dogs Marking of cattle
Environmental	Forage availability	Hay preparations Grazing in family/friends parcel (sharing and swapping of pasture)
	Predators	Reporting to community leaders Hunting
	Weather condition	Change production system to transhumance
	Disease outbreak	Follow national vaccination program Migrate to disease free zones Sales of animals

Source: Compiled from survey

Looking at table 7, it appears that economic and environmental forces are the key areas of attention in any effort to promote pastoralism. For pastoralists, this means economic forces will bring them closer to each other so that they may share resources while the environmental forces may push them to change their way of life and production.

## **CHAPTER 5: MAPPING THE KAJIADO BEEF CHAIN**

In order to map out the beef chain in Kajiado, the result of in-depth interviews were mostly use together with some few details from the survey. In the following pages, the results are further presented.

### **5.1. Actors in the Kajiado beef chain**

The main chains identified in the research were two, one within and the other beyond Kajiado. The chain beyond Kajiado may also be subdivided into two or more chains, one that is limited within the country with a strong link with Dagoretti slaughtering complex that is supplying beef to Nairobi and the other extend to other countries like Egypt, Qatar and Oman through processors like Kenyan Meat Commission (KMC), Framers Choice. Even though it was noted that the chain beyond Kajiado, consumers more than 70% of cattle sold in the region, for straightforwardness and focus of the research, the chain that is present in details is that within Kajiado. The actors identified in the Kajiado beef chain were pastoral producers, traders, brokers, butchers, restaurants and consumers.

#### **5.1.1. Pastoralist producers**

As presented in the first part of this chapter, pastoralist are the most important actors in the chain, they are aware of the main challenges faced in the chain and hardly can provide proper solutions by themselves. Given that they are operating in collaboration with other actors to make sure the product reaches consumers in the right form and place, finding ways to protect their interest remains a struggle to many. From in-depth interviews with traders, it appears that pastoral producers hardly understand the quality measures that are used for price determination. Pastoral producers are the least informed about marketing of cattle as well have the least access to external financial services. Due to less knowledge about the financial sectors in the area, pastoralists turn to be less interested in seeking financial support from service providers.

#### **5.1.2. Traders**

Traders in Kajiado chain are buying between 1 and 8 cattle per week and supplying butchers and restaurants. They buy mostly from the Bissil livestock market in the research area, pay for slaughtering in the slaughter house in the same vicinity and further pay for transportation to the clients. In some rare cases, traders buy directly from farmers at their farm gates. From the interviews, it is noted that, when marketing infrastructure, like road network is poorly developed to further market like 'Mile 46' livestock market, the cost of transportation and risks associated with transportation increases and as a result the marketing cost may increase. Traders seem the most organised in the chain as there is a traders union in every village that informs members about livestock market development.

However, traders who are involved but with the chain beyond Kajiado have more capital and thus they buy more cattle per week (5 and 40) therefore compete with local Kajiado traders in the market. The only advantage hold by local Kajiado traders is that of language and relationships with farmers, therefore local Kajiado traders sometime serve as brokers.

From the trading functions carried out by traders, they can be categories in to four groups, first being brokers who sometimes take command from the second category that is, traders beyond Kajiado. The third are traditional traders who only limit themselves to trading within Kajiado and the last are traders/butchers who also carry out the butchering function. It most be noted also that, these categorisation may sound simple as it is but some time traders are changing from one category to another depending on market demand. When there are more traders in the cattle market needing cattle for the chain beyond Kajiado, other traders shift immediately to brokers, while only the traders/butcher may be more loyal to their function.

The only cost made by traders is on transporting, loading of animals on trucks for traders in the chain beyond Kajiado, own salary and in some case interest on capital. More also, to become a member of a traders union (to get access to some market information, joint transportation etc) a fee of 3000 KSH is charge per year for those interested and

membership is not compulsory. It was indicated that, to transport live animal from Mile 46 livestock market to Bissil slaughterhouse by trekkers, it usually cost about 300 KSH, and slaughtering fee as 500KSH while transporting carcasses of the same weight to Kajjado town is 400KSH. All these cost are hardly fixed, and depend on distance and seasons given the poor road infrastructures in some areas and scarcity of transporters.

More also, some traders are also trading internationally in which they buy cattle some sometime from Tanzania at low prices and traded in Kajjado district. This international trading may not to be posing any threat yet to pastoral producers in the region, only when current imported volume of cattle is documented that threat from competition can be fully understood.

**5.1.3. Butchers**

Butchers are the actors that play two functions in the chain, that of wholesaling and retailing, and they are located on every main street in Kajjado. In the wholesale functions, they are supplying restaurants and in the retailing functions, they supply directly to consumers. From the interviews, it was indicated that butchers supply beef as fresh, roasted and fried to consumers. Amongst these products, restaurants only buy fresh beef. It is considered that about 60% of their products are sold prepared (roasted or cooked). Some butchers are also involved in trading and buy their animals directly from the cattle markets. The capacity of butchers is estimated at 2 to 5 cattle per week excluding sheep and goats (estimated also at 3 small livestock per week) and the cost of an animal of about 250kg was estimated at 45,000.-Ksh. Other cost made by butchers included; labour estimated at 7,500KSH per person, rent is about 5000KSH electricity and fuel is also estimated at 13,000KSH all figures are per month. Other cost which is hardly taken into account by butcher is that of depreciation on fixed capital item. In general, the selling prices products offered by Butchers were observed to be 320KSH per kilogram of fresh or roasted beef is 360KSH for the same weight of cooked beef.

**5.1.4. Restaurants**

The number of restaurants in Kajjado district are also increasing given its closeness to Nairobi and there for increasing population. Restaurants just like butchers are offering processed or prepared beef products to consumers. They usually know where and when the carcasses they process have been slaughtered as well as have structural relationship with butchers based on the interviews. The quantity of beef supplied by restaurants per week is about 250kg. Operating restaurants involves much cost and the most important costs items that are contributing to the price paid by consumers include; personnel, rent, energy and depreciation of fixed capital item. Comparing the space used by restaurants with butchers, it was argued by butchers that, their cost of production are in no way different.

Given the long product line of restaurants, investment on fixed capital and number of personnel, there is no though that selling prices may be higher. Therefore, prices offered for different products are present on the table 7.

Table 8: Averaged prices of beef products

<b>Product</b>	<b>Price in KSH/kg</b>
Fried meat	800
Cooked meat	600
Sausages	650
Meat balls	1000

Source: Compiled from survey

The greatest challenges of restaurants which were also indicated by butchers during interviews were abilities to maintain proper hygiene standard requirements and competitions in meat sales from other butchers and restaurants. To deal with these challenges, by differentiating the way products are prepared, these actors hope to overcome competitions.

Cleaning the environment as much as possible is the only way to deal with hygiene which remains a struggle for most butchers and some restaurants, given that the general Government Standards Act (CAP 496), that dates from 1974 (revised in 1981), Kenyan products must comply with standards designed by the Kenya Bureau of Standards (KEBS) which are in harmony with other existing acts and are adaptations from Codex Alimentarius is hardly enforced and actors may easily avoid the said quality standards. Thus the quality of meat offered to consumers leaves much to be desired.

#### **5.1.5. Consumers**

At present, consumer may not be keen on hygiene of beef with the increasing population of especially immigrant into Kajiado, it may not take long, what is apparent now is quality of the meat offered.

### **5.2. Stakeholders linkages**

Figure 6 provides a map of the Kajiado beef sector as a whole. The numbers of actors next to the boxes indicated are estimations. Within this mapping, functions of each actor are seen on the left of the map and against each actor. Input provision is considered as improved and local breeds, medicines and extra feed supplement. Some actors have more than one function in the chain. Consumers are not categories due to limitation of the research. Prices are extracted from interviews with stakeholders and the chain is limited to the Kajiado area with a link to the chain beyond Kajiado.

Cattle emanating from pastoralist production usually pass through the hands of several brokers before they leave the district to other cities and even beyond the country. Some of the supporting functions are unavoidable like trekking and transporting to the livestock market, slaughterhouse and then carcasses transported to butchers and restaurants. Other support function is slaughtering. These functions are considered supporting functions because, it was found that, services provided in the stated functions are as a result of outsourcing and paid by one of the main actors presented in the chain. Other supporters and influences are located on the right side of the map. These supporters may be influencing the chain positive for particular actors and negatively for others.

The prices mentioned on the map are averaged taken from in-depth interviews. It was also noted that prices depends very much on seasons. In high seasons, usually stretches from late January to February, and from May to July the price may defer from the one indicated.

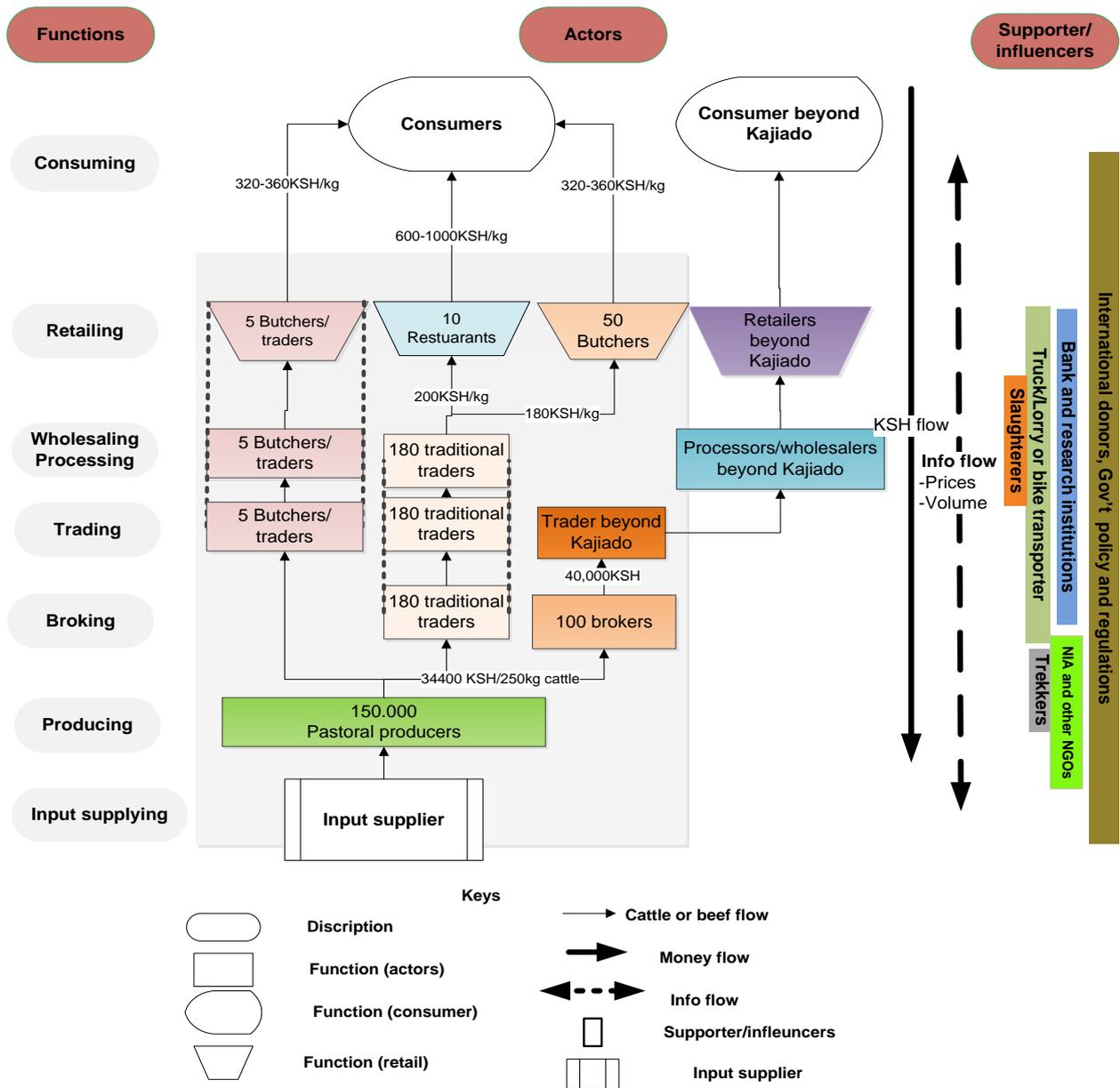
Low prices in high seasons are attributed better weight of animals and therefore increase sales of cattle by pastoralists which lead to more slaughtering. In low seasons the reversed hold true resulting in expected higher prices. The system of production was not seen to influence price much, given that spearman test for correlation between pastoralists who migrate and those who do not in relation to the price of their cattle was insignificant as shown in Annex table E.

To understand the economic viability of pastoral cattle production, it was necessary calculating profit and value shares. However this was made difficult due to the limited data available for the author, in regards to some of the major cost items of other actors as presented in Annex table F. More also, for some actors it was difficult to estimate their own costs. Particularly estimation of own labour input and family labour. Also categorising certain costs as variable or fixed were others issues.

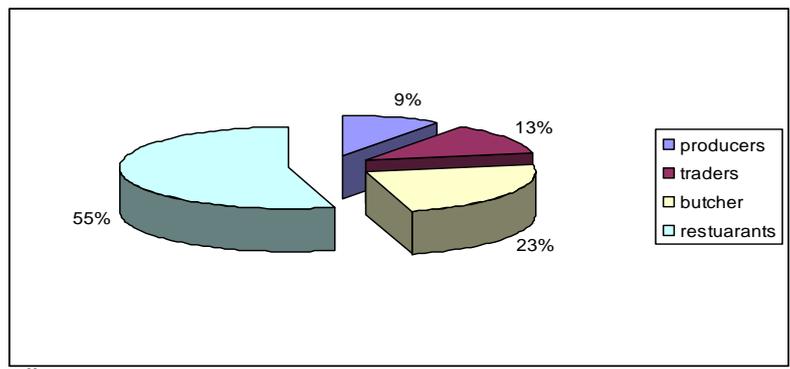
Even without calculating profit and value shares, it seem apparent that restaurants may be making the most profit per kilogram of meat sold on the bases of consumers prices (265%) offered through that channel even with small of on average volume sold per week; given that cost per kilogram is 200KSH (figure 7). As a result value shares are indicated on figure 8. Butcher/traders may also be considered as the second actor that is making a better profit as a result of carrying out three functions in the chain.

In the case of, brokers who are acting simply like middlemen, it was reported that some brokers may not even have capital but due to their network and languages advantages, they can function well in the chain.

Figure 7: Kajiado beef chain map



Sources: From field studies  
Figure 7: Value shares indication



Sources: From field studies

Brokers are the most profitable given that they do not take any risk and as soon as they find a trader who needs a specific animal they do the negotiation with the producers, supply the animal and happily get their share.

### **5.3. Other stakeholders**

#### **5.3.1. Slaughterhouse**

The Bissil slaughterhouse is the largest in the district and more than 400 cattle are slaughtered a week. The facility is privately owned and the owner collects a fee of about 500 KSH per cattle. This fee covers quality control costs by veterinary offices from MOLD, charges for workers, bullet and maintenance fee. Friday is the busiest day at the facility given that the day is also a livestock market day and the location of the market is less than 100 meters away. Only slaughtering is done at the facility given that there is no cooling system in the facility, carcasses are transported immediately.

#### **5.3.2. Transporters**

There are three types of transporters involved in the Kajiado chain. The first are the trekkers, who transport live cattle to cattle markets and from cattle markets to other parts of the country like Dagorethi. This type of transporter is mostly young Maasai less educated or other pastoral farmers with less number of livestock. The second type is transporter motorbike riders who transport carcasses from the slaughterhouse in special certified containers behind their bike to butchery and restaurants. The last are trucks or lorry drivers who transport both live and carcasses. Other stakeholders and their functions in the Kajiado beef chain are presented in Annex table H.

What is also emerging are small meat-matatus, (special hand trucks that deliver meat to consumers) as an important adaptation and at the same time an opportunity offered as a result of butchering industry privatisation.

## CHAPTER 6: DISCUSSION

The types of farming system, transhumance, agropastoralism or ranching observed in the Kajiado district were comprehensively reported in previous studies literature by Rössler, (2010), Campbell et al. (2003) and Blend, (2001). The present study confirmed the existence of the above systems and went further in categorising the information into vertical diversification and economic potentials of pastoralists as well as marketing channels. This is different from the approach of Zaal (1999). The discussions about the future of pastoralism and the way forward from those who are living pastoral life style may follow four main themes.

### 6.1. Changing pastoral production system

Pastoral production systems seem to be fast changing from the tradition form (transhumance) through agropastoralism to what we see today as the ranching system. The argument of Blend (2001) that classification of pastoralism must be treated as a simplification to some extent hold true for Kajiado pastoralists. However, it was observed that land titles and rights given to pastoralists in the region is making pastoralists to capitalised on sedentary form of cattle production. Should 7 (N=45) pastoralists had shifted from other forms to what we may call ranching system, that can be attributed principally Kenyan policy on land tenure and an increasing population that is resulting in urbanization (Mizutani et al. 2005). Land ownership by pastoralists today in Kajiado as observed in the finding, has given pastoralists supremacy to decide what to produce, and which production system to maintain based on their interests and lifestyle. With such supremacy, some are even selling their land in case of livestock losses in order to restock.

While some forms of migration is still commonly practiced within the region as opposed to formal long distances migration (in some case crossed boarder) as in the case of transhumance, the length of time to stay on transhumance with or without family members is basically the same as observed from the survey. Apart from the few that have completely settled, most pastoralists still migrate within the land parcels of relatives or close network (private land). This is based also on the abilities of Maasai pastoralists to share or swap pastures with the understanding of the need and reciprocal action, as their effort to encourage rotational grazing between pastoral shared spaces in the Maasai-land.

It can be argued therefore that pastoralism will never be the same again, as pastoralists continue to depend on area of land owned and relationships with friends and family for migration during harsh times. Another signal that limits the future of pastoralism is the 2008 introduction of hay in the regions (FAO, 2010). When pastoralists are able to get hold of the technique of hay making, that will implied a further step toward the ranching system.

The pastoral system is prone to change further given improved breed availability and the position of such breeds in the market. Management of such breed could be a limiting factor however, pastoralists claimed that they have acquired skills to management livestock from their childhood. In the finding, an ANOVA test (Table C in annex) showed no significance differences in the current management of cattle by pastoralists in different systems in the Kajiado region confirming pastoral skills claim.

With the ever increasing negative effects of climate change on water and pasture (FAO, 2010) pastoralists in Kajiado are challenged to look beyond their comfort zone in order to survive. While Blend argued that their flexible nature will assist them survive any harsh condition, by changing production systems or operating more systems at the same time, it was observed that, their abilities to share and swap livestock resources and in some case donate livestock to poor members of the family are indeed pastoral survival strategies that may keep them for decades. The flexible nature of pastoral cattle producers may also affects marketing of their cattle especially those practicing the transhumance system.

## 6.2. Marketing of cattle in Kajiado district

It was observed that marketing of cattle is done through two main outlets; the livestock markets and farm gate. Besides the Bissil livestock market that is functioning as vibrant centre for trading of cattle, the *mile 46* livestock market is also an important market through which cattle are supplied for the Kajiado chain and the chain beyond. KIT and IIRR (2008) pointed out that the level development of the region's beef chain is still low, with insufficient information flow amongst actors especially producers, given that there are hardly chain coordinators with a vision for the development of the chain. However, it was observed that the role of traders as chain coordinators is indispensable since there seems to be no other options for producers. Whereas the most pastoral producers are selling their cattle through traders, a few have diversified into trading and some have even further open butchering shops in order to sell directly to consumers. This pure economic move is rather rare.

Liug (2010) pointed out that the demand for cattle in Kenya is higher than supply but it was found that pastoral producers still finds it hard to market their cattle at the best price. Traders, who buy from the livestock market outlet, are able to benefit from economics of scale advantages supplying processors out of Kajiado. Yet current volume supplied by individual pastoralists limited to a maximum of 5 cattle per year and this does not permit them to benefit as such. From table 5 and table G. in the annex it appeared that there is no difference in the average number of cattle off-take per pastoral cattle producers in comparison to off-take of sheep and goats off-table.

On the other hand, farm gate outlet was seen to be dominated by pastoralists who have completed upgraded their breeds could be the best outlet for better on averaged price per cattle, but the volume supplied through this outlet is also relative small (an average of one cattle per year per pastoralists) and its usually others pastoralists interested in upgrading that are buying. Despite the fact that there are two main market outlets, it was observed that there is no significant difference between price received by pastoralists from the systems of production following a negative correlations that was observed in from spearman test (Annex table E). There prices depended on marketing conditions such as the weight, age, breed, health status of animals and connection with traders. Known to pastoralists 'unwritten marketing quality measures'. Other marketing problems pointed out by Valk (2008) included transportation system (trekking over land distances before reaching the livestock market) which lead to lost of weight by cattle. For some pastoralists who are unable to trek, addition cost are incurred in marketing.

Apart from marketing challenges and cost involved that may limit the economic viability of pastoralism, production costs have been increasing over the years. Some pastoral producers cited that cost incurred on production depended on herd size, breed, farm locations and climate, the cost item that identified included; feed supplements (vitamins, salt etc.), services (advice, vaccinations, de-worming, dipping, hoof treatment), market fees / entrances, medication (vaccines, pesticides) and recently forage have been included in the list. But determining the economic potential was made difficult, due to the absence of records, inabilities of pastoralists to remember investment made per year and difficulties estimated certain cost like own labour. However, the few that could provide some figure as soon in box 1 gave interesting view on the economic situation of pastoralism, irrespective of the general low on average price offered to cattle as observed in literature (Valk 2008 and Liug 2010) and the surveys. Based on box 1, it can be argued that the prices is not low given an extra income of 30,000.00 KSH per year observed. This extra income is based on sales of 4 cattle at the price of 40,000 KSH each, considering investment in feed supplements, services, market fees and medication. But excluded; interest on land and opportunity cost for pastoral farm family labour income.

Although about 90% of pastoral producers believed that forming a marketing cooperative can assist them gain better prices and therefore higher extra income, forming such a cooperative seem impossible for about same percentage.

### **6.3. Forces influencing the economic viability of pastoral beef production**

Even with the high demand of cattle cited by Luig (2010), different forces have been pushing pastoralists from benefiting fully from the demand. A wide range of forces in Kajiado have been identified and these forces are both internal and external.

From table 7, it was observed that most forces are economic and environmental while a few are political, socio-cultural and technological. It can be argued that these forces are generally negative affecting pastoral cattle producers based on their indications. The main ones included climate change, land, price and marketing information.

FAO (2010) pointed out the changes in weather is resulting not only in poor performance of livestock but also migration of pastoralists. Furthermore, in drought period, the main consequence on pastoralists is loss of cattle due to shortage in forage and water. Therefore drought usually leads to switching from one production system to another to cope with the situation, or sales of cattle to save the money for later re-stocking when the weather is favourable again.

Land available become an issue during the group ranch era which did not properly worked out and resulted in sub-division as pointed out by Zaal (1999). This issue may not be witness the equally by pastoralists due to the criteria used in allocating land (depending on herd size), and changes that have taken place in land use (Nyssen et al. 2009). While a few own relatively large areas of land as presented under 4.1.2, migration within private land and community land is still highly common.

Regarding marketing information flow, this study has also shown that traders are more advantageous, as far as awareness of the requirements of the butchers and processors are concerned in the Kajiado chain and that beyond. Information about demand and prices is left in the hand of traders who are transmitting such information to chain actors at the lower end of the chain in a way that benefits them the most. This was supported by KIT and IIRR (2008) who argued that the beef chain in the region lack stakeholder with the right vision to develop the chain apart from protecting their interest.

Interestingly, pastoralists have their own local ways of dealing with this forces, the most commonly used mechanism when it comes to climate change and land issues; is sharing/swapping of pasture based on pre-existing social relationships and norms.

It can be argued that sales of land practice by some in order to deal with economic issues would challenge the ongoing viability and strength of social and cultural ties in pastoral societies. Other mechanisms such as leasing would be taken up in an effort to access additional pastures types. Given that not all pastoralists are involved in sharing/swapping of livestock resources the search for other options to deal with land and climate issues remains. Hence, pastoralists with less livestock in comparison to their land carrying capacity have the potential to lease out their land or pastures to others after a proper assessment of the positive and negative effects associated with leasing strategies.

### **6.4. Diversification of pastoral producers along the beef chain**

Due to the flexible and opportunistic nature of pastoralists they have been observed to be able to rapidly switch management systems as well as operating two or more systems in one overall production as a coping strategy to improve economic performances (Blend 2001). It was observed that pastoralists are not only diverse on their way of live and cattle production, they have also been adoption other functions in the beef chain. While the young and less educated are getting more involved with transportation (trekking and use of motor bikes) the wealthier are getting into trading and butchering.

Trekkers cover great distances and are the cheapest form of transportation in comparison to trucks or lorry. For this reason, this option is preferred when cattle are moved to or from short distances. However, some trekkers even go beyond Kajiado when transporting cattle and in some cases cattle change hands more than once before reaching the final destination.

Therefore, the probability of cattle losing weight is high and final prices received by the sellers may be lower.

The use of bike was observed to be limited within the divisions and applicable mostly for carcasses even though small ruminants are sometime transported on bikes. This form of transportation seems more flexible and faster and cost can easily be standardized to avoid unnecessary bargaining as compare to trekking.

Further diversification suggested by Murithi et al. (2007) into trading employed by pastoralists to manage risks as well as to improve welfare, was seen to be creating new economic opportunities for pastoral farm families. While one member is responsible for trading others are responsible for production and therefore, the profit share for such a farm family is higher than a family that focuses on production only. More also, local Maasai traders were seen to have an advantage in the region over non-locals due to their language and network but they generally lack capital to explore trading opportunities beyond Kajiado. They used their opportunistic and flexible characteristics to serve as broker or middlemen, given that some have relations with larger traders in the chain beyond Kajiado, while expanding their relations with butchers in the district, sometimes using advance communication tools like mobile phones.

Additional function of pastoralist along the chain as indicated by Luig (2010) is butchering. It was observed that there are some traders who also carry out butchering function as depicted on figure 4. Such trader/butchers may be realising more returns as they have expanded their risks in the chain. This function is also carried out by non-Maasai who have created ties with traders supplying them with beef. It can be argued that butchering is the most recent function pastoralists have considered as strategic move to increase their economic positions in the chain.

## CHAPTER 7: CONCLUSIONS AND RECOMMENDATIONS

### 7.1. Conclusions

This paper carefully examined the pastoral cattle production in Kajiado district of Kenya from an inclusive value chain wide perspective. In an attempt to classify current pastoral production system in Kajiado, on the basis of the extent to which migration in search of water and pasture as well as diversifications into crops productions is practiced, enough evidence were not observed for proper classification. The forms that may be prevailing in the district included transhumance, agropastoralism and the ranching system. Within these systems, pastoral producers are shifting from a life style and production system characterised by extensive seasonal movement and intensive short-duration grazing of successive areas, entangled with crops cultivation in some cases, to a system that is based on intensive, long-term grazing of private parcels where households have ostensibly fewer options for mobility. Pastoralists have realised that, the necessity to upgrade production and change management is a decision left in their hands. There was also general acceptance regarding improved breeds availability and that upgrading will be an instrument to fetch better prices, even though improved breeds are considered less resistance to the Maasai production environments.

More also, the organisation of pastoral cattle production in relation to the beef value chain is fragmented, hampered with insufficient and uneven access to market information (sales volumes, prices, disease status and market locations) needed in order to make timely and well-informed decisions by actors. Unfortunately, it is not possible to say who is benefiting. Pastoral producers obtain cattle market information from traders, brokers and other producers. The only two locations where they get information are either at market during bargaining or after the market during conversation with other stakeholders and at home with family and friends. Usually, they arrive at the market (Bissil or Mile 46) with information of variable degree of exactness, with no accurate knowledge of on-going prices, demand or traders to do business with. Depending on the severity and urgency of pastoral household needs, sales decisions are made regardless market information. Thus, cattle's marketing in Kajiado is a highly uncertain activity, loaded with risk, given insufficient infrastructures and the absence of an organised market institution that can coordinate flow of information; not only for the pastoralists but also other actors in the chain. Consequently pastoral producer blamed traders for not providing timely and current market information. Not knowing fully well the risk and challenges of traders such as insufficient capitals, quality standard set by processor like KMC coupled with poor road infrastructure producer will hardly understand the position of traders. This is also attributed to lack of proper linkages and transparency in the beef chain including the absence of meat processing plants in the Kajiado.

Apart from marketing challenges that are hindering pastoral producers, two other main factors included are;

- recurrent drought is causing animals loses as a result pastoralists are selling land in order restock and
- cost of input (improved breeds, supplementary feed, minerals) in addition to limited financial resources

Despite climate changes, land issues and the general low prices that constrained pastoralists to some extent, from enjoying their way of life and productions system, they seem to have been dealing with these challenges using the sharing/swapping of livestock resources mechanism. A mechanism, believed to have originated from socio-cultural norms. Price seems to be a challenge but, pastoralists may be able to generate extra income, when interest on land and opportunity cost of family labour are excluded. But the growing focus on livestock marketing and value chain as a meaningful way of income improvement as well as resilience to drought, it is imperative to expand market opportunities for pastoralists and other actors in the chain.

Thus, the diversification efforts of Kajiado pastoralists along the beef chain to cope further is ongoing; while some are entering transportation, trading and even butchering, others are moving into production of other species or crop. The worse cases are ceasing from a way of live they did enjoy for decades. With current 'unwritten marketing quality measures' regarding sales of cattle, it will not be an easy task for pastoral cattle producers with their own effort to counteract such measures. Consequently, mitigation by some is to diversify and add other functions such as transportation, trading and butchering.

## **7.2. Recommendations**

In the focus areas of this study, low weight of cattle at point of sales and insufficient flow of marketing information are the key constraints to economic benefit for pastoral producers. More also, poor marketing opportunities in the beef chain especially during non-drought times mean that traders and producers have to trek long distances to improve their selling prospects and therefore economic viability of the whole chain is negatively affected. To deal with these current and future challenges as well avoid limit ongoing debate about pastoralism at the KIT, a traditional approaches that combines pastoral life style and production is needed as suggested below under three themes.

### **Upgrading producing function**

Given the current available improve breed, changes in climate and pressure on land use, the following upgrading activities are suggested, KIT should facilitate;

- the adaptation of improved breed production by pastoralists. A few pastoralists have complete embarked on improved breed production, a structure and genetic program should be designed to encourage further proliferation of the improved breeds. The genetic objectives in that case will be to compile information on genetic parameters and estimate the economic values of current traits and the structural objects will be to spread the genetically superior traits available in the region throughout the whole population at affordable cost for pastoralists,
- forage cultivation and hay production. This is another approach to overcoming drought and feeding problem. Forage can be cultivated during the rainy season and the excess conserved, in the form of hay at the end of the main rainy season. During raining season, pastoralists are relatively free given that they do not trek far to grazed their cattle and there is no competing demand for labour.

The upgrading strategies generally include capacity building trainings on relevant techniques and provision of appropriate tools or any logistic support would contribute to interested pastoralists would solve the problem of low on average weight and point of sales and management of any given production system of that pastoralists. For long term purposes, such training may be incorporated in to basic school training curriculum in Kajiado region.

### **Facilitate pastoral farm families and friends marketing cooperatives formation**

The strategy focuses on adding value through coordinating marketing by a pastoral farm family and friends who understand and trust each other to take control over more activities in the chain. This upgrading strategy may require some skills and entails little costs given that is based in the socio-cultural norm of sharing/swapping of cattle production resources. Similarly, it was observed that some pastoralists are already taken-up function up the chain, such as family could be targeted including cattle producing friends and network of the family to form such a cooperative. Members of such a pastoral farm family and friend marketing cooperative would be able to share their knowledge and skills in the chain and responsibilities assigned according to member areas of expertise.

The cooperative will be able to developing chain partnerships with other actors especially traders and processors in the chain beyond Kajiado, centred on shared interests and mutual growth. In the way, members of the cooperative will be upgraded and their economic benefit per cattle will like increase as a result of joint bargaining and prise formation.

**Facilitates the establishment of local marketing quality standards**

As opposed to the ‘unwritten marketing quality measures’, a set of standard should be established for price determinations. The should involve all actors (producers, traders, butchers, processors, consumers) and supportive institutions (Donors, Government departments, non-governmental organisation) in order to ensure acceptance and coordination and maintenance for its sustainability. This will bring about transparency in prices which will encourage pastoralists to make better decisions about production and commercialisation given their great knowledge of adaption to different climate zones and production conditions.

However, this intervention should also go beyond the Kajiado chain and included not only important market parameter for price determination such as age, weight, breeds, health status, but also technical details of market data collection, preservation and management for future development in the beef sub-sector. This strategy also entails a system of information dissemination areas pastoralists considered important and steadfast information sources.

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## Annex

### 1. Tables

Table A: Spearman's test for correlation between age and area of land own

		Age	Total land area own/grazing
Spearman's rho Age	Correlation Coefficient	1,000	0,156
	Sig. (2-tailed)	.	0,307
	N	45	45
Total land area own/grazing pattern	Correlation Coefficient	0,156	1,000
	Sig. (2-tailed)	0,307	.
	N	45	45

Source: research survey

Table B: Average number of small ruminants owned by pastoralists

	N	Minimum	Maximum	Mean	Std. Deviation
Number of other species own in 2011	42	0	82	29,84	22,22
Valid N (listwise)	42				

Source: research survey

Table C: ANOVA Test

Number of month of migration per year

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	2,66	3	0,89	1,609	0,20
Within Groups	22,59	41	0,55		
Total	25,24	44			

Sig. level of 0.05

Figure A.

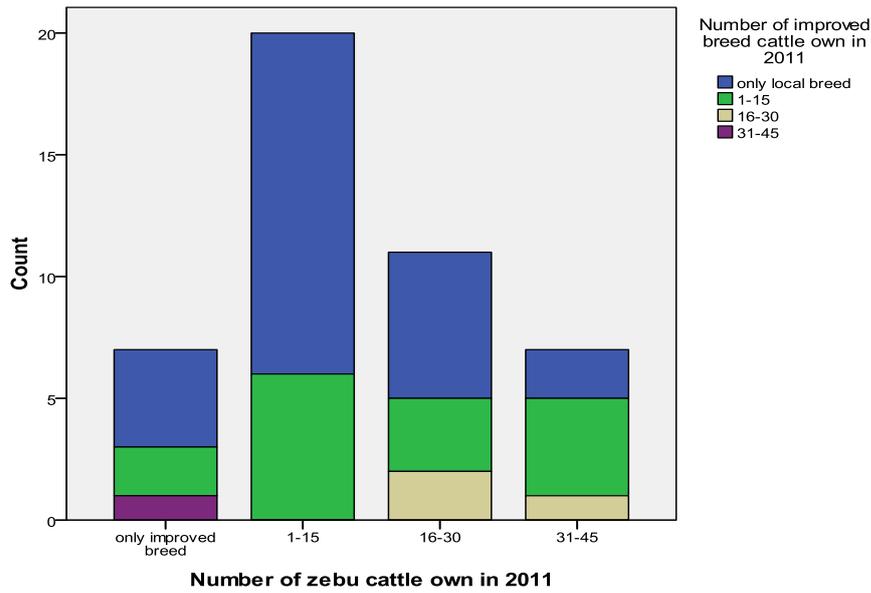
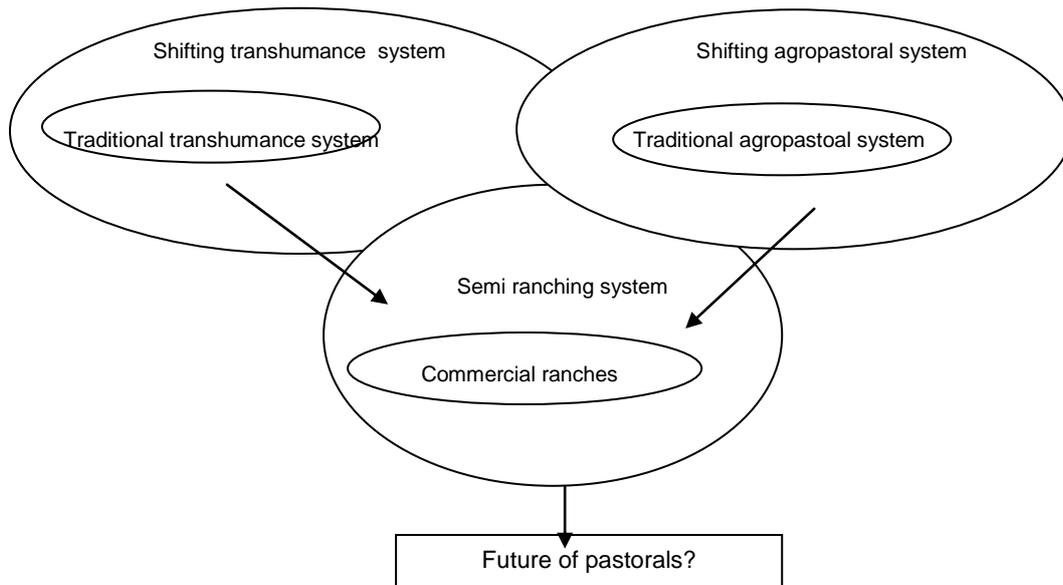


Figure B: Classification of pastoralism in Kajiado



Sources: Compile from interviews and survey

**Descriptive Statistics**

	N	Minimum	Maximum	Mean		Std. Deviation
	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic
How many goats and sheep did you sell in the last 12 months?	45	1	4	1,62	0,13	0,86
Valid N (listwise)	45					

Number of month of migration per year					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	3,10	1	3,10	6,03	0,02
Within Groups	22,14	43	0,52		
Total	25,24	44			

Table E: Correlation test between price and number of months of migration

	Number of month of migration per year	What will be the price of a bull of say 250kg
Spearman's rho Number of month of migration per year	1,000	-0,29
Correlation Coefficient	.	<b>0,065</b>
Sig. (2-tailed)	.	
N	45	45
What will be the price of a bull of say 250kg	-0,28	1,000
Correlation Coefficient		.
Sig. (2-tailed)	<b>,065</b>	
N	45	45

Significant level of 95%

**Table F: Cost item for main actors**

<b>Pastoralist</b>	<b>Traders</b>
Forage	Loading of cattle cost
Feed supplements (vitamins, salt etc.)	Transport cost
Vaccines	Market fees / entrances
Pesticides	Trading Licences
Services (advice, vaccinations, deworming, dipping, hoof treatment)	Movement permits
Losses per year (theft, disease)	Slaughter services
Market fees / entrances	Interest rates on loans
	Product losses
<b>Butchers and restaurants</b>	
Casual work	
Electricity bill	
Water bill	
Depreciation cost	
Product losses	

**Table G. Goats and sheep off-table by pastoral cattle producers**

	N	Minimum	Maximum	Mean		Std. Deviation
	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic
How many goats and sheep did you sell in the last 12 months?	45	1	4	1,62	0,13	0,86
Valid N (listwise)	45					

**Table H: Other stakeholders in the Kajiado Beef Value Chain**

Agency	Support function the VC	Implementation Mechanism
Department of Veterinary Services (MoLD)	Livestock production Trading Processing (Slaughterhouse)	Inspection, licensing and issue of health certificate Training and advisory (drugs, pesticides, feed control, feedstuffs) Extensions services (extension management, gender equality, mobilization, information provisions and publications, research and food security) Monitoring and evaluations (animal health, disease, drugs, meat)
Neighbour Initiative alliance	Training, lobbying and provision of relief aids	<b>Improving Livestock Activities</b> Livestock production: In which farmers are assisted to upgrade their breed either for dual purpose on more resistant breed by creating access to AI and improved breed. Hay production and management program for farmers <b>Land management and Social Justice Activities</b> Improved access to land as a means of production by the poor Building capacities of communities to respond to injustices <b>Increased Emergency alertness and response capacity Activities</b> Advocacy
Kenya Agricultural Research Institute (MoA)	Animal production	Research and development in animal disease control Information dissemination and advisory Laboratory analysis (drugs, animal health, animal feedings, toxins, pathogens)
Kenya Bureau of Standards (Mol)	Inputs Processing (Slaughterhouse, Butchery, Tanneries)	Development of National Standards Inspection, surveillance, issuance of certificates/reports of analysis Product certification HACCP compliance audit certificates Laboratory analysis (pathogens, aflatoxins, pesticides, water) Prosecution System certification
The Kenya Livestock Marketing Council (KLMC)	Market services	Networking and market creation Formation of marketing unit in different locations

## Annex 2

### 1. Survey Questionnaire

#### Introduction

1. Please fill in the following information

- Name.....
- Age.....Sex.....
- Village..... Marital status.....
- Number of children.....

1.1. Please circle one of the following to indicate your educational level

- Never been to school
- Primary level
- Secondary level
- Certificate level
- Diploma & above

2. Household

Are there some family members that have been absent for period longer than 6 months?  
(Please underline one answer)

- Yes (If Yes, please continue with question 2.1.)
- No (If No please continue with question 3)

2.1. Where do they live?.....

2.2. What is the reason for their absence?.....

#### Farm system identification and trends

3. What is the total size of the land you own in acres? (circle one)

- 1- 200 acres
- 201- 400 acres
- 401-600 acres
- 601 to 800 acres
- 801 acres & above

4. Where do you graze your animals? (underline one answers)

- Private land only
- Community land only
- Both private and community land

5. Where do you give water to your animals?

- Community source
- Own source
- Both community and own source

5.1. Why do you underline the option in question 4 above?.....

5.2. Why do you underline the option in question 5 above?.....

6. How many of the following categories of cattle do you have? (Please fill in the table below)

<b>Category of cattle</b>	<b>Number</b>
Zebu calves	
Zebu cows	
Zebu steers	
Zebu bulls	
Improved breeds <sup>1</sup> calves	
Improved breeds <sup>1</sup> cows	
Improved breeds <sup>1</sup> steers	
Improved breeds <sup>1</sup> bulls	

(1 Improved breeds may be Sahiwal or Boran cattle or crossbreeds)

7. Do you have other species of animals?

Choose	Species	Total
Yes		
No	Go to the question 8	

8. What was the total number of cattle in 2010? .....

8.1. How many animals were calved 2010? .....

8.1. How many die in 2010? .....

8.2. How many did you buy in 2010? .....

8.3. How many did you give to others (family members) in 2010.....

8.4. How many did you received from others (family members) in 2010.....

9. Do you only graze and water your animals all year round in this same area? (please underline one answer)

- Yes (if yes, please go to question 12)
- No (If no, please go to question 10)

10. How many months do you travel and stay out of your grazing areas per year?

- 0-2 months
- 3-5 months
- 6 to 8 months
- I never return to the same place

11. Do you take your family with you? (please underline one answer)

- Yes
- No
- Partly

12. In relation to the statement below, please indicate your degree of agreement or disagreement and explain your answer.

*“There have been positive changes in my land size and feeding of cattle since 2009”*

- Agree totally
- Agree
- Neutral
- Disagree
- Disagree totally

*“I manage improve breed differently from local breed”.*

- Agree totally
- Agree
- Neutral
- Disagree
- Disagree totally

### **Marketing and economic situation of the production system**

13. Where do you sell your cattle? (please underline the answer, multiple answers are possible)

- At my farm gate
- Livestock market
- Abattoir/slaughter house
- Others (specify) .....

14. Who is your main cattle buyer? (please underline one answer)

- Cattle traders
- Other cattle farmers
- The slaughter house

- Others (name them.....)

14.1. Why do you prefer the buyer?  
.....

15. How many cattle do you sell per year?.....

15.1. How many are Zebu cattle? .....

15.2. How many are improved breeds?.....

16. What will be the price of a bull of say 250kg (This weight will be described in terms of size and height later to interviewees)?.....

16.1. Will the price be the same for both Zebu and improved breeds of the same weight? (please underline one answer)

- Yes (if yes, please go to question 16.2)
- No (If no, please go to question 17)

16.2. What is the difference?.....

17. What help formulate the price in Question 16 above?.....

18. Who determines the final price of your animal?.....

19. *What cost do you incur per year in your cattle? (This question is more for the case study)*

Items	Amount per year in KSH
Veterinary drugs	
Veterinary services	
Purchase of cattle	
Feed and salts	
Dipping of cattle	
Extra hired labour	
Own labour (hours)	
Others (specify)	

20. In relation to the statement below, please indicate your degree of agreement or disagreement and explain your answer.

*One can make enough money from producing cattle only in this region'*

- Agree totally
- Agree
- Neutral
- Disagree
- Disagree totally

21. How many goats and sheep did you sell in the last 12 months?.....

21.1. What was the price your receive per goat/sheep?.....

22. Apart from income you get from sales of cattle, sheep and goats, do you have other sources of income? (please underline one answer)

- Yes (if yes, please go to question 21.1)
- No (If no, please go to question 22)

22.1. Name the sources .....

23. Do you or other family also produce crops for family consumption? (please underline one answer)

- Yes (if yes, please continue with question 23.1)
- No (If no, please go to question 24)

23.1. What type of crops? .....

24. In relation to the statement below, please indicate your degree of agreement or disagreement and explain your answer.

*'I do not buy extra crops for my family'*

- Agree totally
- Agree
- Disagree
- Disagree totally

**Forces promoting or hindering pastoralists**

25. Which of the factors listed below do you know they are promoting your cattle production system? (Give a score between 1 and 5. the higher the score the higher it's promoting you)

Factors	Score				
	1	2	3	4	5
Prices					
Improved breed availability					
Weather					
Feed availability					
Land availability					
Labour availability					
Support from stakeholders (training services, policy and credit)					
Disease					
Husbandry skills					
Cost of input (medication, salt etc)					
Government policy					
Predators					
Thieves					
Marketing					
Capital					
Others (namely.....)					

26. How do you deal with the factors above that scored 3 and below?  
.....

27. In relation to the statement below, please indicate your degree of agreement or disagreement and explain your answer.

*"There is sufficient production and marketing information flow in the beef chain in the region"*

- Agree totally
- Agree
- Disagree
- Disagree totally

*"Working in cooperation with other farmers for marketing of cattle is one of the best ways to improved my financial benefits per cattle"*

- Agree totally
- Agree
- Disagree
- Disagree totally

*"Forming farmers marketing cooperation is not feasible"*

- Agree totally
- Agree
- Disagree
- Disagree totally.

## 2. Checklist for interviews

### Cattle traders/brokers

#### Introduction

- Names, age, village name, motivation as a trader
- When did you start your trading cattle?
- Which areas do you cover in your business?

#### Trading system, management and input suppliers

- How many day per week do you actively search for cattle to buy and sell?
- Who are business partners (Pastoralists, processors, traders, butchers, capital providers)
- How do you make the choice of an animal to buy or what are the criteria or quality attributes for selecting an animals?
- Are farmers aware of these criteria?
- How do you determine the price?
- Do you buy from the same sources (pastoral or ranch)? If not what is the number you buy from each source per week or per month?
- Has your buying power changed over the last two years, if so how?

#### Marketing and economic situation

- How much do you buy one animal of say 250kgs?
- How do you transport the animals to the market if you do not slaughter at the nearest slaughter house? What is the cost of transporting one animal in that case?
- How does breed of cattle influencing the price you offer farmers and the amount your get at sales?
- What is the price you sell a kg beef?
- What also influences the price of each outlet?
- What are you doing to improving on your trading function in the chain?
- Is there enough and open information flow in the market (price, cost, quality/quantity needed etc)
- Do you belong to any cattle trader's group?
- How do you deal with transport?

#### Forces affecting traders and future thinking

- What are the main challenges you are facing in trading cattle?
- How do you deal with them?

### Butchers

#### Introduction

- Names, age, village name, family status, motivation as a trader
- When did you start your butchering cattle?
- How many people work with you and what are their functions?

#### Butchering system, management and input suppliers

- Have anything change in you business since you started, if so, what has changed?
- What support services are provided to you in your business?
- Who are business partners (traders, other butchers, capital providers)
- How much do you buy one a carcass of say 80kgs? How much and who determine the cost?
- Do you buy from the same sources (traders)? If so (or not) what is the quantity you buy from each source per week or per month?
- Has your buying power changed over the last two years, if so how?

#### Marketing and economic situation

- How do you transport the animals to the market? What is the cost of transporting one animal?
- Where are how do you sell the cattle? (What are the main market outlets?)
- What percentage is given through each outlet? Are the prices per outlet the same?
- How much and who determines the price?
- What also influences the price of each outlet?
- What are you doing to improving on your marketing?
- What are the cost involved in your business?
- Is there enough and open information flow in the market (price, cost, quality/quantity needed etc)
- How do you deal with transport?

#### Forces affecting butchers and future thinking

- What are the main problems you are facing in trading cattle?
- How do you deal with them?
- How do you deal will quality issues?
- What role is the government playing for your business success?
- What are your plans for the future?
- Are you actively working toward this; If so how?

#### **Checklist for District Livestock production and veterinary Officers**

##### District livestock population and profile

- What is the area under your jurisdiction and the current population of livestock?
- How has this change over the years?
- Possible beef chains in the region

##### Livestock production

- What is the system practice in the area and how are they changing?
- How has the farming system improved?
- What are the reasons for this?
- Who are the main stakeholders and how are they working on improving cattle production in the area?

##### The beef chain

- Apart from farmers, who are the main actors in the chain and what are their functions?
- How organized are farmers in relation to the beef chain?
- Are there some farmers that are also involved in other functions in the chain, if so which function?
- How is transporting and processing of beef and by products done?
- How are retailers (butchers and restaurants) organized?
- Is there enough and open information flow in the market (price, cost, quality/quantity needed etc)

##### Price situation and potential

- How are prices formulated?
- What possibilities are there for new start-ups?
- What are the most influential in the chain?
- What is major cost items involved in the beef chain in the region?

##### Challenges

- What are the main challenges?
- How are actors dealing with such challenges?
- What support services are offered by your department?
- Do you also face limitation in your effort to supporting the chain?

## **Check list for cattle slaughterhouse/processors/restaurants.**

### Background information

- How is the slaughter house or facility organised?
- Capacity or number of animals slaughtered per day
- Ownership of animals slaughtered
- Business model

### Functions in the beef chain

- What are the key functions and how are they executed?

### Livestock procurement

- Where and how do you get cattle to slaughter or processed?
- Any contract with chain actors?
- Any conditions for actors to supply livestock?
- What is the holding capacity of the facility?

### Communication and Marketing

- Who are the main clients?
- How do you reached out to clients?
- What are the main products?
- What percentage of your product is supplied through each market out let?
- What is the price situation?
- How is transport organised?

### Quality and waste management

- How do you deal with quality issues and waste management?

### Challenge of facility and coping strategies

- What are the main challenges and coping strategies?

## **Checklist cattle transporters**

### Introduction

- Names, age, village name, motivation as a transporter
- When did you start your transporting cattle and do you also transport other animals?
- Which areas do you cover in your business?

### Transporting system

- How many day per week do you actively transport cattle?
- Do you transport your own animals also?
- Who are partners (Pastoralists, processors, traders, butchers)
- How do you transport carcasses?
- How do you determine the price?
- Has your transporting power changed over the last two years, if so how? (volume transported per week, mode of transport etc)

### Economic situation

- From where do you mostly transport animals, and what is the common destination where you deliver?
- How much do you transport one live animal and/or carcass of say 250kgs?
- How does breed of cattle influencing the price you charge for transporting?
- What are the costs you make in transporting?
- What are you doing to improving on your transporting function in the chain?
- Do you belong to any cattle transporter's group?

### Forces affecting transporting and future thinking

- What are the main challenges you are facing in transporting cattle or carcasses?
- How do you deal with them?

### 3. List of interviewed stakeholders

<b>Chain stakeholder</b>	<b>Name of interviewee</b>
Butchers	<ol style="list-style-type: none"><li>1. Ng'ang'a Kenneth (Saferi Butcher)</li><li>2. Feslus Muthoka David (Nasaro Butchery)</li><li>3. James Mutunga (Gesarate Bar resto and Butcher)</li></ol>
Trader/brokers	<ol style="list-style-type: none"><li>1. Loody Ole Kiria</li><li>2. Stephen Lesiamon</li><li>3. Donald Milia</li></ol>
Service provider	<ol style="list-style-type: none"><li>1. Kenny Matampash (Neighbour initiative alliance)</li><li>2. Penina Mutua and</li><li>3. Justus Gathogo (Ministry of livestock)</li></ol>
Slaughter houses/processors	<ol style="list-style-type: none"><li>1. Adan B. Hussein (Kenya meat commission)</li><li>2. Tutui James (Bissil slaughter house)</li></ol>
Restaurants	<ol style="list-style-type: none"><li>1. Suleman Osman (Sissilers Hotel restaurant)</li><li>2. Muthami Peter (Nyambene bar and restaurant)</li></ol>
Transporters	<ol style="list-style-type: none"><li>1. Lesiamon Anthony</li><li>2. Simon Katina</li></ol>

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