Analysis of the Kenyan Livestock Market
And Feasibility Study Of A Livestock Business

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ABSTRACT
The livestock sector is an important global player with significant and wide-ranging social, economic and environmental impacts. Worldwide, livestock production provides livelihoods for 1 billion of the world’s poor. However, the livestock sector is also a major driver of deforestation, land degradation, pollution, climate change and biodiversity loss.

Kenya is a clear illustration of livestock’s complex social, economic and environmental roles. In the Arid and Semi-Arid Lands (ASALs) of Kenya, the livestock sector provides livelihoods for 95% of families and employs 10 million people. However, pastoralism in ASALs faces many challenges. Population and livestock growth has led to overgrazing, creating a negative-feedback loop of environmental degradation, reduced livestock yields and greater poverty. In addition, pastoralists lack access to capital, markets and extension services, such as veterinary care.

This report conducted an analysis of the livestock market and feasibility study of a social business that trains pastoralists in better land management techniques called Holistic Management. The study interviewed 30 pastoralists, from the village of Olekimunke, examining the different challenges they face raising livestock and their interest in the business model. Based on the information provided in interviews, pastoralists in Olekimunke are experiencing negative environmental change due to land degradation and desertification. These negative processes are partially driven by climatic factors, such as more frequent and severe droughts, as well as increasing human settlement and changes in land rights and practices. In addition, the markets in which pastoralists depend on to meet their subsistence livelihoods, do not provide enough services.

The business model proposed in this document offers a potential solution to the environmental and market challenges faced by pastoralists in Olekimunke. The model provides pastoralists with the training and resources to implement Holistic Management and provides a vehicle through which the pastoralists can organize and successfully manage their land. Furthermore, the Company increases pastoralists access to capital, markets and other resources, such as training, which will further improve their livelihoods. As a result, pastoralists expressed a strong interest in the business model, which can potentially improve their livelihoods, thus demonstrating both its feasibility and viability.
# TABLE OF CONTENTS

INTRODUCTION .......................................................................................................................... 1
  Global Livestock Sector ........................................................................................................... 1
  Kenya Livestock Sector .......................................................................................................... 1
    Challenges to Pastoralism in Kenya ..................................................................................... 2
Holistic Management .................................................................................................................. 10
Current Work on HM & Market Challenges ............................................................................ 12
Business Overview ..................................................................................................................... 14
Research Objectives .................................................................................................................. 15
Study Area ................................................................................................................................ 15
METHODS .................................................................................................................................... 16
RESULTS ....................................................................................................................................... 17
  Community Demographics ..................................................................................................... 17
  Livestock Demographics ....................................................................................................... 18
  Markets & Market Participation ............................................................................................... 20
    Buying and Selling Patterns ................................................................................................. 21
    Market Prices and Variations ............................................................................................... 23
  Markets .................................................................................................................................... 25
  Market Services ....................................................................................................................... 27
Environmental Issues and Change ............................................................................................... 30
Land Management ....................................................................................................................... 34
  Holistic Management ............................................................................................................. 36
Challenges for Pastoralists .......................................................................................................... 37
  Grazing Challenges ............................................................................................................... 37
  Overall Challenges ............................................................................................................... 41
Business Model ............................................................................................................................ 44
DISCUSSION ................................................................................................................................. 46
  Pastoralist Profile .................................................................................................................... 46
  Business Model ....................................................................................................................... 51
CONCLUSION ................................................................................................................................. 54
ACKNOWLEDGEMENTS ............................................................................................................... 55
BIBLIOGRAPHY ............................................................................................................................. 55
APPENDICES ................................................................................................................................. 63
INTRODUCTION
Global Livestock Sector
The livestock sector is an important global player with significant and wide-ranging social, economic and environmental impacts. Worldwide, livestock production employs 1.3 billion people, providing livelihoods for 1 billion of the world’s poor, and accounts for 40 percent of global agricultural GDP. It is also the single largest anthropogenic user of land, accounting for 70 percent of all agricultural land and 30 percent of the land surface on the planet.

However, the livestock sector is also a major driver of deforestation, land degradation, pollution, climate change and biodiversity loss. The industry is responsible for degrading 20 percent of the world’s rangelands and producing 18 percent of worldwide greenhouse gas emissions; overall, threatening 306 of the world’s 825 eco-regions.

The impacts of the livestock sector are expected to only increase in the future. Due to population and income growth, global meat demand is projected to more than double from 229 million tons in 1999/2001 to 465 million tons in 2050. However, current levels of production are unsustainable and to just maintain current levels of environmental damage, the impact per unit of livestock production must be cut in half by 2050. This is particularly true in Africa where the livestock sector is the fastest growing agricultural sector, largely driven by growth in demand. Over the next 20 years, meat consumption in Africa is expected to grow by 50%, an addition of 100 million tons, due to the combination of rising population, per capita income, consumption, and urbanization.

Kenya Livestock Sector
Kenya is a clear illustration of livestock’s complex social, economic and environmental role. The livestock sector contributes approximately 12 percent of national GDP ($4.5 billion per year), 40 percent of the agricultural GDP and employs 50 percent of the agricultural labor force. This industry, particularly the beef sector, is ranked as one of Kenya’s fastest rising economic sectors. Per capita meat consumption, stood at 10.8 kg. in 2003, 75 percent of which was beef. Meat consumption has increased by nearly 10 percent in the past six years. Consequently, beef production has grown since 2001 from 287,000mt per year to about 300,000mt in 2008, with steady growth projected over the coming years.

Kenya’s livestock base is estimated at 60 million units comprised of approximately 29 million indigenous and exotic chickens, 10 million beef cattle, 3 million dairy and dairy crosses, 9 million goats, 7 million sheep, 0.8 mi camels, 0.52 mi donkeys and 0.3 million pigs. Though Kenya is almost self-sufficient in livestock production, the country is still a net importer of beef

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2 Ibid
3 Ibid
7 Ibid
mostly from neighboring countries, such as Somalia, Ethiopia, and Tanzania. As a result, Kenya is part of a regional market where livestock move across porous boundaries according to market dynamics with Nairobi as the focal point and main driver of demand.

The Arid and Semi-Arid Lands (ASALs) of Kenya, defined as areas with less than 700mm of annual precipitation, are a key component of the country’s livestock production base. This region constitutes 80 percent of the land and where 60 percent of Kenya’s livestock herd can be found.\(^8\) Consequently, approximately 90 percent of the total meat consumed in Kenya comes from ASAL and other pastoral herds, which is valued at $800 million.\(^9\) Though the livestock sector in ASALs is an important source of meat for Kenya, it is also a significant form of income and livelihood for people living in this region. In ASALs, the livestock sector employs approximately 90% of the ASAL workforce, 10 million people, providing 95% of ASAL household income. This is an essential source of income for a region with a poverty rate of 65 percent.\(^10\) However, pastoralist in Kenya suffers from several key constraints that have or continue to negatively impact pastoralism.

**Challenges to Pastoralism in Kenya**

This section will discuss the numerous challenges that confront pastoralists in Kenya and other parts of the world. It will begin will a discussion on the political and land rights issue that impact pastoralists, followed by the environmental facts that threaten pastoralism. The section will conclude with remarks on the market barriers and challenge encountered by rural pastoralists.

**Political**

Pastoralists in East Africa and the Horn of Africa are some of the most marginalized and underrepresented groups in society.\(^11\) In Kenya, this is a historical trend dating back to colonial times and post-independence, driven largely by issues of geography, ethnicity and economics.\(^12\) Pastoral communities in the ASALs of Kenya tend to be located in remote areas and maintain a nomadic lifestyle, with no permanent settlements. Geographic remoteness and nomadism, along with tribalism, have undermined political representation of ASALs and engagement by pastoralists.\(^13\) As a result, the Kenyan government has historically had little interest in the needs and interests of pastoral communities, which also represent a minority vote.

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The disenfranchisement of pastoralists is also linked to policies surrounding development and economics. In government circles throughout Africa, pastoralism has and continues to be linked to backwardness, poverty, and an outdated mode of life, in need of replacement with modernity.\textsuperscript{14} As a result, national economic policies have prioritized sedentary lifestyles and non-nomadic agriculture in national development plans, showing less interest in pastoral livelihoods and further development in these areas.\textsuperscript{15}

In Kenya, during the 1970s, the development policy for ASALs was unfavorable toward nomadic pastoralism, as pastoralists were encouraged to settle in ranches with assigned grazing lands, which denied traditional land rights.\textsuperscript{16} These initiatives along with political marginalization, led to chronic underdevelopment and investment in the ASAL region which undermined livelihoods in pastoral areas. This is despite the fact that pastoralism is often the only suitable economic activity in these dry, arid regions.\textsuperscript{17}

In recent years the Kenyan government has become more focused on arid regions, developing policies and initiatives to support pastoralism, promote livestock trade and economic development in these regions. In 2008, the government launched the Ministry of State for the Development of Northern Kenya and Other Arid Land, to manage and lead the economic development of the ASALs. This coincided with the development and later approval in 2012 of the National Policy for the Sustainable Development of the Arid and Semi-Arid Lands of Kenya. This policy document acknowledges the problems faced by the ASALs and established the government’s new focus on fostering development for pastoral communities.\textsuperscript{18}

To promote economic development and pastoralism the government envisions constructing road networks, establishing market information systems and slaughterhouses, and improving rangeland management, as well as investing in animal health and disease control.\textsuperscript{19} If effectively implemented these initiatives could significantly improve the livestock trade and the livelihoods of pastoralists in the ASALs, but this remains to be seen.

\textit{Land Rights}

In the arid regions of Africa, the Mideast, Central Asia, grazing lands are frequently managed and owned as communal property, often by a village or several neighboring villages.\textsuperscript{20} This

\begin{itemize}
  \item \textsuperscript{15} Ibid
  \item \textsuperscript{17} Brooks, N. (2006). Climate Change, Drought and Pastoralism in the Sahel. World Initiative on Sustainable Pastoralism.
\end{itemize}
tradition and culture of communal land ownership and management is a defining part of pastoral societies.\textsuperscript{21} In some societies, pastoralists use collective terms for waterpoints and grazing land. However, this can be both inclusive and exclusive as a resource can belong to one community but not another.\textsuperscript{22} Pastoralists in northern Kenya follow similar land right practices, where resources such as grazing land waterpoints are considered common property.\textsuperscript{23} To summarize, the rangeland in Kenya “is managed under a communal land tenure system based on non-exclusionary, flexible and negotiable rights of use”.\textsuperscript{24}

However, many governments, particularly in Africa, do not fully recognize the communal land tenure rights of pastoralists.\textsuperscript{25} In Kenya, the government historically has not acknowledged the traditional ownership rights and institutions of pastoralists around natural resources management. Instead the government has tried to introduce and enforce formal institutions, where land is characterized as: government, private or trust land. In this system, the ASALs were Trust lands, which were managed and administered by County Councils.\textsuperscript{26} These government bodies exercised strict control over land allocation and were often unaccountable to local communities, granting groups access to grazing lands and water, under the auspice of “freedom of movement”, without local conciliations or considerations.\textsuperscript{27}

This institutional arrangement led to undesirable results in Kenya, as it eroded traditional institutional resource arrangements and weakened pastoralists’ ability to manage natural resources. In essence, the granting of resource rights by local government, instead of customary leaders or elders through traditional negotiations, constituted, in the eyes of pastoralists, open and unregulated access to these resources (e.g. pastures and water).\textsuperscript{28} Ignoring the customary rules of granting access to common property codified through traditional rights, granted to access common property, which created the perception of trespassing and uncertainty over ownership. This uncertainty, sets up a classic “Tragedy of the Commons” situation, in which there is no incentive to sustainably manage land.\textsuperscript{29} As a result, lands were exploited, causing environmental degradation, and fought over by pastoralists, causing conflict and insecurity in pastoral areas.

Fortunately, the Kenyan government has taken steps recently to reform land rights. The new Kenya Constitution, ratified in 2010, has brought major legal changes to land rights, reclassifying land categories, replacing Trust lands with Community lands. According to the

\textsuperscript{23} Ibid
\textsuperscript{24} Ibid
\textsuperscript{29} Hardin, G. (1968). The tragedy of the commons. science, 162(3859), 1243-1248.
Constitution, the community lands are owned and held by the communities. In addition, the Kenyan government approved a new National Land Policy in 2009, which recognized the need to secure land tenure rights and acknowledges pastoral communal land rights as a unique land rights category. However, this does not guarantee that pastoralists’ land right will be secured as specific legislation has yet to be formulated and these policies will ultimately have to be enforced by government bodies, which have often neglected pastoralists.

**Climate Change**

The impacts of climate change will negatively affect the poverty and development problems faced by pastoral communities throughout Africa. Pastoralism is heavily reliant on seasonal weather and rainfall patterns and for thousands of years, pastoralists have managed climate variability. However, with increasing global temperatures and climate disruption, pastoralists are facing climatic challenges. In the past few decades pastoralists in East Africa have experienced successive poor rains, frequent and more severe drought and unpredictable rainfall patterns. Before 1990, droughts used to occur every seven to ten years but recently occur every five years or less. Two severe droughts occurred in 1999-2000 and 2009-2010, with the most recent being considered to be the worst in living memory as it caused herd losses of at least 75%. This climatic variability limits rangeland regeneration, reduces pastoralists’ grazing land and their ability to effectively manage their resources, and lessens the time interval in which to rebuild assets and resource reserves. These challenges have contributed to worsening resource management, environmental degradation and decreasing livestock production in the region.

Climate scientists predict that these climatic trends will continue in the short term (10-15 years) but are likely to change again after the next 15 years. In the long term, experts predict that temperature will increase 1°C by 2020 and 1.5°C by 2050. In addition, climate change will bring an overall increased rainfall, especially during the short rains (October-December), which will increase up to 60 percent by 2050 (The impact of climate change on the long rains (March-
May) is less well understood. This could significantly benefit pastoralists as more rainfall during the short rains will generate more pasture that could sustain cattle through the dry season.

**Land Degradation**

Worldwide, drylands are experiencing severe environmental degradation and desertification, defined as the reduction in the productive potential of the land, due to various human activities, such as livestock production. In the ASALs of Kenya, excessive pressure on grasslands due to livestock grazing has negatively impacted the production potential and carrying capacity of the grasslands. The rapid growth of the pastoralist communities and corresponding increase in livestock numbers has led to overgrazing and expansion of grazing into marginal lands, causing severe degradation, reduced livestock yields, thus leading to greater poverty (See Photo 1). In addition, extensive land degradation has reduced the amount of grass cover, leading to a depletion of the natural seed bank, with the local extinction of perennial grasses, causing severe soil erosion, reduced water retention, and reduced carrying capacity (See Photo 2). In some areas the land is grazed until it is bare leading to malnourished animals and even livestock deaths.

As a result, in 1997, 64 percent of Kenya’s landmass was subject to moderate land degradation and about 23 percent to very severe degradation problems. In ASALs, 12.3 percent of land suffers from severe degradation, 52 percent from moderate degradation and 33 percent is vulnerable to land degradation. Environmental degradation in Kenya has direct and quantifiable economic costs. Annually, Kenya losses (4.5E21 sej) of soil due to erosion per year or equal to $390 million USD or 3.8% of GDP annually, with communal rangelands contributing a significant proportion to soil loss.

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39 Ibid
44 Ibid
Limited Access to Services and Markets

ASALs are the least developed regions of Kenya, due to years of economic and political marginalization, along with improper development policies, as previously discussed. Over the decades, there has been a severe lack of investment in infrastructure and economic development, creating large deficiencies in public services. Consequently, pastoralists in these remote, under-developed areas are often unable to or have limited access to markets and livestock-related services (See Figure 1). The lack of these markets and services is a major detriment to pastoralist income and livelihoods and inhibits market efficiency. (For a SWOT analysis of the livestock sector see Appendix A)

Inadequate infrastructure (roads, stock routes, holding grounds) is a significant constraint in the ASALS, contributing to the inefficiency of livestock markets. Most of the infrastructure is dilapidated or non-existent, as the government allocated insufficient funds to maintain it in these regions. As a result, transporting and marketing livestock to terminal markets, such as Nairobi, is often a costly, risky, time consuming and inefficient process. To compensate for these inefficiencies, pastoralists rely on a system of marketing chains, connecting primary markets to terminal markets.

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50 Ibid
These chains are composed of a network of suppliers and traders, a system that is also inefficient.\textsuperscript{51} This is due to the high number of agents/middlemen and the relatively high levels of risk and costs to which the middlemen are exposed. For instance, long travel distances, high animal mortality en-route, banditry, high transport costs, and local trade taxes. Transportation constitutes the largest cost in livestock trading, representing 25 to 40\% of the total cost of transporting livestock to terminal markets.\textsuperscript{52} In addition, the stocks may trade hands two to three times en-route to the end market, generating transactional costs. To cover these risks and high operational and transactional costs, middlemen charge high margins.

These costs are passed onto and borne by pastoralist, as they receive a lower effective price for their animals, and thus profiting the middleman at the producers’ expense. As a result, pastoralists are able to collect only 40-50\% of gross livestock sale value and realize only 5\% net returns on their marketing and herding investment.\textsuperscript{53}

Pastoralists in ASALs also lack sufficient access to livestock-based services, which are often located in the far-away urban centers and markets. In particular, pastoralists lack access to financial services, such as credit facilities, which impedes livestock production and marketing.\textsuperscript{54} Specifically, pastoralists face difficulty acquiring loans, due to logistical issues of traveling and applying at bank branches. More importantly, pastoralists often don’t qualify for traditional loans, as they lack collateral since conventional banks don’t consider livestock as equitable assets.\textsuperscript{55} The financial services accessible to pastoralists in ASAL region are limited to savings and credit groups, managed through NGOs and micro-credit institutions. However, these institutions offer limited credit opportunities and are not professional managed, as the NGOs lack the business skills.\textsuperscript{56}

\textsuperscript{56} Ibid
In addition, pastoralists in ASALs are often unable to access proper animal health and veterinary services. Previously, livestock health provisions, such as clinical and dipping services, were provided and subsidized by the government, and delivered through a robust network of government employed veterinarians. Following policy reform and the implementation of Structural Adjustment Programs (SAPs) in the 1990s, these animal health services were liberalized and largely relegated to the private sector. Over time, livestock services provided by the government diminished, leading to poor animal health outcomes. This has contributed to the outbreak of livestock diseases, such as Rift Valley Fever and Foot and Mouth Disease, which has limited the marketing of livestock and resulted in export bans from Europe and other countries. This has limited the markets available to pastoralists, negatively impacting their livelihoods, particularly those in the remote areas of the ASALs.

Market liberalization also took a significant toll on breeding services and the delivery of Artificial Insemination (AI) to pastoralists in Kenya. Previously, the Kenyan government provided AI services through the Kenya National Artificial Insemination Services (KNAIS), which peaked in 1979 when it performed 542,000 inseminations. With SAPs, AI services were also liberalized and the number of insemination performed by KNAIS in 2000 dropped to 7,000. Unfortunately, the number of inseminations provided by private providers did not keep pace with the decline in the public sector, only performing 74,000 inseminations in 2000. The precipitous drop in breeding services may have caused a decline in the genetic quality of Kenya’s livestock population. As of 2007, there are approximately 500 private AI providers in Kenya, but many pastoralists now rely on NGOs to provide breeding services.

**Livestock Breeds**

Pastoralists in ASALs use a mix-herd system of cattle, sheep and goats breeds to stock their herds. The most common breed used in the ASALs is the native East African Zebu cattle as it is adapted to live under semi-arid climatic conditions and can tolerate water stresses, poor nutrition and harsh climates. In addition, Zebu cattle are resistant to disease and are able to travel long distances. Due to its popularity, the Zebu produces approximately 67% of beef marketed in Kenya. However, the Zebu breed is regarded as inferior to exotic breeds due to its low productivity and growth rate, taking five to seven years to reach a live weight of 300-400 kg.

Breeds such as the Boran and Sahiwal are also relatively common in Kenya, but are mostly found on commercial ranches. These breeds are exotic to Kenya but are preferred as they are adapted to dry, arid conditions but have high productivity and growth rate. The Boran cattle can

60 Ibid
64 Isaac Nemuta, personal communication, March 30, 2014.
reach a live weight of 400-500 kg within three years, making it more productive than the Zebu. However, most pastoralists have limited access to these improved breeds due to limited availability and financial constraints.

Pastoralists also rely on a number of goat and sheep breeds, collectively known as “shoats”, in their herding system. Generally, in the ASALs the most common goat breeds are the East African goat and Galla goat, which reach approximately 50 kg live weights. As indigenous breeds, these goats are well adapted to the hot and dry climates of arid regions. For sheep, the most common breeds in arid areas are the Black-head Persian and Red Maasai. These breeds typically reach approximately 40 kg in size. Like the goats, the sheep breeds are also adapted to the dry climates of arid regions.

**Holistic Management**

One potential solution to the environmental challenges faced by pastoralists is Holistic Management (HM). HM is a Ranch Planning System that helps pastoralists and land stewards better manage agricultural resources. In this system, land is managed on a large-scale and the livestock are grazed in concentrated groups, mimicking wild herds, within demarcated areas. The cattle are moved daily, rotating through the landscape, on a pre-prescribed basis, allowing previously grazed grass enough time to regenerate (See Figure 2).

This system enhances natural processes, such as nutrient and water cycling, since bunching cattle together concentrates hoof action, which increases soil aeration and water infiltration and accelerates the breakdown of organic matter. The clustering of livestock also increases the concentration of urine and manure deposits which increases soil fertility. In essence, holistic management uses cattle grazing as a tool, where the timing and impacts of grazing are managed to shape ecosystem processes and rehabilitate the land.

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67 Ibid
Holistic Management was first developed in Zimbabwe, by Alan Savory, during the 1960s. Today, HM is practiced in many countries across the globe, including Canada, United States, Mexico, Australia, South Africa and others. It is estimated that nearly 12 million hectares are currently managed under HM principles. HM has been shown to rehabilitate habitats by reducing overgrazing and erosions and enhancing natural processes, such as nutrient and water cycling (See Photos 3 and 4). As a result, land productivity increases, generating higher beef production rates of up to 50 percent, and ROA up to 200 percent, while sequestering carbon into the soil at 0.1-5.3 T C · ha⁻¹ · yr⁻¹ (Roughly equivalent to removing 1 car off the road). Overall this holds the promise of reversing the processes of desertification and climate change, while significantly improving the livelihoods of pastoralists.

Holistic Management has been successfully implemented by pastoralists and ranchers across the world. One of the most prominent examples of this is in Zimbabwe, where the African Center for Holistic Management worked with the Hwange community to manage an 8,000 ha property of private and state land, using HM. Since 1998, the project has nearly tripled the meat production rates of the land, while reducing bare ground and soil erosion. The organization subsequently expanded into neighboring communities. Holistic Management has been introduced to other pastoral communities in Sub-Saharan Africa, particularly in Namibia by organizations such as the Integrated Rural Development and Nature Conservation (IRDNC). Working with pastoralists in the Kunene region, IRDNC introduced HM to the pastoralists, which has generated improvements in land and animal productivity and has been well received by the government, local officials and farmers.

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78 Malmberg, A. (n.d.). African Center for Holistic Management Case Study. Savory Institute
Current Work on HM & Market Challenges
Currently, a number of NGOs and other organizations in Kenya are supporting the implementation of Holistic Management in pastoral communities and working to address the market challenges faced by pastoralists. Northern Rangeland Trust (NRT) is one of the preeminent organizations working on these issues in Kenya. Formed in 2004, NRT is an umbrella body of 26 community conservancies who own and manage an area greater than 25,000 km² throughout northern Kenya.

In 2010, NRT launched a holistic rangeland management program in the West Gate Community Conservancy with the goal to rehabilitate the land through planned grazing and reseeding activities. The program began with a pilot project but has since been implemented in several NRT conservancies, encompassing 307,481 ha of land. So far, the program has rehabilitated 624 hectares and reduced the amount of degraded land by 10%. NRT also manages ‘Linking Livestock Markets to Wildlife Conservation’ program, which purchases livestock, at higher-than-market price, from conservancies in order to support pastoral livelihoods and provide incentives for proper rangeland management. To date, the program has purchased over 5,000 cattle from 2,000 conservancy members, generating $1,467,000 USD in financial returns.

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81 Ibid
84 Ibid
Despite the success of these programs, NRT requires $1.2 million USD from donors each year to cover the $1.5 million cost of operating these programs and the conservancies.\textsuperscript{85}

CARE International is another prominent organization in Kenya that worked to improve market access for pastoralists in ASALs. In 2007, CARE launched the Livestock Marketing and Enterprise (LIME) program with the aim to develop a financially sustainable livestock marketing system that would link pastoralists in northern Kenya to markets in Nairobi and Mombasa.\textsuperscript{86} In this, CARE helped pastoralists form groups and acted as an alternative buyer, purchasing livestock for fattening and subsequent sale in commercial markets. The purpose of forming the groups was to increase cooperation and collective bargaining among the pastoralists, as well as reduce transportation and operational cost of the groups and CARE. The program was successful in increasing the incomes of group members by $700 to $1,200 USD during the duration of the project.\textsuperscript{87}

However, the LIME program was financially unsustainable and shut down. Upon review, staff members identified their lack of experience and knowledge in the livestock industry and purchasing livestock. This led the staff to purchase cattle based only on weight and not the quality or age of the animals. Pastoralists took advantage of this discrepancy, selling poor quality livestock to CARE and receiving high prices. Furthermore, CARE was perceived as a charity, making it difficult for staff member to negotiate favorable prices. High prices offered for the poor quality cattle along with the cost of transportation and operations led to the loss of significant amounts of money.\textsuperscript{88}

Other organizations in Kenya, such as One Acre Fund and Komaza, are working to improve access to markets and services for rural communities, outside the livestock sector. Founded in 2006, One Acre Fund offers farmers with inputs, such as enhanced seeds and fertilizer, and technical advice, all on credit. The organization primarily operates through field officers who work with groups of around 200 farmers. To date, One Acre Fund has reached over 150,000 farmers, increasing incomes by over 50%, while covering 80% or more of its costs.\textsuperscript{89} Komaza, founded in 2006, promotes micro-forestry and provided farmers with agriculture inputs, such as saplings and fertilizer, and training on credit. In addition, they offer access to markets through their vertically integrated value chain services. By 2012, Komaza has enrolled 2,860 farmers and planted more than 660,000 trees.\textsuperscript{90}

\textsuperscript{87} Ibid
\textsuperscript{88} Ibid
Business Overview
To address the issues faced by pastoralists as described above, I developed and investigated a social enterprise model that engages pastoralists in the practice of Holistic Management. The objective of the Company is to provide sustainable income-generating opportunities to local pastoralists, by utilizing better rangeland management techniques to restore the local ecosystem and thereby increase the productivity of the land and livestock. In addition, as part of the model, the Company will provide needed services to small-scale livestock producers such as access to finance, livestock inputs, and training. The Company will also act as a transactional intermediary, helping small-scale pastoralists sell their livestock into larger-scale commercial market, thereby addressing the missing market linkages between small producers and large-scale buyers, while eliminating the inefficient middlemen. Last, the Company will help pastoralists access veterinary and breeding services, by acting as a facilitator between pastoralists and the services providers (See Figure 3).

Pastoralist Production Groups
In the initial phase, the Company will work with community members to form Pastoralist Production Groups (PPG). In these groups, the members agree to manage their land and livestock together, as one unit. Rangeland Solutions will require that each PPG have the minimum of 150 cows or their equivalent (10 goats at 3,500Ksh=1 cow) and/or have a minimum of 15 families (i.e. one family with 150 cows cannot form a PPG). The PPGs will also have to adopt a constitution that establishes the system of leadership and the rules of operation. These requirements are to ensure the effective delivery of services, create economies of scale, and improve the overall operation of the PPGs.

Training and Inputs
Once the PPG is formed with its own constitution, the PPG will sign a contract with the Company, establishing the rules of the business relationship. At this point, the Company will begin to provide services to the PPG. In the model, a Program Officer will be assigned to each PPG, preferably sourced from the local area, who will work with the PPG throughout its relationship with the Company. The Program Officer will provide training to the members of the PPG on Holistic Management and help them with its implementation. The Program Officer will also work with the PPG to coordinate activities, such as livestock grazing, obtaining medicine and hiring a veterinarian, as well as resolving any disputes. In addition to the training, the business will provide two 10kg sacks of seeds to each family in the PPG for reseeding. The Company will provide these services to the PPGs upfront at no cost, in the form of a loan, which the pastoralists will then have to pay back the full value, plus interest. This will allow the Company to recoup its initial investments.
**Livestock Marketing**
As part of the model, the Company will also help PPGs market their livestock as a group and sell them into larger-scale commercial markets, providing pastoralists with better access to terminal markets and higher prices. The Company will help pastoralists establish networks and relationships with local slaughterhouses to find potential wholesale buyers and negotiate prices and contracts. Aggregating livestock sales and selling directly to wholesale buyers reduces the number of middle men and the associated costs, allowing the Company to provide higher profit margins to the pastoralists in addition to potentially negotiating higher end prices for the livestock, all the while earning a commission.

**Research Objectives**
This study conducted an analysis of the livestock sector in Kenya and investigated market dynamics from the perspective of livestock producers (i.e. pastoralists). The purpose of the study was to ascertain the feasibility of a social business that provides pastoralists with infrastructure development and training in HM. The primary research objectives were:

1. Provide a profile of pastoralists in southern Kenya;
2. Examine how pastoralists participate in the livestock market and the drivers of market participation;
3. Examine how pastoralists access markets and use services and identify potential barriers;
4. Identify environmental and land management issues faced by pastoralists;
5. Measure pastoralists interest in the business model and desired modifications, and;
6. Refine business model, based on input provided by pastoralists

**Study Area**
Primary data collection was carried out in Kajiado County, which is 21,292.7 km² and has a population of 807,070 individuals, as of 2012, approximately 140,000 household. The population is projected to grow to 1 million by 2017. The local economy is largely driven by agriculture and livestock production, as well as tourism. Within Kajiado County, the study focused on the community of Olekimunke (25 km²) located 70 km south of Nairobi (See Figure 4). This site was chosen due to its relative accessibility from Nairobi and the established connections and network of my local partners, Isaac Nemuta and Michael Kibue. The community is culturally Maasai with approximately 300 individuals living in the area. Community members are predominantly pastoralists and live in traditional Maasai bomas, multi-generational family complexes. The community is also located a few kilometers away from the town of Oltepesi, a small trading post, and 50 km south of Kiserian, a sub-city of Nairobi and major livestock market.

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METHODS

The study was conducted over a 10-week period, from June 4th to August 15th, 2013 in southern Kenya. During this period, semi-structured interviews (See Appendix B) were performed at the household level with pastoralists, collecting quantitative data on population demographics and qualitative data on the livestock market. The interviews were semi-structured in order to allow for open-ended questions, and incorporated techniques such as laddering to uncover the subject’s beliefs, feelings, and motivations. The interviews explored issues such as, pastoralist market access and barriers, determinants of market participation, pastoralist needs, and pastoralist interest in the business model. Pastoralists were interviewed on an opportunistic basis, but sampling was restricted to heads of households above the age of 21 and those owning at least one livestock. The interviews were conducted in Maa, the local language, and administered by a native-speaking assistant. When appropriate, the interviews were recorded. In total, 30 respondents were interviewed, representing 30 households. Not all interviews were completed as one respondent opted out during participation, due to time constraints.

Table 1. Number of respondents interviewed in Olekimunke, including respondents per gender.

<table>
<thead>
<tr>
<th>Survey Respondents (n=30)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>28</td>
</tr>
<tr>
<td>Female</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>30</td>
</tr>
</tbody>
</table>

All interviews were transcribed and uploaded into NVivo, a qualitative data analysis software package. The program was used to code for themes and analyze respondents’ answers in relation to the research objectives and questions (See Appendix C for description of themes for coding).

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Quantitative data was analyzed using descriptive statistics, such as measures of central tendency and frequency of response.

**RESULTS**

This section will review results from the analysis of interviews with pastoralists in Olekimunke. Main topics will include community and livestock demographics, market participation patterns, markets, services, followed by data on environmental issues and change, land management and overall challenges to pastoralists.

**Community Demographics**

Respondents were asked demographic data about themselves and their families, including both nuclear and extended (Table 2).

Table 2. Demographic data of respondents in Olekimunke, including mean age, years of livestock keeping, household and boma size and monthly income per household.

<table>
<thead>
<tr>
<th>Age (Yrs.)</th>
<th>Livestock Keeping (Yrs.)</th>
<th>Individuals Per Household</th>
<th>Households Per Bomas</th>
<th>Individuals Per Boma</th>
<th>Monthly Income (Ksh)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Respondents</td>
<td>40.57</td>
<td>19.55</td>
<td>7.63</td>
<td>3.13</td>
<td>27.60</td>
</tr>
</tbody>
</table>

The average pastoralist interviewed in Olekimunke was 40.57 years of age, which is relatively high considering Kenya has a median age of 18 years and a life expectancy of 56 years.\(^9^3\) However, this result is probably skewed because of the sampling methods since participants were required to be at least 21 years of age and the head of the household. Interestingly, respondents have spent half of their lives (≈19.55 yrs.), starting from their early 20’s raising and keeping livestock. This demonstrates how pastoralism is engrained in individuals in this community from a young age and represents many years of experience and knowledge in livestock production and the challenges surrounding it.

In regards to family structure, respondents had an average household size of 7.63 individuals. A majority of participants indicated having only one spouse, thus the average household would have 5+ children. In addition, respondents lived in complexes with 3.13 households, including their own, possibly representing a multi-generational, grandfather-father-son living situation, a common practice among the Maasai. Based off responses, these complexes housed 27.6 individuals, a larger number than the individual household figure would suggest. This discrepancy is likely a result that respondents did not know the precise number of inhabitants in the complex and provided close estimates.

When asked about income, most respondents were unable to provide a hard figure and the responses given were best estimates, often based off of their livestock selling patterns. The monthly income of ≈ 20,000 Ksh equals approximately $2,800 USD earnings per years ($1

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USD= $85 Ksh). This figure is noticeably larger than the national GDP per capita of $1,800 USD, suggesting that this community is relatively wealthy and certainly not poverty-stricken, as pastoral communities are often depicted. However, this figure cannot be taken at face value as many respondents had difficulty producing a number and had no record of their financial condition or activity, resulting in a range of values from 6,000 Ksh to 30,000 Ksh per month.

The lack of financial record keeping maybe related to the general education level in the community as the majority of respondents had never attended school (See Table 3). In this area, in the past, children were used to look after livestock or tend to household chores and the importance of education was not emphasized, which might account for the low level of schooling in the area. It is worthwhile to point out that educational attainment in Olekimunke has a slight bimodal distribution, concentrated over those with “No Schooling” and those with “Beyond Secondary Schooling”, though this may be due to sampling bias. However, education rates in Kenya are beginning to change, especially since the Kenyan government passed free access to primary education in 2003. This is true in Olekimunke which has a primary and secondary school in the vicinity and where many children now attend.

Table 3. Highest level of schooling completed by respondents in Olekimunke.

<table>
<thead>
<tr>
<th>Highest Level of Schooling Completed (n=30)</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Schooling Completed</td>
<td>18</td>
<td>60.0%</td>
</tr>
<tr>
<td>Some Primary School (not completed)</td>
<td>4</td>
<td>13.3%</td>
</tr>
<tr>
<td>Primary School Graduate</td>
<td>2</td>
<td>6.7%</td>
</tr>
<tr>
<td>Some Secondary School (not completed)</td>
<td>1</td>
<td>3.3%</td>
</tr>
<tr>
<td>Secondary School Graduate</td>
<td>0</td>
<td>0.0%</td>
</tr>
<tr>
<td>Beyond Secondary School</td>
<td>5</td>
<td>16.7%</td>
</tr>
</tbody>
</table>

Livestock Demographics

Respondents were asked about their current and past livestock holdings (See Table 4), in order to determine the value of their assets and livestock keeping patterns (See Table 5). According to the data, respondents had an average of 14.4 cows and 99.3 shoths (term to refer to sheep and goats), with a total asset value of 921, 137 Ksh (~$10,836 USD), based off of current livestock market prices (See discussion of prices below). Current livestock herd size is closer to that of the lowest size provided by respondents, than the highest herd size. This could be a result of the 2009 drought, when some communities lost over 50% of their livestock, and the herds are still recovering. Though six of the respondents indicated that their current livestock herd was their largest. When comparing these figures it’s important to note that some of them are based on memory and might not be reliable.

Table 4. Mean number of livestock held by respondents, current and past

<table>
<thead>
<tr>
<th>Livestock Demographics</th>
<th>Current</th>
<th>Most</th>
<th>Least</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cow</td>
<td>14.4</td>
<td>79.5</td>
<td>5.0</td>
</tr>
<tr>
<td>Goat</td>
<td>99.3</td>
<td>203.4</td>
<td>23.0</td>
</tr>
</tbody>
</table>
When comparing herd composition, we see a much higher number of shoats than cows. Generally shoats have faster reproduction rate (≈ 5 months) than cattle (≈ 11 months), allowing numbers to increase quicker and recover from population dips, which could account for the higher number. In addition, shoats have lower energy requirements than cows and generally the grazing requirement of three shoats is equal to one cow. Therefore, a standard unit of area is able to support more shoats.

However, when considering their value, cattle in Olekimunke represent an almost equal portion of total asset value (See Figure 5). Therefore, cattle still represent a significant source of stored capital and income for pastoralists, even though four respondents did not currently own any cattle, for reasons not explored in this study.

![Composition of Livestock Asset Value (Ksh)](image)

**Figure 5.** Comparison of asset value of livestock herd, cows and shoats.

When exploring breed composition of their herds, pastoralists in Olekimunke showed strong breed patterns and preferences (See Table 6). Among cattle, the Zebu was the most common, followed by Boran and Sahiwal. During interviews many respondents expressed a preference for Boran cattle, for various reasons discussed below, but particularly because of the price its can fetch at the market. This reason might account for the limited number of Boran cattle in Olekimunke, as they are expensive, and the relative abundance of the Zebu breed, which are cheap.

<table>
<thead>
<tr>
<th>Livestock Asset Value (Ksh)</th>
<th>Current</th>
<th>Most</th>
<th>Least</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cow</td>
<td>424,471.2</td>
<td>2,339,003.0</td>
<td>146,065.2</td>
</tr>
<tr>
<td>Shoats</td>
<td>496,666.7</td>
<td>1,017,000.0</td>
<td>114,833.3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>921,137.9</td>
<td>3,356,003.0</td>
<td>260,898.5</td>
</tr>
</tbody>
</table>
With goats and sheep there was a lower diversity of breeds, with a particular preference among goats. Both the Black-head Persian and Red Maasai sheep were common among pastoralists. However, some respondents indicated that they were moving towards the Red Maasai sheep because of its’ cultural value and other positive attributes. Among the goat breeds, the Gala breed was by far the most common.

Table 6. Breed composition of livestock herds, frequency count

<table>
<thead>
<tr>
<th>Breed Composition</th>
<th>Cattle Breeds</th>
<th>Sheep Breeds</th>
<th>Goat Breeds</th>
</tr>
</thead>
<tbody>
<tr>
<td>Count</td>
<td>Count</td>
<td>Count</td>
<td></td>
</tr>
<tr>
<td>Zebu 11</td>
<td>Black-head Persian 18</td>
<td>Gala 22</td>
<td></td>
</tr>
<tr>
<td>Boran 8</td>
<td>Red Maasai 16</td>
<td>East African 3</td>
<td></td>
</tr>
<tr>
<td>Sahiwal 6</td>
<td>Dorper 1</td>
<td>Anglo-nubian 2</td>
<td></td>
</tr>
<tr>
<td>Mixed Breed 3</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Respondents were also asked why they preferred or chose certain breeds of cattle and shoats (See Table 7). Interviewees often responded in terms of climatic related characteristics, such drought resistance or climatic adaptability/suitability. In addition, breeds were also preferred for their “heartiness” (defined as the ability to walk far distances, climb mountain and withstand many days without water). Therefore, pastoralist preferences seem partial driven by a breed’s ability to survive and even thrive in a harsh, arid region, limited by climatic variables and rainfall patterns.

However, respondents also indicated that their choices were driven by subsistence and economic needs. In many cases, respondents discussed how certain breeds provide good milk and meat, which is often consumed at home, and is thought to be medicinal. In this area, livestock are often used to supplement diets and are slaughtered for ceremonial and festive occasions, so the quality of meat and milk provided by the livestock is important. However, in recent times the Maasai are engaging more with markets and the modern economy, and household, subsistence needs have to be balance with economic, income needs.94 Therefore, almost an equal proportion of pastoralists also cited profitably or ability to fetch a good price at the market, as an important characteristic when choosing which livestock to keep. Profitability along with growth, or ability to reach market size quickly, are livestock attributes that will probably continue to grow in importance to pastoralists and their herd decisions.

Table 7. Attributes assigned to livestock breed, frequency count

<table>
<thead>
<tr>
<th>Livestock Attributes</th>
<th>Drought Resistant</th>
<th>Suitability</th>
<th>Milk</th>
<th>Profitable</th>
<th>Hearty</th>
<th>Meat</th>
<th>Growth</th>
<th>Medicinal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Count</td>
<td>21</td>
<td>19</td>
<td>16</td>
<td>16</td>
<td>14</td>
<td>11</td>
<td>8</td>
<td>2</td>
</tr>
</tbody>
</table>

Markets & Market Participation

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Buying and Selling Patterns

Respondents were also questioned about market participation patterns, specifically how many livestock they bought or sold per year and the reasons for participation. Overall, the respondents sold a mean of 5.57 cattle and 36.48 shoats per year (Table 8), representing $346,261 Ksh in total value ($4,073 USD). This is a higher figure than the monthly income estimates provided by the respondents, again suggesting that this community is relatively affluent. The respondents also purchased a mean of 1.83 cattle and 13.33 shoats per year for a total value of $120,385 Ksh ($1,416 USD). These purchases represent replacement rates of approximately 35%. However, these figures are also based off of best estimates as none of the pastoralists kept records of their purchases or sales. In addition, the calculated value might be inflated as it is based off of mean market prices at the time of the interview and don’t account for monthly fluctuation, discussed below.

Table 8. Mean number of livestock sold and bought by respondents per year

<table>
<thead>
<tr>
<th>Livestock Sold</th>
<th>Livestock Bought</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cattle</td>
<td>Shoats</td>
</tr>
<tr>
<td>Count</td>
<td>5.57</td>
</tr>
<tr>
<td>Value (Ksh)</td>
<td>163,850.65</td>
</tr>
</tbody>
</table>

When making the decision to sell or buy, respondents considered a number of factors. The majority of interviewees participated in the market based on household financial needs and a subsistence mindset, particularly when it came to selling. Respondents discussed making decision based off of market prices or trying to maximize profit, but with much less frequency (See Figure 6).

![Market Participation Drivers](image)

Figure 6. Market participation drivers: subsistence vs. market price.

In some cases, pastoralists are cognizant of market prices and try to increase profit by forgoing sale until a later time when prices are high. One interviewee stated:
“Sometimes when (I am) not very much pressed, the prices are down so sometimes (I) decide not to sell. When the prices are high, (I) decide to sell.”

But often immediate household needs override the decision process and the desire to increase profit, as one respondent notes:

“Different prices from time to time effects selling. Right now the prices are very low and there is nothing (I) can do because (I’ve) got (my) own personal needs. Family needs food, we need school fees, clothing and there’s no way out. That really affects (me) very much. So for (me) it is very hard even for (me) to stay and wait till better prices, good prices, the future prices which will be good, it’s hard for (me).”

Another respondent stated:

“The prices will not affect (my) decision to sell because once (I am) in need even if the market is low or no price at all or maybe the demand is very low (I have) to receive the money even if it’s too little to be able to cover (my) costs. Otherwise it is of no value to (me).”

When livestock were sold, the money was received by the head of the household in every case, who used the money towards their household needs and other expenses. Most needs were related to those of the household such as food, clothing, medical care, school fees and livestock drugs. In deciding to sell their livestock respondents chose the individual animal based off their needs and whether the animal would generate enough money to meet it. As one pastoralists said, “with selling (I) look the kind of shoat which can sustain (my) needs”. In most cases pastoralists will sell a goat to meet basic, daily needs such as food or clothing and sell a cow for larger costs, such as school fees or medical care. In this way, shoats act as a “walking ATM”, drawn from for small, immediate costs, while cattle serve as long-term stores of capital.

Since pastoralists often sell to meet immediate needs, the majority did not state any preference for the season or time of year to sell. When a respondent did have a preference it was often August and December, or around festive holidays, for reasons discussed below. To wait out price changes, some pastoralists indicated they rely on alternative income sources, such as hiring themselves out as day labor, to help augment their needs. However, only three respondents engaged in this activity and could depend on it as a steady source of income. In addition, there appeared to be limited opportunities for such activities.

Decisions on purchasing livestock were also limited by subsistence needs. Pastoralists would buy livestock after and only if they have met their needs and when there is a “surplus” of money. However, respondents revealed more judgment in their purchasing decisions, considering other factors, such as price and season, and not just immediate needs. As one pastoralist explained:

“(I) buy whenever (I have) extra money…(I) prefer to buy on the onset of rain because that is when we can buy some weak animals and then they can get more grass and then they can grow fast because they have pasture”
In addition, pastoralists also purchased livestock based off the breed and it’s suitability for the region, as well as the overall health of the animal.

“(I) decide to buy when the animals are cheap in the market. Most likely (I) look at the cheapness and also (I) look at, once (I) go to the market, (I) try to look at the breed, (I have) to buy a breed which is suitable to here.”

Interestingly, two of the respondents specified an interest in buying cattle from Tanzania, as they were often in poor quality and cheaper. However, pastoralist respondents did not show a very strong preference for the time of year in which they purchase livestock, though preferences were stronger than with selling livestock. Predominantly, January and April were the best times to buy, when demand and prices were low, for reasons discussed below.

**Market Prices and Variations**

The interviews also explored market prices, the determinants of market price and the potential drivers of price changes. Generally, pastoralists in Olekimunke received an average of $29,409.09 Ksh for their cattle and $5,000 Ksh for their shoats. Factors that determine livestock price were primarily attributed to overall market conditions and dynamics, as well the physical attribute of the livestock. Generally, changes in overall market prices were driven by seasonality and climatic variations (See Figure 7). Pastures are dependent on seasonal rainfall to regenerate grass, from which the cattle graze. Simply put, the more grass the heavier and healthier the cow. As one respondent put it:

“It is seasonal. Sometimes the animal becomes so weak and thin because of a drought so prices go low. And there are times when they look really fat, in good health, well fed so they can sell at a high price.”

![Market Price Determinants](image)

Figure 7. Number of respondents referring to different market price determinants.
However, the dynamics of demand and supply were also mentioned as important market price determinants. Generally, the higher the relative demand, the higher the price. The higher the relative supply, the lower the price. Though it may be difficult to separate these drivers in an agricultural dominated society where seasonal and climatic variation can determine supply/demand, as household incomes are based on the success or failure of crops or livestock. One respondent provided a strong insight into these demand/supply and climatic dynamics:

“The prices in the course of a year are constantly different. They are different in different ways because one, in terms of the year we have drought season whereby the prices drop. We have a certain times like now it is June and July where there’s no business there’s small demand for meat, therefore the prices tend to go down. Therefore, at different times of the year there are different prices. Then in December there’s a lot of demand for meat because of the festive season. Therefore, prices tend to go high even for the weak animals or any type of animal.”

Therefore, the overall market price is determined by a combination of market supply and demand, as well as seasonal changes. These factors are dynamic and interact in complex ways. Though, generally pastoralists stated that prices tended to be higher in August and December, during the festive season when demand is high. Prices were lower in April and January, when demand is low and supply is high, as people are selling their livestock to pay for school fees, which open in January.

Overall market conditions are not the only determinant of price, as mentioned before, the physical attributes of the livestock also play a role (See Figure 8). Logically body weight, size and conformity were the most commonly referenced determinants of price. However, the breed of the livestock also plays an important role. From this it appears that pastoralists are willing to pay for a price premium for the breed of the livestock, which might account for pastoralist preference for Boran. However, breed and animal size are linked, as Boran are characteristically larger than other breeds, so when pastoralists mentioned breed they could just be referencing size.

![Livestock Price Determinants](image)

Figure 8. Frequency of responses referring to livestock price determinants.
Respondents also frequently discussed the importance of livestock health and generally quality of the animal. When buying or selling, many pastoralists looked for signs of the health of the animal, which help determine the price of the livestock. Typically, animals of poorer health and quality were cheaper than those exhibiting good health qualities. This emphasizes the importance of treating diseases and maintaining livestock health, as discussed below.

**Markets**

When discussing markets, every respondent mentioned that Kiserian was the primary market in which they sold their livestock. Pastoralists would visit markets, such as Kiserian, an average of 1.47 times per weeks, selling an average of 2.05 animals per visit. Respondents favored Kiserian because of two main attributes, proximity and vibrancy (See Figure 9). Proximity was an important consideration to pastoralists in Olekimunke as Kiserian was perceived as relatively close, a 1.5 hour truck ride or 1.5 day trek. Often time pastoralists mentioned they went to Kiserian because it was the only market that they had. Given there are many markets throughout Kenya, respondents’ preference towards Kiserian can be interpreted as an issue of proximity and transportation costs, as farther away markets are more expensive andlogistically harder to get to.

Figure 9. Number of respondents referring to market attributes.

However, respondents most often mentioned that Kiserian was a vibrant market, with high demand, many buyers/traders and high prices. Pastoralists also preferred Kiserian because they could access other services and buy goods near the market. One respondent sums up these points well:

“Kiserian market has a lot of potential in terms of many customers, many local traders so you can sell well. Also, once you get your money you can shop and buy food, supplies and go to the market and buy fruits, vegetables.”
These responses indicate that pastoralists place high priority on the strength and vibrancy of a market (i.e. # of buyers/traders, high demand, high prices) and its proximity. In this area, they prefer markets where transportation costs are low and demand is high and there are a variety of potential buyers. This would help ensure that they are able to sell their products and receive a good price. In addition, pastoralists like to access other services and markets when selling their livestock.

**Traders/Middlemen In The Market**

Traders and middlemen serve an important role in the market place, connecting producers with consumers and helping pastoralists to market and sell their livestock. Pastoralists were asked if they used traders and brokers in the marketplace, and how they interact with these actors and if they provide fair prices and are trustworthy.

All of the pastoralists indicated that they had used a trader or broker to sell their livestock at one point. When utilizing a trader or broker, pastoralists would negotiate the price of the animal with the middleman, who would buy it with cash on the spot, to then resell to a prospective buyer. For these transactions, the trader and broker, in most cases, would not charge the pastoralists a commission, instead collecting the profit remaining from the resale value. If a trader or broker charged a commission, it was 5.9% of the resale value, on average. The majority of pastoralists viewed the traders and brokers favorably because they served an important role, offering an alternative marketing channel and providing good prices for livestock. Only three respondents viewed brokers and traders negatively, believing they took advantage of pastoralists or manipulated prices at the pastoralists’ expense. As one pastoralist says:

“Brokers are so many in the market, for sure, in every market that you go. But actually they also determine the price of cattle because sometimes they control the price because they want to get a small number, maybe, just like a tip.”

This system of traders and brokers relies heavily on a network of social relations and trust. All respondents indicated that they only work with traders and brokers whom they know personally and can trust. Pastoralists in Olekimunke will not work with traders they don’t know, because they don’t know if the trader is trustworthy.

“There are those brokers who (I) trust, there are those (I don’t) trust at all because others will try to press for more profit, to make more money.”

Traders and brokers also serve as an indicator of market conditions and a source of market information. Approximately 75% of pastoralists received information about the market and market prices through local traders, as one source. Pastoralists talked to the local traders regularly over the phone about market prices or when they were passing through the area. Pastoralists relied on other information sources, such as family members and friends, as well as observing the market themselves, but traders were the most dominant source. Thus, traders and brokers play an essential role in information dissemination, helping pastoralists to gauge the market. One pastoralist also looks at the behavior of brokers to measure the strength of the market place:
“The brokers, they are very clever... (a) way of learning how the market is when you go to Kiserian you see the brokers and traders come in so quickly and very fast and try to grab the sheep and goats that is a green light that the market is hot and there is a lot of business. When they go there and see that the brokers are not bargaining and they don’t participate that is an indication that the market is not well.”

Market Services
Pastoralists also rely on services to provide inputs, resources and support to help them raise livestock. As part of the interview, pastoralists were asked about their access and use of financial, veterinary and breeding services, in order to ascertain their ability to access and use these services and if there are any barriers to access.

Financial Services
When asked about their use of financial services, 44.8% of respondents indicated they had a bank account which they used 1.26 times per week. In addition, 75.8% stated they had an MPesa account, a mobile-phone based money transfer and microfinancing service, which they used 3.89 times per week, indicating the popularity of this service. Since its inception MPesa has been a very popular form of banking in Kenya as it allows user to open accounts with their mobile devices and can deposit, withdraw, and transfer money. It requires no physical infrastructure, is low cost, and operates where ever there is a phone signal. This is ideal for pastoralists living in remote areas where it might be hard to travel to town centers and visit a bank branch. This convenience might explain why more pastoralists in Olekimunke had MPesa than bank accounts and used it more often.

At certain times pastoralists might rely on loans to purchase goods or livestock and in Olekimunke 75.8% of respondents indicated that they had access to credit facilities and were able to take out loans. However, only 31% of respondents actually received loans, with an average loan amount of $62,777 Ksh ($738 USD). These loans were paid back over 1 year to 1.5 years, at a monthly interest rate of (3.52%-5.17%). All of the respondents who took out a loan used at least a portion of it to purchase livestock to fatten and sell as part of livestock trading and value addition. The proceeds from livestock trading were used to pay back the loan.

Those who did not take out loans provided a variety of answers, but 17 stated they have never thought to take a loan, perhaps representing a lack of familiarity with this type of institution or a cultural apprehension towards loans. Five respondents indicated an apprehension to taking loans due to a lack of financial knowledge and capacity to manage the loan. One of the respondents stated:

“(Pastoralists) are afraid of it because they use to say that if you take a loan you will misuse it and the bank will come and take everything that we have.”

However, a few of the respondents showed a willingness and desire to learn how to manage a loan so that they could take one out:
“Yes, (I would be interested) if there is capacity building, so I know how to manage and I understand how to use and pay back the loan”

The lack of economic opportunities was also cited by four respondents as a reason for not taking a loan. In these cases the lack of opportunity centered on concerns unfavorable climatic conditions would limit the profitability of livestock fattening and trading.

Though many respondents showed apprehension towards taking a loan, 31% of respondents who hadn’t taken out a loan were interested. Therefore, 62% of respondents have acquired a loan or are interested in taking one. Of the respondents who showed an interest in taking a loan, all indicated they would use it to buy livestock for fattening and engage in livestock trading. This indicates that pastoralists have a desire to engage with the market economy and approach livestock production as a business and not just a subsistence livelihood.

**Veterinary Services**

Health of an animal is an important determinant of the market price it can obtain. Aware of this, pastoralists in Olekimunke exhibited a strong culture of treating and tending to their livestock, in order to prevent disease. All respondents specified they had access to medication and other medical supplies and administered a variety of treatments including injecting vaccinations, administering de-worming treatments and applying anti-insect spray. The cost of providing this medical care cost an average of $263 Ksh (~$3 USD) per animal per year, though most respondents were unsure of the exact cost and provided approximations. All interviewees indicated that the cost of administering this care was a good value, especially when compared to the value of their livestock.

Pastoralists in Olekimunke were generally unable to access veterinary care, as only 44.8% of participants indicated they had to access a vet. Pastoralists were unable to access veterinarians because the vets were either located in faraway towns, like Kiserian, or their services were expensive. In some cases the pastoralist had to pay for the transportation of the vet to the location. Once arriving, the pastoralist would also have to pay for the treatment, which cost approximately $19 Ksh per animal. As a result, many pastoralists indicated that they preferred to administered treatment themselves and not use a vet. In addition, 12 of the respondents indicated that their medical knowledge was sufficient to detect and treat diseases, as they grew up taking care of livestock and there was cultural knowledge of it. Asked if he used vets, one respondent stated:

“No, (vets) are quite expensive and I know how to take care of the livestock. For example if the goat broke its legs I know how to give it medication and take care of it until it legs get better... Maybe I am a vet because I was born into livestock rearing so I know all of the steps, how to help a cow to deliver. So I am a vet.”

Those that did have access and used veterinary care (41.3%) used it 1.6 times per year on average. In most cases the vets performed check-ups, diagnose diseases and administer vaccines. They were called upon especially during times of disease outbreaks, such as Rift Valley Fever or anthrax. The use of veterinary care during times of disease outbreaks might be a measure of last
resort and pastoralists in Olekimunke might be limited to using vets in only dire circumstance due to a lack of financial resources, as many interviewees noted how expensive veterinarians are.

Of the respondents that indicated they were unable to access veterinary care or didn’t use it, four pastoralists mentioned how they often talked to vets at shops in town, seeking advice on disease diagnose or treatment. Though these pastoralists did not use the direct services of the vet, they still relied on the vets to augment their own knowledge and experience. In this manner some individuals acknowledge the limitations of their own expertise and the need for a vet to help prevent, diagnose and treat diseases. One respondent stated:

“Like now we are trying to treat our animals (and) we don’t know what disease it is. We don’t know but we are just giving them drugs. So after death maybe we realize which disease it is.”

In relation to wanting better livestock health outcomes, 93.1% of respondents expressed an interest in having better access to veterinary care. Individuals were primarily interested in better access, as a vet could help them detect and treat diseases, but pastoralists were also interested in gaining knowledge and capacity to detect and treat from the vet. One pastoralist explains:

“We need to be taught about diseases and how best we can control and how best (to treat, because) sometimes we get a lot of cost, (by) not treating the disease, (and) putting a drug on a different disease.”

As can be seen, pastoralists in this region are interested in the physical delivery of medical care but also in obtaining more knowledge in livestock health. Therefore, an effective program designed to increase livestock health outcomes should be concerned with the delivery of care but also the sharing of knowledge and capacity.

**Breeding Services**

Access to breeding services is also important to livestock production, as it can help improve the breed and the genetic composition of the herds, making it more productive and profitable. Pastoralists in Olekimunke are aware of the importance of breeding and 44.8% of respondents have accessed and used breeding services, including renting a bull. All other pastoralists who didn’t use breeding services purchased their own bulls for breeding which can be expensive as a healthy, productive bull may cost upwards of $150,000 Ksh ($1,764 USD). None of the respondents indicated that they used artificial insemination and they did not trust its effectiveness, preferring natural methods instead.

The respondents, who rented a bull, obtained it from their neighbors and did so because they lacked one and couldn’t afford to buy a bull. To pay for these services, pastoralists cited returning a young heifer or ewe, presumably the offspring of the rented bull, to its original owner. This arrangement allows the pastoralist without a bull to access one at a low upfront cost, but represents a significant opportunity cost as the young heifer given for payment could have produced more offspring over its lifetime and could itself eventually yield ≈$30,000 Ksh in the market. However, this practice appears to be cultural ingrained and matters of potential cost and profit are not considered.
Though a low proportion of respondents indicated they have access or used breeding services, 86.2% expressed a desire for better access. Pastoralists were particularly interested in better access to improved exotic breeds, such as the Boran, as they are expensive and difficult to obtain.

**Environmental Issues and Change**

Pastoralism is heavily reliant on the seasonal climatic patterns, grasslands, and other ecosystem processes. However, in Kenya with rapid population and modernization the pasturelands are undergoing changes. Respondents confirmed this as 96.5% noted a change in the landscape in the past ten years and observed many different changes (See Figure 10).

![Environmental Change In Past 10 Years](image)

Figure 10. Most frequently observed changes in the environment and landscape over the past 10 years.

The majority of respondents discussed how the availability of grass and pasture has changed in the past ten years, and in almost all cases pastoralists indicated a decrease in overall pasture and grass availability. Desertification was the second most commonly discussed issue and is most likely related to the decrease in pasture, as pastoralists expressed an increase in bare land over the past ten years. Along with these topics, respondents also discussed changes in biodiversity, land rights, human settlement and bush encroachment. Generally, the interviewees noticed a decrease in biodiversity and increase in bush encroachment, as well as an increase in human settlement that corresponded to a change in land rights. Specifically, this region had witnessed an increase in land demarcation and privatization, discussed below. In some discussions, the interviewees indicated how these issues were linked. One respondent, who grew up in the area, described these interactions most succinctly:

“For 30, 40 years (I) can remember this was the best place ever. There was plenty of grass, plenty perennial grasses, there was wildlife, there was no bare lands...We have come to see bare
land which was not there before. Initially we had big trees and people came down to chop the
trees for charcoal. So we are now seeing some shrubs growing and grass disappearing...The
challenges is now is having everybody owning his own piece of land. Now somebody owns his
own piece of land and it cannot sustain his livestock so he has to move into other people
property. Then you find somebody with land and too few animals. So now we have a challenge
with people having their own land, it cannot sustain alone.”

Asked about the drivers of environmental change, pastoralists also provided a variety of
responses (See Figure 11). Interestingly, the frequency of responses exhibit a wider distribution
than the observed environmental change, which might represent a lack consensus on the drivers
of change, as some respondents were unsure of the causes.

![Figure 11. Most frequently identified drivers of change in the environment and landscape over
the past 10 years.](image)

Nonetheless, human settlement was the most frequently discussed driver of environmental
change, followed by climatic issues (i.e. drought, rainfall, climate change) and grazing practices.
Respondents frequently noted an overall increase in human settlement which was related to
changes in grazing practices and land management. In five of the interviews, increasing
settlement was linked to worse grazing and land management practices. As people settled the
amount of unsettled land decreased, restricting the movement of livestock and access to pasture,
thus pastoralists could not properly graze their livestock. One respondent noticed this
connection:

“This thing called land demarcation and settlement. The moment people started to settle and
then people start now to say that this belongs to me then you try to graze your animals in your
own place it’s not enough so you have to get out so you have to finish completely you overgraze
first, everybody else overgraze. So overgrazing happens because of poor management.”
In relation to human settlement and changes in grazing practices and livestock mobility, one pastoralist stated:

“We are now settling, so we do not migrate. So when we settle here all of our livestock will just roam around and they will clear every perennial grass. So initially we use to migrate before we finished then move to a different area, (letting) this land to rest and recover.”

Another respondent said about settlement and grazing practices:

“What happened is that due to settlement, people started to settle and also now they started doing very poor management of land, they are not practicing what it was before.”

Prior to increasing human settlement, pastoralists in Olekimunke had more land to practice extensive grazing, where livestock were grazed at low densities over large amounts of land and migrated seasonally to different areas, allowing land to regenerate. With the increase in human population, this form of grazing became unfeasible, and grazing practices changed to their current form, discussed below. Interestingly, the issue of overgrazing was illicitly mentioned in only one interview, though seven of the pastoralists alluded to the topic, noting how there was too little land and grass to support livestock.

Many respondents also cited climatic factors as causes of environment change and were asked to discuss the observed changes in the climate (See Figure 12). Almost all pastoralists mentioned how rainfall patterns have changed in the past ten years, becoming unpredictable and inconsistent. Describing the changes in climate one pastoralist stated:

“So a long time (we) use to experience heavy rainfall (we) were even able to time. (We) know that rainfall will start at a certain date. But now it is unpredictable, now we are experiencing unpredictable weather conditions. 15 years ago we use to predict well, we know that this month it is going to rain. But now it can rain anytime it can stop anytime, so it is not consistent like before.”
In some cases, pastoralists noted that rainfall had also changed in intensity and duration, raining very hard for a short period of time, in contrast to steady precipitation over many weeks, as it was in the past. The changes in intensity and duration decreased the amount of time for the water table to replenish and also led to increased runoff and soil erosion, as the sudden flux of rainfall could not percolate and absorb into the soil. This was made worse by increasing bare land. Respondents in Olekimunke also observed an increase in drought frequency and duration. Combining the topics of rainfall, drought and erosion, one pastoralist states:

“Nowadays experience frequent droughts and prolonged. When the rain comes a lot of rain will come, plenty of rain, in a very short period. A lot of rain which will carry the trees and the soil around.”

Another respondent also observed changes in rainfall and drought duration and frequency, explaining:

“…now we receive rainfall, but in a few weeks and then we have a drought immediately. After that drought comes another drought immediately. So we have consistent droughts coming frequently.”

In these conversations, pastoralists related the combination of inconsistent rains and frequent drought to decreasing pastures and desertification. Overall, the changes in the frequency and duration of drought and rainfall pose a significant challenge to pastoralists, as it makes it difficult to manage grazing movements, and lessens the time interval in which to rebuild resources.

Looking to the future, respondents were also asked to predict how they expect the environment and climate to change in the future (See Figure 13).
The topics of grass availability and settlement were the most frequently discussed by pastoralists, with a general consensus that settlement and human populations will continue to increase while pasture and grass availability will decrease. Noted one pastoralist:

“In the next ten years settlement will continue to increase and we will have less and less grass. And of course less pasture and therefore we will be in trouble in the next ten years.”

When it came to climatic patterns, respondents generally spoke of how poor climatic conditions will continue, with inconsistent rains and frequent drought. But five of the pastoralists were unsure, claiming that it was up to God. Generally, pastoralists did not draw any conclusions on how these predicted changes will affect them. Given the predicted increase in human settlement and decrease in pasture, these changes will most likely impacts pastoralists negatively as in the past, which some pastoralists concluded. However, not all outlooks were bleak and some expected the land to continue to recover from the 2009 drought, as the most recent rainy season was successful and grass cover was beginning to increase.

**Land Management**

Interviewees were asked about current land management practices and if they have thought about changing their practices. While describing their grazing methods most discussed how they grazed their livestock randomly, without a plan (See Figure 14).
One pastoralist said:

“We have no organized grazing plan. What (we) do is that (we) just allow livestock to roam around, nobody looks at them. Nobody goes to herd them. We only herd sheep and goats. Cows no herder, they just go wherever they wish to go.”

Only three respondents referenced any form of planned grazing, which in these cases meant establishing grazing enclosures or drought reserves, which are set aside for young livestock or times of drought. Interviewees did not provide an explanation or reason for their current grazing methods.

When asked if they have thought about changing their grazing methods, 75.8% stated that they had. In most cases, pastoralists discussed trying to follow some form of planned grazing with grazing areas for the wet seasons and areas reserved for grazing in the dry season. In addition, some respondents mentioned how the community wanted to set aside the hills surrounding the area as a drought reserve. Though pastoralists had considered changing their grazing practices, only one respondent stated he had implemented one, by setting aside drought reserves. Most of the pastoralists did not provide reasons or explanations for why they hadn’t made any adjustments.

However, a six of the interviewees stated that increasing human settlement and disagreements between community members due to land rights made it difficult implement any form of planned grazing. Describing this situation one interviewee said:

“(I am) really interested in (planned grazing) but it is a big challenge because we may not agree. Some other people may not agree. (I) thought of changing but people will not accept that because of this kind of landownership…”

Figure 14. Number of respondents referencing unplanned or planned grazing practices.
Another respondent described how part of the community in Olekimunke had tried to implement a grazing plan in the past, but this attempt failed due to confusion and disorganization amongst community members. Though only discussed in a few instances, the lack of community organization and conflict over land rights could be the reason why pastoralists in Olekimunke have been unable to implemented new grazing practices, which so many have considered.

**Holistic Management**

Pastoralists in Olekimunke were also tested about the knowledge and perceptions of Holistic Management, to determine whether they were already familiar with it or open to implementing it. Interestingly, 86.2% were familiar with the basic concept of rotational, planned grazing, the central tenets of Holistic Management, though only two respondents knew HM by name. In these cases, the respondents had visited ranches in the Highlands where it was being implemented. Explaining their familiarity with the concept, five respondents indicated that the people in the region use to follow the principles of HM. As one respondent said:

“(I am) very much aware because that is the practice (we) use to have. When it use to rain, (we) always grazed around this area near the tarmac road and then when it started now becoming drought is when (we) started now moving towards near our area whereby there is a lot of grass.”

Though pastoralists once implemented these practices, they were abandoned as this pastoralist explains:

“Yes, (I am) aware because when we were young that was what was happening. But now because everybody owns his own ranch, things have changed. But upon when we come together we can agree and start doing something.”

Pastoralists in Olekimunke exhibited a strong cultural familiarity with the principles of Holistic Management, particularly the component of rotational grazing. As explained by the pastoralists, the community use to loosely follow these principles in their grazing management practices, migrating their livestock through the landscape and letting previously grazed areas to rest. As a result, 86.2% of respondents indicated they were aware of the impacts of HM, listing a number of benefits, such as reduced soil erosion, improved grass cover and regeneration, and the establishment of drought reserves. Explaining the impacts of HM, one pastoralist stated:

“Yes, (I am) aware of the impacts because (I) remember when (we) were young. The cows use to be grazed on this side of Oltepesi to graze there and drink water there. Then when it comes to drought they would move and drink water on the other side, then they would graze on this side. Then this other side would recover. Then they would come down to Olekimunke another time. So giving land time to recover.”

Another pastoralist was also familiar with the impacts and benefits of HM:

“(HM) would reduce soil erosion. Once the animals are in one place and they step all over, they will move the grass and the grass will die. Once they use a portion, after finishing the grass completely on that side. Once they are taken to the other portion of the land and they are eating
on the other side, the grass will grow on the side they come from. So it will help them to rotate. Also parasite and that is good because they will not get sickness from other cows.”

As a result, a large majority of respondents, 96.5%, viewed Holistic Management favorably, believing it will bring many benefits. One pastoralist most familiar with the practice said:

“It’s the only thing that works. Holistic Management is the only thing that can bring back pastures. It is the only thing that can sustain our cattle. Without Holistic Management we will surviving here in very hardship. We will not be able to have cow or goat. Everything is changing, I think the climate change has brought the needs for Holistic Management for all poor people, not just a group of people.”

**Challenges for Pastoralists**

**Grazing Challenges**

Towards the end of the interview, participants were asked to summarize the overall challenges they face with grazing their livestock, what could be done to alleviate these challenges and potential barriers to why these improvements haven’t been implemented. In responses to grazing challenges, water availability and grass availability were the two most common topics (See Figure 15).

![Challenges with Grazing Livestock](image)

**Figure 15.** Most frequently identified challenges associated with grazing livestock.

When discussing water availability and grass availability, most respondents stated that they had difficulty accessing pasture and water. This corresponds to the observed decrease in grass availability and desertification discussed before in relation to environmental change. In most cases, the pastoralists mentioned how they had to travel far for water or how there wasn’t enough
grasses to sustain their livestock. Related to water and pasture, drought and rainfall were frequently mentioned as challenges in grazing livestock. Most respondents noted how frequent drought and inadequate rainfall had negatively impacted water and grass availability. This made it difficult to raise livestock as one pastoralist noted:

“One of the main challenges for them is first of all number one is grazing. Look now when he opens the gate, the cow does not even bend to get some grass. Number two, lack of water...there is no water here, we get water from far. So, meaning that we have the challenge of water, without water life here is hard, very, very terrible.”

The issues of disease, land rights and wildlife were also brought up as important problems. Respondents mentioned disease as a challenge but did not discuss it at length. In regards to wildlife some pastoralists noted that predators in the surrounding area had eaten their livestock, causing human-wildlife conflict. As a result, pastoralists in this community did not view predators favorably and actively tried to eradicate them from the area. Interviewees told stories of how lions once inhabited the area but had since been eradicated. Consequently, few predators, such as jackals and hyenas, remain and are restricted to the surrounding hills and cliffs, only coming down during the night.

The issue of land rights invoked more conversation, which centered around how changes in land rights, specifically land demarcation and privatization, have made it more difficult to herd and graze their livestock. In particular, with privatized land, pastoralists in this area were restricted to their individual plots and were not always free to move their livestock herds onto neighboring plots as they pleased. This reduced mobility of the livestock and made it difficult for households to sustain their herds on their individual plots. However, not all landowners enforced their private rights and often allowed neighbors to graze on their land. In this way, the land regimes in Olekimunke exhibit a mix of communal and private property rights, which are enforced based on the individual land owner and his relationship with neighbors and the community. However, the relatively new system of land demarcation presented challenges and created conflict at times. Explaining his difficulty with land demarcation one pastoralist said:

“The other thing is this land demarcation where everybody owns his own land. So everybody says, ‘Don’t step in my place’. These are great challenges because my land will not sustain the animals I have even if they are a few.”

In addition, some of pastoralist and families in Olekimunke did not officially own land in the area, which also presented challenges to the community. Without land of their own, some families had to graze their livestock on the land of other households. However, the land owners did not want the “landless” on their property, as land in the region was already limited and the owners had difficulty sustaining their own livestock. Technically, the land owners are in their legal right to remove people from their land, but the interviews did not reveal any such instances. Instead, it appears that the community and the land owners have taken a “live and let live” approach, but tensions might exist under the surface.

Respondents were also asked what they or others could do to alleviate these challenges, which they answered with a variety of different strategies (See Figure 16).
Figure 16. Most frequently identified areas to improve challenges associated with grazing livestock.

The need to organize the community was the most commonly discussed topic, as this could help people mobilize their resources and lobby for funding or support from the government or NGOs. The need to organize was often discussed so the community could increase water availability and develop a waterpoint. In support of organizing the community to raise funds and improve water availability one participant said:

“With the community (I) can try as much as possible to get (my) brothers, (my) neighbors to sit down and say, ‘Now we have this challenge, please can we sit down and try to get some funds from the government or other organizations. Talk to them about our problem so we can get water.”

Many of the pastoralist understood the challenges faced by the community and had opinions on how to potentially fix them. However, since many of these challenges still existed, the interviewees were also asked what preventing them from implementing the solutions they suggested (See Figure 17).
Similar to the discussion on grazing solutions, respondents focused on community organizing. There was a strong consensus that the community in Olekimunke was disorganized, which prevented individuals from taking action. This was contrasted with the past, in one instance, when the community was more united:

“(I see) that right now the only thing is like we are disorganized, unless we meet and try to see what to do. Because a few years ago when the old men, the grandfathers, were there they use to be very well organized. But now we fail to understand what to do because now we see a lot of disorganization.”

Respondents explained that the current lack of organization within the community was because the community members hadn’t thought to organize and work on these issues. This suggests the community may lack the initiative or capacity to organize and might suffer from a leadership shortage. In one case, the government was blamed for not putting enough priority towards pastoral communities and helping them address their challenges. Some respondents offered other explanations attributing the lack of action and organization due to financial constraints, since developing waterpoint and/or purchasing grass seeds is expensive and not affordable for most community members. Two interviewees noted the lack of education and knowledge of land management as a contributing factor, suggesting the community members need education in order to build capacity and help build interest and unity. As one pastoralist said:

“Community capacity building, we need people to come in and educate the community on the importance of something like water. Once we get education and we put people together we can come up with a solution. But now that everyone goes on his own way, how can we (organize). So we must come together, unity.”
However, these causes do not necessarily explain why the community became initially disorganized. As a previous quote describes, the community was once organized. One explanation for disorganization, provided by a respondent, was the increase in human population and settlement in the area. The influx of “outsiders” may have frayed the social connections and institutions of the community, which could have limited the community’s capacity to make decisions collectively and may account for the lack of leadership.

**Overall Challenges**

Pastoralists were also asked to consider all the challenges they faced raising and selling their livestock. Disease was the most frequently discussed issue (See Figure 18). Respondents did not talk about the topic at length but identified problems with diagnosing and treating diseases, as well as disease outbreaks that would occur in the area as a result. Grass availability, water availability and drought were also commonly mentioned, as in the question relating to grazing challenges, again highlight the importance of these topics. In response to this question, pastoralists stressed again how pasture is limited, and is not enough to support their livestock. In addition, they needed to travel far to fetch water for their animals. As these challenges were brought up in previous questions, respondents did not discuss them in much detail.

![Figure 18. Most frequently identified challenges in livestock production.](image)

A number of pastoralists mentioned problems with market prices and how the prices greatly fluctuated and the prices they received were often low. This caused significant hardship for the pastoralists as low prices made it harder for them to cover their household needs (e.g. food, medical costs, school fees, etc.). Since these needs were immediate, the pastoralist had to accept the lower prices. As a result, pastoralists would have difficulty planning out their finances and determining when to sell their livestock, as the prices fluctuated throughout the year, often according the variable weather or season patterns, as previously discussed. Discussion the hardship caused by price fluctuations, one pastoralist said:
“For selling there is a challenge. Sometimes the market is seasonal and maybe you took your two healthy goats to the market and the prices you are given are maybe halfway price of the main price, that is one of the challenges that we have selling our livestock. Then perhaps you have a problem, you have to cover costs, now you have to sell at a throwaway price.”

Reflecting on his frustration with market prices and financial needs, another pastoralist said:

“In the market (I) have challenges. Sometimes (I) have a need and (I) go to the market and the prices are too small, too low but (I) must sell because (I) need the money.”

Interestingly, three respondents brought up the lack of herders for their livestock as a challenge. Lacking herders makes it difficult for pastoralists to tend to their herd, as the pastoralists and the members of the household are often busy with other household activities (e.g. going to the market, fetching water, cooking etc.). This presents a time constraint on pastoralists as without herders they must look after the herd themselves, if they can at all. As previously discussed, most pastoralists let their cattle just roam around where they want without being looked after. In fact, only five of the respondents stated they used a herder to take care of their livestock. This may reflect the general lack of herders, which is caused by children now going to school. Typically, Maasai children are responsible for herding the livestock, but this has become less common in this area in recent years with children going to school. Without children to tend to the herds, pastoralists must do it themselves or hire a herder. Discussing the challenges with taking care of his livestock and using herders, one pastoralist said:

“One of the challenges when it comes to rearing and raising (my) livestock is when (I) have too few people to take care. Sometime (I) might not be there, or the mother and maybe the herders are not available. It’s a challenge.”

Pastoralists were asked how they could address or solve these issues (See Figure 19).
Figure 19. Most frequently areas identified to improve challenges associated with livestock rearing and selling.

The topics of water availability and waterpoints were the most common responses to this question. As in the discussion on improving grazing challenges, interviewees mentioned the need to develop a waterpoint in order to increase the availability of water and improve grazing. On this topic, one pastoralist said:

“If we can get support to build a dam to collect water for our livestock we can be able to graze well and water our animals in a near place so that our plan will be ok when we can (have) water.”

Pastoralists also identified a need for the community to organize and work with outside groups such as the government or NGOs to improve water or grazing challenges. As these two pastoralists noted:

“If there is a way that we can organize or talk to groups, to organizations that can be able to help the community to get a waterpoint for all of our livestock, that would be great.”

“We (can) come together, we can form a group, we can raise funds, we can borrow funds, we can drill water and also we can get support from friends to do that.”

Interestingly, one respondent was particularly in support of organizing the community, so they could implement Holistic Management:

“One of the ways to improve that, is for the whole community to come together, we agree and this is the way we shall move and this is the way we shall try to implement Holistic management but upon having the meeting and making sure that we look for a plan.”

After water and community issues, disease and access to veterinary services were the most commonly discussed topics. Similar to the previous discussion on veterinary services, most respondents mentioned the need for better access to veterinary care and better knowledge on how to treat and diagnose diseases. In regards, to veterinary access, one pastoralist said:

“(I) would like us to have a very experienced vet who is near, who can help us to identify diseases and how to maintain.”

For one pastoralists access to veterinary services was particularly important during disease outbreaks:

“Whenever there is outbreak of diseases, we would like to have very quick accessibility to drugs easily and to detect as fast as possible and to vaccinate livestock immediately before the disease spreads.”
However, pastoralists saw the importance of gaining knowledge on disease diagnosis and treatment, because without it they sometimes misdiagnosed diseases and used incorrect treatment, leading for poor health outcomes. In support of this one pastoralist said:

“We need a lot of knowledge when it comes to diseases and when they happen, when you vaccinate, especially these viral diseases which attack. When they attack, no treatment, but you can prevent. (I don’t) know how to do it and when the diseases are coming.”

Business Model
At the end of the interviews, the respondents were given a description of a potential business model that provided pastoralists with training and services. After the description the respondents were asked if they would be interested in the using the services offered by the business, what they liked/disliked and how they would improve it. 100% of respondents indicated that they would be interested in using the services offered by the company. When asked to describe which aspects they liked about the company like, close to 50% of respondents particularly liked the component of reseeding the land with grass seed (See Figure 20).

![Figure 20. Most frequently liked components in the business model.](image)

When discussing reseeding, pastoralists noted that this would help increase the availability of grass and decrease the amount of bare land, which would greatly benefit them and their livestock.

“One thing that (I am) very much interested in is the idea of growing grass, which will really help us when we put our livestock together we will build our resilience at least at some percentage we can be able to control the drought.”

Many respondents also discussed how they appreciated the component of the training and forming the PPG in the model, because of its focus on community organizing and capacity building. It was believed that bringing people together and forming a group would help bring
unity and organization to the community which was previously lacking, as discussed before. Stressing the importance of training one interviewee states:

“Number one is capacity building, that is number one without that we are going nowhere. Through that, that is the way we can look forward and get the revelation of the training of how this thing is going to happen. You don’t just bring and say these are the seeds without training.”

When asked if they disliked the model, only two respondents directly mentioned a component of the model. One respondent did not like the component of providing veterinary access, because he did not see a need to use them. Another respondent did not like the component of bringing the people’s cattle together, a key principle of Holistic Management, and he believed people would not be willing to adopt it.

Last, respondents were asked how they would improve the business in order to make people more willing to use the services (See Figure 21)

![Desired Improvements in Business Model](image)

Figure 21. Most frequently desired improvements in the business model.

The importance of community organizing and capacity building was discussed by close to a third of respondents. In these responses, the pastoralists emphasized that the company should focus on helping the community to organize and build capacity through the trainings. Furthermore, some respondents provided suggestions on how best to engage the community:

“One of the things is that first of all you give empowerment, when we start the group you empower people to move on. You include the men, the leaders, the decision-makers. The point he is bringing out is that the decision to form, including the leaders, women representative and the youth.”

A third of respondents also mentioned the importance developing a waterpoint in order to increase water availability and help people implement Holistic Management. Without a
waterpoint respondents noted that people would not organize and follow a grazing plan because they would need to take their livestock elsewhere to get water:

“(I) want to add so that people will like the idea is, first of all, it is not a problem for us to come together. But there is one thing that will separate us on, maybe will not make the company better, is water. Without water, a certain central point, whereby we can water animals then we can graze. The PPG here will have a watering point whereby they water and then they manage the livestock together. Then in our place down there we have a watering point whereby we can water animals and then graze together. Water is the core, it’s the one connect all of us. One point (I) want to add and strengthen is the idea of one water. And how best the company will work to unite the community. Unity among the PPGs.”

Reinforcing how people will not organize without a waterpoint, one pastoralist said:

“There is no way the project can move on without having water. Sometimes if no water, (I) will take (my) cows away and then the other person will take his away, so then we become disintegrated. So when we have a central point we drink water and then we graze the way we want or according to the planned grazing, then we can be successful. So we have the challenge of water, that is the greatest challenge you have in the project.”

DISCUSSION

The objective of this study was to conduct an analysis of the Kenyan livestock market, in order to better understand market dynamics and conditions, particularly from the perspective of livestock producers, the target customer of the business model. Collecting the thoughts, beliefs, feelings, expectations and motivations of pastoralists in Olekimunke offers a window into their experience raising and selling livestock, which can be used to determine their met and unmet needs and thus, the feasibility of the business model. This section will provide a summary of the findings, sketch a profile of pastoralists in Olekimunke and their experience as livestock producers, and then pull out key insights related to the development and refinement of the business model and overall feasibility.

Pastoralist Profile

Based off the quantitative data collected on population and livestock demographics, the family and community structure of Olekimunke mirrors that of similar Maasai communities, with families living in large, multi-generational compounds. The majority of pastoralists, or 60%, in Olekimunke are uneducated and have not received any form of schooling. Data on income levels and asset, indicate that families in Olekimunke are relatively wealthy compared to the overall populace in Kenya. When looking at livestock demographics, pastoralists in Olekimunke appear to have similar herd sizes (assets) as other pastoral communities in Kenya.

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With regards to market participation, pastoralists in Olekimunke exhibited a subsistence mindset, whereby individuals sell their livestock to meet only immediate cash needs. These needs typically included food, clothing, medical care, school fees and livestock drugs. Pastoralists visited the markets every week, but only sold a few animals per visit, just enough to meet their expenses. When selling, pastoralists were not price sensitive, since they could not delay sale, and were not interested in maximizing profit and capturing the gains on their livestock. By contrast, households were more price responsive when purchasing livestock, showing a pattern of buying only when prices were low. Therefore, it appears pastoralists in Olekimunke participate in the market in response to cash needs rather than profit-maximizing opportunities and their financial decisions are not driven by the market and prices.

These market decisions and participation patterns closely resemble other pastoral communities in Kenya, where pastoralists sold their livestock only to meet subsistence needs. To explain these patterns researchers have suggested that pastoralists in Kenya and other African nations use livestock as a productive storage of wealth, or asset, often because it offers the highest financial returns. In comparison, raising livestock in Kenya can generate a 15% rate of return per year, while savings in a commercial bank of equal value generate only a 2% return. Thus, there is little incentive for pastoralists to maximize profits on livestock and convert their assets to cash, since it would then generate lower real rates of return. Acting rationally, pastoralists only draw from their “bank on hooves” in order to meet immediate cash needs. Put succinctly, when making market decisions, “pastoralists balance long-term herd, (asset) building objectives with short-term consumption smoothing objectives.”

When selling livestock at the market, pastoralists noted that prices were primarily driven by overall market conditions and dynamics, as well the physical attribute of the livestock. Prices in the market primarily responded to prevailing range conditions, determined by seasonal and climatic variations. Prices were also influenced by the age, breed, physical condition and health of the animal, which in turn are also affected by climate. Last, market prices followed regular demand and supply cycles associated with annual events, such the festive season and the opening of schools. These market patterns and price dynamics correspond to similar studies conducted in Kenya, suggesting the markets throughout Kenya follow similar trends.

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99 Ibid
When evaluating these prices patterns, pastoralists in Olekimunke felt that markets prices were erratic and often too low, causing them hardship and financial stress. Unfortunately, pastoralists often have low bargaining power because they are selling to meet immediate cash needs and cannot delay sale.\textsuperscript{102} Therefore, they are price-takers and must accept the money they are offered even though it doesn’t meet their expectations of a fair price. This trend of variable prices and low bargaining power causing financial hardship for pastoralists is not uncommon in Kenya, which suggests a significant challenge.\textsuperscript{103}

Producers in this region seem to have reliable access to terminal markets. This presents a contrarian view on the ability of pastoralists to access markets. However, as Olekimunke is relatively close to Kiserian, a 50 Km (1.5 hour) ride away, this finding probably does not hold for other communities located farther away. Households in Olekimunke exhibited a strong preference for marketing their livestock in Kiserian because producers can meet and negotiate with many buyers/traders and receive higher prices, due to the large number of buyers and high demand in the market. This emphasizes the importance of a well-functioning market to help drive the livestock supply chain and provide pastoralists with essential marketing services. Since Kiserian has multiple slaughterhouses and is located near Nairobi (a large consumer market), it will most likely remain the preferred market for pastoralists in the region.

Though pastoralists in Olekimunke had adequate access to terminal markets, they still relied on traders and brokers to help sell and bring their livestock to market. In this area, the middleman bought the livestock directly from the pastoralists for an agreed amount, not charging a commission. The pastoralists viewed these middlemen favorably because they served an important role, offering an alternative marketing channel and providing good prices for livestock. Only three respondents expressed negative perceptions towards traders and brokers, believing they manipulated prices. Studies conducted with pastoralist in Kenya and other African countries also found a difference in attitudes towards traders and brokers, which varied based on the perceived fairness of the prices they received.\textsuperscript{104} This suggests that middlemen in the livestock marketing chain don’t necessarily exploit pastoralists and the experience of pastoralists with traders and brokers can be personal.

However, the system of traders and brokers operate on a network of social relations and trust. All respondents indicated that they only work with traders and brokers whom they know personally and can trust. The importance of trust in livestock marketing has been found in other markets in northern Kenya and serves to reduce trading risk and fraud.\textsuperscript{105} As the community members in Olekimunke noted they did not want to work with middlemen they did know for fear of being exploited or conned. In a large market with much uncertainty, it is probably difficult and time-consuming to locate and establish relations with trustworthy traders. This creates a high


\textsuperscript{103} Ibid


transaction cost for bargaining with and selling to multiple middlemen, limiting pastoralists potential bargaining power and choices. These high transaction cost create opportunities for middlemen to manipulate pastoralists.\textsuperscript{106}

In contrast to market access, pastoralist in Olekimunke generally exhibited limited access to and use of extension services, such as financing and veterinary care. Though individuals demonstrated a strong interest in these services, these needs were unmet by the market place or public services. Studies show that pastoralists in other regions also lack access to extension services, suggesting that the pastoralists’ experience in Olekimunke is not unique.\textsuperscript{107} However, the low usage of extension service may also be explained by pastoralists’ perceptions, knowledge of, and familiarity with these services. In the case of financing, pastoralists showed an apprehension towards taking loans due to a lack of familiarity with and knowledge about financial planning and budgeting. Pastoralists also showed strong misgivings towards veterinarians, preferring to treat their animal themselves, even if they lacked the full capacity to diagnose and treat diseases. Similarly for breeding services, pastoralists preferred using bulls and did not trust other methods, such as AI, which are offered by private practitioners. There appears to be a strong disconnect between perceptions of these services and their interest in using them, as pastoralists expressed strong interest in these services, but were also reluctant to use them. This may be due to a lack of familiarity, particularly with the case of financial services. Therefore, pastoralists must be educated and become more familiar with the value of these services since their perceptions must first change if they are to utilize these services.

Pastoralists in Olekimunke also face a number of environmental and land management challenges that impact their livelihoods. Overall, pastoralists in the village face difficulty accessing and providing sufficient water and pasture resources for their livestock. The scarcity of grass and water poses a significant challenge to pastoralists because their herds have to travel far in search of these resources, which further strains the livestock. These challenges correspond to the changes in the landscape observed over the past decade, in which pastoralists noted severe environmental degradation with decreasing pasture, increasing desertified, bare land and bush encroachment.

According to the community, the two most likely drivers of environmental degradation are climate change and human settlement. In recent years, the local climate has changed dramatically, as the rains and rainy season have become less consistent and predictable, while droughts have become more frequent and severe. As a result, rangeland regeneration and growth have been limited, while pastoralists have been unable to effectively manage and plan their grazing movements, putting further pressure on already stressed resources. The negative impacts of climate change have been exacerbated by increasing human population, which has led to the conversion of pasture to settlements, thus reducing land available for grazing and restricting the mobility of pastoralists, a key management and coping strategy.

The increase of human settlement is partially correlated to changes in land right regimes around the community, in which land has become privatized and sub-divided. This recent development,


moving away from communal land property, has presented challenges and created conflict in Olekimunke as pastoralists are no longer able to move freely and are more restricted to their individuals plots, further limiting livestock mobility and the accessibility of water and pasture. This reduced mobility of livestock has made it difficult for households to sustain their herds on their individual plots, contributing to overgrazing and environmental degradation. Increasing human settlement and changes in land rights has also led to environmental degradation in other parts of Kenya and Africa.\(^{108}\)

In response to increasing human population and settlement, as well as changes in land rights regimes, pastoralists in Olekimunke have modified their grazing and land management practices. At one time, pastoralists practiced extensive grazing methods in the area, whereby their livestock migrated to different seasonal areas, allowing previously grazed lands enough time to rest. With increasing settlement and decreasing pasture and livestock mobility, pastoralists in Olekimunke were no longer able to follow such methods. As a result, most household in the region currently graze their livestock randomly, not implementing a set method or plan.

Grazing practices have further deteriorated due to the weakening of communal ties. In the past, elders in Olekimunke negotiated and controlled the management of communally owned pasture land, facilitating the coordination of grazing and livestock movements. However, corresponding with the influx of settlers and conflict over land rights, the community has experienced a breakdown in social cohesion and leadership, a theme brought up by many of the respondents. This pattern has occurred in other pastoral communities in Kenya and other parts of the world, where influxes in human population have altered social institutions and caused instability.\(^{109}\) In Olekimunke, the community has been unable organize or gain support from outside actors, such as the Kenyan government. Consequently, the majority of pastoralist in Olekimunke would like to change their grazing methods and follow the practices of their ancestors, but have been unable because of inadequate community organization, unity and support.

Studies of pastoralists in other communities in Kenya have identified similar challenges with land degradation, water scarcity, climate change, land rights, and grazing practices,\(^{110}\) thus illustrating the severity of these issues in Olekimunke and throughout pastoral communities in the country. Looking towards the future, community members did not see a bright future for pastoralism in the region. They predicted that human populations and settlement will continue to


increase in the area, and pasture and grass scarcity will remain a challenge and potentially get worse. In addition, poor climatic conditions will persist, with inconsistent rains and frequent drought.

These bleak predictions may be warranted. With a population growth rate of 2.7%, as of 2012, Kenya can expect to nearly double its population to 80 million people by 2030.\textsuperscript{111} This increase in human population will undoubtedly lead to expanding human settlement and urban areas, putting further pressure on pasture lands, as it has in the past. Predictions on climatic patterns do not bode well for pastoralists, as models indicate that current patterns of inconsistent rain and frequent drought will continue in the short term, over the next 10-15 years. Though over the long term experts predict that overall rainfall will increase, especially during the short rains (October-December), which will see rainfall levels rise 60% by 2050.\textsuperscript{112} Fortunately, this could significantly benefit pastoralists as more rainfall during the short rains will generate more pasture that could sustain cattle through the dry season.

Business Model
Based off the feedback collected in interviews, the proposed business model offers a potential solution to the environmental and market challenges faced by pastoralists in Olekimumke and aligns with their needs. First, the model directly addresses the environment challenges with its focus on providing pastoralists the training and resources to implement Holistic Management. As discussed previously, HM has the potential to significantly stop and reverse the processes of overgrazing, land degradation and desertification, which pastoralists identified as a threat to their livelihoods. Pastoralists believed that HM will help increase the availability of grass and particularly liked the business model component of purchasing grass seeds and reseeding the land. Their belief justified as HM has been successfully implemented in Kenya and other African countries with positive environmental results.\textsuperscript{113}

The model not only offers a solution, but provides pastoralists with the support to implement it. As identified by pastoralists in Olekimumke, the lack of community organization, partially driven by changes in land rights and increasing human settlement, has prevented individuals from taking action and changing their grazing methods. The formation of PPGs aims to help pastoralists to organize and implement HM. During the process of forming a PPG, community members must agree to collectively manage their land and develop a constitution, establishing the governance and the rules of operation. This creates a formal avenue through which community members can make collective decisions and acts as a vehicle through which people can organize. In this way, the Company acts both as facilitator and vessel through which the community can organize, establishing some of the pre-conditions for the PPG (e.g. adoption of

HM principles) and filling the leadership vacuum. Respondents in Olekimunke recognized the positive role the Company and PPGs can serve to help the community organize. Consequently, establishing PPGs was one of the most popular components of the model and respondents emphasized the importance of uniting the community.

The Company would also provide on-going support through a Program Officer, preferably sourced from the local area, who is assigned to work with the PPGs. The role of the Program Officer is to augment and build the capacity of the PPG, by provide training to the members of the PPG on Holistic Management and help them implement it. The Program Officer’s duties would include coordinating activities such as livestock grazing, obtaining medicine and hiring a veterinarian, as well as resolving any disputes. This aspect of the model fits well with the conditions on the ground, as the Program Officer would help fill the leadership gap in Olekimunke and provide on-going assistance. The Officer also helps maintain a link and communications between the PPG and the Company, so the Company can respond to needs of the PPG.

The business model also addresses some of the market barriers and resources challenges experienced by pastoralists in Olekimunke. As mentioned in interviews, community members have difficulty accessing resources, such as financing or government support, which could assist them with improving their livestock production methods. The business model removes some of these market barriers, particularly financial barriers, by providing pastoralists with the training and inputs, such as grass seeds, upfront at no cost to the pastoralists. This eliminates issues with access and reduces the upfront investment costs of implementing HM, thereby encouraging adoption and participation.

The model also works to help improve pastoralist access to markets so they can receive better prices. Though community members in Olekimunke could reliably access the markets in Kiserian and had positive experiences using middlemen, this may not be true for all communities. In some areas of Kenya transportation cost are high, restricting access, and middlemen are seen as exploiting pastoralists. Furthermore, pastoralists in Olekimunke observed they received low prices for their livestock, despite their good access to markets. By collectivizing the pastoralists through the PPGs and marketing their livestock directly to commercial markets, the Company can eliminate the middlemen and their associated transactional costs and increase the prices pastoralists receive, through increased collective bargaining power. Organizing pastoralist into groups and increasing their bargaining power


has been recommend in a number of reports and has been effectively implemented in pastoral communities in East Africa.

Due to the combination of services offered in the business and the problems/needs it addresses, pastoralists showed strong interest in the model. Correspondingly, only two respondents noted an aspect of the model that they disliked. These findings suggest there is an opportunity for a social business that trains pastoralists in improved land management techniques. Despite this interest and strong potential, pastoralists in Olekimunke identified a number of challenges and potential improvements for the model.

The issue of land rights, sub-division and increasing human settlement in Olekimunke poses the most significant challenge to the implementation of HM and the business model. The privatization of land in the area and increasing human settlement have limited livestock mobility and grazing lands, putting pressure on pastoralists and causing disagreement about land management in the community. Pastoralists in Olekimunke believed these factors may limit community members’ willingness to unite and engage in HM practices, though they would represent a small minority.

These issues highlight the challenges surrounding land rights throughout Kenya, where uncertainty over ownership of land can cause conflict in some places. To address these challenges, the Company will work through established power structures, such as local village chiefs and elders, to help pastoralists organize PPGs and resolve disputes. In addition, before entering into an arrangement, the Company will require the community to confirm in both their constitution and in our contracts that any land disputes within the PPG have been resolved. Establishing groups and collective rules has been used in other HM projects in Africa and this type of arrangement has been shown to be effective in resolving disputes and encouraging collective decision making and resource sharing.

Pastoralists in Olekimunke also identified the challenge with water availability and access. Specifically, the respondents noted the importance of developing a waterpoint in order to increase water availability, foster greater grazing cooperation, and help people implement Holistic Management. Without a waterpoint people would not organize and follow a grazing plan as they would need to take their livestock elsewhere to get water. It appears that water scarcity is an issue that affects other pastoral communities in Kenya and is a major constraint to livestock production. Though pastoralists seem interested in the business model, it appears

116 Ibid
many of them would not fully participate without having a secure water source. Consequently, a close to a third of respondents wanted the business to incorporate the development of a waterpoint. From this it seems the business model and the implementation of HM does not seem feasible without the ensuring proper access to water resource for the PPGs.

Therefore, the business model required some modifications to address the needs and challenges brought up by the pastoralist. First, the Company will have to expand the services it offers to include the development of a waterpoint. The waterpoint would have to be large enough to support the herds of the PPGs, approximately 150 livestock, through the dry season (3-4 months). This will significantly increase the upfront cost and investment required by the Company, but appears essential to attracting customers and ensuring the success of the PPGs and sustainability of the business model.

Secondly, the Company should move its revenue model away from loans, as it would have to charge too high of an interest rate. In addition, pastoralists in Olekimunke appeared unfamiliar with the concept of a loan and a few pastoralists expressed apprehension towards taking a loan. Instead, a more profitable revenue stream could entail the Company acquiring the rights to raise and graze its own cattle on the lands of the PPGs, free of charge. In this approach, the cattle produced by the Company will be sold into the meat market, with the Company collecting all of the proceeds. This allows the company to recoup its initial investment and share in the benefits of improved livestock yields. In addition, this aligns the Company’s interests with the pastoralists’ as the Company literally has “hide in the game” and thus has its fortune tied directly to the long-term success of the PPG. This type of transaction would benefit pastoralists as it is essentially an exchange of capital, which pastoralists lack, for land and labor, of which the pastoralists have plenty. To execute this, the Company will have to purchase starting stock from local ranches, adding to the upfront investment, but potentially generating large returns.

Lastly, it was decided to drop the components of veterinary or breeding services, as it was not considered the core of the business. Though pastoralists in Olekimunke expressed strong interest in veterinary and breeding services, offering these services would take away from resources dedicated to higher-valued services. However, the findings of this studies and other suggest that access to veterinary care and proper disease diagnosis and treatment is a significant challenge faced by pastoralist in Kenya\footnote{Mugunieri, L., Omiti, J., Irungu, P. (2002). Animal Health Service Delivery Systems in Kenya’s Marginal Areas Under Market Liberalization: A Case for Community-Based Animal Health Workers. Institute of Policy Analysis and Research (IPAR), and International Food Policy Research Institute (IFPRI); Onono, J. O., Wieland, B., Rushton, J. (2013). Constraints to cattle production in a semiarid pastoral system in Kenya. Tropical animal health and production, 45(6), 1415-1422.} and offers a meaningful business opportunity for those who can address it. It is possible that the Company will to expand into these fields later on once the business has grown past its initial stages.

**CONCLUSION**
Pastoralists in Olekimunke are experiencing negative environmental change due to land degradation and desertification. These negative processes are partially driven by climatic
factors, such as more frequent and severe droughts, as well as increasing human settlement and changes in land rights and practices. These factors combined have reduced the availability of pastures and water, and restricted livestock mobility, a key land management and coping strategy. Based on projections from pastoralists and experts, these trends will continue into the near future, putting pastoral livelihoods at greater risk.

Furthermore, the markets in which pastoralists depend on to meet their subsistence livelihoods do not provide enough services. Though pastoralists are readily able to access terminal markets to sell their livestock, the prices they receive are highly variable and low at times. In the market, pastoralists have low bargaining power because they are price takers since they must sell now to meet immediate cash needs. Middlemen/traders are viewed positively by pastoralists, helping them sell their livestock and providing fair prices. However, there are opportunities for manipulations and profiteering by the middlemen. Lastly, pastoralists face difficulty accessing and using extension services, such as financial facilities and veterinary services, which could benefit their livestock production operations. Sadly, pastoralists are fully aware of these challenges and know how to address many of them, but have been unable to organize and get the support they need from the market or government bodies.

The business model proposed in this document offers a potential solution to the environmental and market challenges faced by pastoralists in Olekimunke. Providing pastoralists with the training and resources to implement HM prevents the continued environmental degradation from overgrazing and enables the restoration of grazing land. In addition, this approach offers the mechanisms and support, through our PPG structure and Program Officers, to organize and successfully manage their land. Furthermore, the Company increases pastoralists access to capital, markets and other resources, such as training, which will further improve their livelihoods. As a result, these bundled services are an attractive offering to pastoralists in Olekimunke.

This research has demonstrated a clear need and interest in a business that trains pastoralists in Holistic Management. In this paper, I have modified and developed business model to help scale up Holistic Management and make it more accessible to pastoralists.

ACKNOWLEDGEMENTS
I would like to thank my advisor, Dr. Elizabeth Shapiro who has supported me throughout my time at the Nicholas School and guided me through this project. In addition, I would like to thank my partners in Kenya, Isaac Nemuta and Michael Kibue, who offered their expertise and guidance. I would also like to thank the village of Olekimunke for hosting and welcoming me into their community. I enjoyed our man discussions and appreciate all the knowledge you have shared with me. Last, I want to thank my family and friends for all of their encouragement and support throughout this journey, it would not have been possible without them.

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APPENDICES

Appendix A

An overall assessment of the sector through a SWOT analysis, as conducted in the AU-IBAR and NEPDP joint study.

<table>
<thead>
<tr>
<th>SWOT Analysis of Kenya Livestock Sector</th>
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<tr>
<td><strong>Strengths:</strong></td>
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<tr>
<td>• Large community of pastoralists committed to livestock production and eager to improve.</td>
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<tr>
<td>• Large livestock population, 10 million beef cattle</td>
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<tr>
<td>• A society with a long tradition in livestock farming and a variety of organization, institutions and companies related to meat production</td>
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<tr>
<td>• Availability of a reasonably developed system of slaughterhouses, abattoirs and meat export firms</td>
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<tr>
<td>• Low prices of live animals (at source)</td>
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<td>• Low labor costs</td>
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<tr>
<td>• Trained and experienced veterinarians</td>
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<tr>
<td>• Red meat consumption is relatively high due to strong meat eating tradition</td>
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<tr>
<td>• Market is demand driven, liberalized within private sector</td>
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<td><strong>Weaknesses:</strong></td>
</tr>
<tr>
<td>• Diminishing pasture resources due to changes of land use patterns</td>
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<tr>
<td>• Low pastoralist producer prices relative to the terminal market prices due to prevalence of many brokers in the chain</td>
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<tr>
<td>• Poorly organized producers, little bargaining power</td>
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<tr>
<td>• Inaccessibility to affordable credit facilities for traders and producers.</td>
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<td>• Inaccessibility of market information by producers</td>
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<tr>
<td>• Inaccessibility of market information by producers</td>
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<tr>
<td>• Collapse of key livestock marketing infrastructure</td>
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<tr>
<td>• Low livestock productivity, over 75% of the herd consists of local, indigenous breeds</td>
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<td>• Poor road transport and insecurity</td>
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<tr>
<td>• Quality and availability of veterinary services</td>
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<tr>
<td>• Prevalence of livestock disease, Rift Valley Fever</td>
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<td>• Lack of chain approach</td>
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<tr>
<td>• Not ‘quality’ and consumer conscious</td>
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<tr>
<td>• Limited access to lucrative international markets</td>
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| **Opportunities:**                     |
| • Huge local market (over 300,000 MT of red meat) provided to major cities of Nairobi, Mombasa, Nakuru, Kisumu etc. |
| • Rationalize meat marketing chain to reduce unnecessary intermediary transactions, profits and meat prices and increase consumption |
| • Strengthen stakeholder associations, especially pastoralists and slaughters/ meat wholesalers to reduce middlemen’s power |
| • Prospects for export especially to the Middle East and COMESA region |

| **Threats:**                           |
| • Natural disasters (drought, famine and conflicts) |
| • Gaps in legal framework (land ownership, rights of women, grazing rights) |
| • Political interference and corruption |
| • Confrontation between vested stakeholder interests |
| • Demand reduction due to lower purchasing price |
| • Import bans / sanitary regulations |
| • Fluctuations in world price |

Appendix B

PASTORALIST INTERVIEW GUIDE
Demographic Information
Community/Village: ______________
Age of respondent: __________
Occupation of respondent: __________
Gender of Respondent: Male / Female
Highest level of schooling completed (Circle one)
  No schooling completed
  Some primary school (not completed)
  Primary school graduate
  Some secondary school (not completed)
  Secondary school graduate
  Beyond Secondary school

Household Information
1. How many families and people live within this boma?

2. How large is your household? How many people sleep and eat everyday with you at home? What kind of members (relation, age, gender, marital status)

3. What is your average monthly/yearly income? What are your sources of income?

Market Participation
Livestock Information
4. How long have you kept your own livestock? How many livestock do you currently have? What is the most and fewest livestock you have ever had? Who takes care of them?

5. What breed/types of livestock do you have? How many of each? Ages?

6. How do you decide which breed/types of livestock to keep and how many? Do you prefer a certain breed, if so why?

7. Do you sell your livestock? How and when do you decide to sell your livestock? What factors affect that decision? How many livestock (cattle, shoats, camels, donkeys) do you sell per year? If you sell, do you have a preference of when in the year you sell?

8. When you sell your livestock, who gets a portion of the money and when, and what do you and they do with any of the money?

9. Do you buy livestock? How and when do you decide to buy livestock? How many livestock (cattle, shoats, camels, donkeys) do you buy per year?

10. What factors go into your decision to buy or sell your livestock? Whom do you consult about
making the decision to buy/sell? Where and from whom do you get your relevant information?

11. How many kids do your livestock have per year? How much time does it take for the livestock (cattle, shoats, camels, donkeys) to reach market size? Do you have an estimate of how much it costs you to raise the livestock to market size?

12. How many of your livestock die per year? What are the main causes of death?

Markets
13. Do you sell your livestock at a market? What market do you go to most often and what factors made you choose that market? Where and from whom do you get your market information?

14. Who goes to the market? Do you sell to a trader/broker or send someone from your family? How much commission do you give a broker if you use one?

15. How far away is the market? How long does it take to travel? How do the livestock get to the market? How do you travel there?

16. How often do you visit the market and how many animals do you usual sell at each visit?

17. What prices do you receive for your livestock (cattle, shoats, camels, donkeys)? What factors determine the prices? How much to they vary during the year and from year to year? Is there a seasonality to pricing? How do (current, past and expected future) prices affect your decision to sell or not?

18. How much do you trust the traders/brokers at the market? How fair is the price you receive for your livestock? Please explain the reasons for your answer?

19. How safe do you feel at the market? Have you ever lost an animal via theft/runaway animal/death?

Finances
20. How do you get paid for your livestock? Do you receive payment in cash or in other forms?

21. Do you have a bank account? MPesa account? If so, how often do you use them?

22. Do you have access to loans and credit facilities?? If so, who do you receive loans from and how much money do you borrow and what are the terms: maturity, rates, payments per year and covenants? What are the rates based off of and how do the rates vary and how often? If no access, would you take out loans if you did?
23. What do/would you purchase with the loans?

*Extension Services*

24. How do you keep your animals healthy? Do you use or have access to medication? How much does it cost? How economic are those costs?

25. Do you have access to veterinary care? If so, under what circumstances do you use it and how often? How much does it cost? Would you like better access to veterinary care? If you do not use veterinary services or infrequently, what prevents you from using do so or doing so more often?

26. Do you use breeding services? If so, how often do you use it? How much does it cost? Would you like better access to breeding services? What if any value do you think this service offers?

*Environment/Holistic Management*

27. How and where do you graze/feed your animals?

28. Have you noticed changes in the landscape in the past ten years? How has the landscape changed? What plant species do you see more or less of? Why has it changed?

29. Have you noticed changes in the climate in the past ten years? How has the climate changed?

30. How do you think the climate and landscape will change in the next 10 years?

31. What is or are the main challenge(s) with grazing your livestock? What could be done differently by you or others to alleviate these challenges? What prevents this from happening? If you had more money or resources, what else could be done to improve things?

32. Have you thought about adjusting your grazing methods?

33. Are you aware of the concept Holistic Management and if it is being implemented in your community? Are you aware of the impacts of Holistic Management? Do you have an opinion on it?

*Summary*

34. Overall what are some of the main challenges that you face raising and selling livestock?

35. In what ways would you like to see them improve? If given the right tools and resources, what can you do to help them improve? What could others do?

*Business Model*
36. Would you be interested in using the services of offered by this business? What aspects of the business do you like? What aspects of the business do you dislike?

37. What would you change about the business to increase the chance of you or someone else you know using its services?

**Appendix C**

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<thead>
<tr>
<th>Node (Parent and Sub-nodes)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Community</td>
<td>Discussion on community member of community in general</td>
</tr>
<tr>
<td>Community Action and Organization</td>
<td>Discussion of level of current community organization</td>
</tr>
<tr>
<td>Community Challenges</td>
<td>Discussion of how lack of community organization or unity does or might disrupt certain actions</td>
</tr>
<tr>
<td>Community Organizing and Capacity Building</td>
<td>Discussion of process or need of organizing community or building capacity</td>
</tr>
<tr>
<td>Environmental</td>
<td>Discussion of environmental topics, specifically related to the state of the environment</td>
</tr>
<tr>
<td>Biodiversity</td>
<td>Discussion on the occurrence or absence of certain plant and animal species.</td>
</tr>
<tr>
<td>Climate Change</td>
<td>Discussion about changes in climate</td>
</tr>
<tr>
<td>Environmental Change</td>
<td>Discussion of environmental change: past, present and future</td>
</tr>
<tr>
<td>Current Environmental Change</td>
<td>Discussion about perceived changes in the environment and landscape.</td>
</tr>
<tr>
<td>Drivers of Environmental Change</td>
<td>Discussion on the potential drivers of environmental change in the region</td>
</tr>
<tr>
<td>Future Environmental Change</td>
<td>Discussion of expected environmental and climatic changes in the future</td>
</tr>
<tr>
<td>Land Degradation</td>
<td>Discussion of general land degradation</td>
</tr>
<tr>
<td>Bush Encroachment</td>
<td>Discussion about changes in the occurrence and spread of bush plants</td>
</tr>
<tr>
<td>Desertification</td>
<td>Discussion about process of desertification or bare land</td>
</tr>
<tr>
<td>Erosion</td>
<td>Discussion or mention of soil erosion</td>
</tr>
<tr>
<td>Grass Availability</td>
<td>Discussion on the availability or accessibility of grass or pasture</td>
</tr>
<tr>
<td>Water</td>
<td>Discussion about general water issues</td>
</tr>
<tr>
<td>Drought</td>
<td>Discussion or mention of drought</td>
</tr>
<tr>
<td>-------------------------</td>
<td>--------------------------------------------------</td>
</tr>
<tr>
<td>Rainfall</td>
<td>Discussion about rainfall amounts or patterns</td>
</tr>
<tr>
<td>Runoff</td>
<td>Discussion on water runoff</td>
</tr>
<tr>
<td>Water Availability</td>
<td>Discussion about the availability or accessibility of water</td>
</tr>
<tr>
<td>Waterpoints</td>
<td>Discussion or mention of water points (e.g. dams, wells)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Land Management</th>
<th>Discussion of general land management practies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Changes in Land Management</td>
<td>Current or desired changes in land management</td>
</tr>
<tr>
<td>Education of Land Management</td>
<td>Discussion of recieving training or education on land management</td>
</tr>
<tr>
<td>Grazing Practices</td>
<td>Discussion of current grazing practices, not including current changes or developments</td>
</tr>
<tr>
<td>Planned</td>
<td>Grazing practices that are described as planned</td>
</tr>
<tr>
<td>Unplanned</td>
<td>Grazing practices that are described as unplanned</td>
</tr>
<tr>
<td>Herders</td>
<td>Discussion or mention of herders</td>
</tr>
<tr>
<td>Land Rehabilitation</td>
<td>General discussion on land rehabilitation</td>
</tr>
<tr>
<td>Reseeding</td>
<td>Discussion or mention of reseeding or growing grass</td>
</tr>
<tr>
<td>Land Rights</td>
<td>Discussion about land rights, ownership or regimes</td>
</tr>
<tr>
<td>Overgrazing</td>
<td>Discussion about the act of overgrazing or inability of land to support the number of livestock</td>
</tr>
<tr>
<td>Settlement</td>
<td>Discussion on the settlement of people and population numbers</td>
</tr>
</tbody>
</table>

| Traditional Management  | Discussion of traditional land management technique, those that were practiced in the past |

<table>
<thead>
<tr>
<th>Livestock Health</th>
<th>Discussion of general livestock health issues</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disease</td>
<td>Discussion or mention of livestock diseases</td>
</tr>
<tr>
<td>Emaciated</td>
<td>Discussion of livestock that are emaciated or are poor quality</td>
</tr>
<tr>
<td>Importance of Health</td>
<td>Discussion on livestock health and its impact on quality and price of livestock</td>
</tr>
<tr>
<td>Livestock Health Knowledge</td>
<td>Discussion on livestock health knowledge, specifically in relation to pastoral knowledge</td>
</tr>
<tr>
<td>Treatment</td>
<td>Discussion about general livestock treatment and treatment methods and inputs.</td>
</tr>
<tr>
<td>Wildlife</td>
<td>Discussion of wildlife killing livestock and wildlife conflict</td>
</tr>
<tr>
<td>Market Participation</td>
<td>Discussion on market participation determinants and patterns</td>
</tr>
<tr>
<td>Livestock Attributes</td>
<td>Discussion of general livestock physical attributes</td>
</tr>
<tr>
<td>------------------------------</td>
<td>------------------------------------------------------</td>
</tr>
<tr>
<td>Breed</td>
<td>Discussion of breed when describing attributes</td>
</tr>
<tr>
<td>Drought Resistant</td>
<td>Discussion of how livestock is resistant or adapted to drought</td>
</tr>
<tr>
<td>Growth</td>
<td>Instance where growth capabilities of livestock breed are mentioned</td>
</tr>
<tr>
<td>Hearty</td>
<td>Discussion of how livestock are robust and hearty (i.e. able to walk long distance or up hills)</td>
</tr>
<tr>
<td>Meat</td>
<td>Discussion about quality of meat provided by the livestock</td>
</tr>
<tr>
<td>Medicinal</td>
<td>Discussion of medicinal properties of livestock products</td>
</tr>
<tr>
<td>Milk</td>
<td>Discussion about the quality or quantity of milk provided by the livestock</td>
</tr>
<tr>
<td>Profitable</td>
<td>Discussion of how ofe price or money the livestock breed recieves in the market</td>
</tr>
<tr>
<td>Resistant to Disease</td>
<td>Discussion on how livestock is resistance to disease</td>
</tr>
<tr>
<td>Suitability</td>
<td>General statement how livestock breed is suitable for climate</td>
</tr>
<tr>
<td>Livestock Trading</td>
<td>Discussion of buying, fattening and selling cattle as a business</td>
</tr>
<tr>
<td>Market</td>
<td>Discussion of specific markets, such as Kiserian</td>
</tr>
<tr>
<td>Market Actions and Decisions</td>
<td>Discussion of actions in market and what might influence them</td>
</tr>
<tr>
<td>Market Price</td>
<td>Discussion of prices and changes in market and how it might affect decision or outcomes</td>
</tr>
<tr>
<td>Subsistence</td>
<td>Instances where pastoralists sells livestock to meet basic, daily needs</td>
</tr>
<tr>
<td>Market Attributes</td>
<td>Discussion of market attributes</td>
</tr>
<tr>
<td>Proximity</td>
<td>Discussion of how the market is close or the only one in the area</td>
</tr>
<tr>
<td>Safety</td>
<td>Discussion about the safety of the market</td>
</tr>
<tr>
<td>Vibrancy</td>
<td>Discussion about the vibrancy, strength or functioning of the market</td>
</tr>
<tr>
<td>Market Information</td>
<td>Discussion on where pastoralists obtain information about the market</td>
</tr>
<tr>
<td>Middlemen</td>
<td>Discussion about traders and brokers and the role they serve</td>
</tr>
<tr>
<td>Commission</td>
<td>Discussion about commission, other than when there is none</td>
</tr>
<tr>
<td><strong>Price from Middlemen</strong></td>
<td>Discussion of Price from Middlemen</td>
</tr>
<tr>
<td>--------------------------</td>
<td>-----------------------------------</td>
</tr>
<tr>
<td><strong>Price</strong></td>
<td>Discussion of livestock market prices</td>
</tr>
<tr>
<td><strong>Price Determinants</strong></td>
<td>Discussion of the livestock attributes that determine the price of the animal in the market</td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td>Discussion of age of livestock</td>
</tr>
<tr>
<td><strong>Animal Breed</strong></td>
<td>Discussion of the breed of the livestock</td>
</tr>
<tr>
<td><strong>Health</strong></td>
<td>Discussion of the health condition of the livestock when selling</td>
</tr>
<tr>
<td><strong>Size or Weight</strong></td>
<td>Discussion about the general size, weight and conformaty of the livestock</td>
</tr>
<tr>
<td><strong>Price Variation</strong></td>
<td>Discussion of how prices for livestock vary in the market</td>
</tr>
<tr>
<td><strong>Demand</strong></td>
<td>Discussion about demand for meat or livestock</td>
</tr>
<tr>
<td><strong>Holidays</strong></td>
<td>Discussion about holidays and festive seasons</td>
</tr>
<tr>
<td><strong>Seasonality</strong></td>
<td>Discussion on how prices change by month or over seasons</td>
</tr>
<tr>
<td><strong>Supply</strong></td>
<td>Discussion about the supply or demand of meat</td>
</tr>
<tr>
<td><strong>Trust</strong></td>
<td>Any Instance in which the word trust is mentioned</td>
</tr>
</tbody>
</table>

**Services**

<table>
<thead>
<tr>
<th><strong>Breeding Services</strong></th>
<th>Discussions of breeding services, such as using AI and renting to buying a bull</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Access or Use of Breeding Services</strong></td>
<td>Discussion on the access or use of breeding services, such as buying a bull or renting one.</td>
</tr>
<tr>
<td><strong>Breeding Need</strong></td>
<td>Discussion about the need or want for breeding services, a demonstrated lack of the services</td>
</tr>
<tr>
<td><strong>Financial Services</strong></td>
<td>Discussion about financial services, such as loans and banks</td>
</tr>
<tr>
<td><strong>Access to Finance</strong></td>
<td>Discussion on access and ability to obtain financing. The act of acquiring financing</td>
</tr>
<tr>
<td><strong>Financial Knowledge</strong></td>
<td>Discussion on financial knowledge and capacity to manage</td>
</tr>
<tr>
<td><strong>Financial Need</strong></td>
<td>Discussion about general need or desire for financing which hasn't been met</td>
</tr>
<tr>
<td><strong>Livestock Marketing</strong></td>
<td>Discussion about the livestock marketing services other than livestock trading</td>
</tr>
<tr>
<td><strong>Vet Services</strong></td>
<td>Discussion about veterinary services</td>
</tr>
<tr>
<td><strong>Access to Vet</strong></td>
<td>Discussion on access and ability to obtain veterinary services. The act of obtaining a vet.</td>
</tr>
<tr>
<td>Vet Need</td>
<td>Discussion about the need or want for veterinary services, a demonstrated lack of services</td>
</tr>
</tbody>
</table>