

Economic viability of abattoirs in Arid and Semi-Arid Land (ASAL) counties of Kenya



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Abbreviations and acronyms

AfDB	African Development Bank
ASALs	Arid and Semi-Arid Lands
CECs	County Executive Committee Members
DFZ	Disease Free Zones
EPZ	Export Processing Zones
FCDC	Frontier Counties Development Council
HACCP	Hazard Analysis and Critical Control Points
KBHC	Kenya Bureau of Halal Certification
MoU	Memorandum of Understanding
NGO	Non-Governmental Organization
RDA	Regional Development Authorities
SFAL	Sector Forum for Agriculture & Livestock
WSTF	Water Sector Trust Fund

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Executive summary

Recently, several large-scale meat processing abattoirs are under construction in the Arid and Semi-Arid Lands (ASALs) of Kenya. This is in response to the emerging meat export opportunities to the Middle East and North African countries. These developments are in the right direction toward expanding Kenya's foreign exchange earnings and improving the livelihoods of livestock producers and other actors engaged in livestock related activities in the country. However, one of the major challenges facing the existing meat market is the inadequate supply of quality live animals for meat processing. It has been observed that the live animal throughput is inadequate and, as a result, the existing meat processing facilities operate at less than their full capacity. Overcoming the constraint of supply shortage of quality live animals is key to the feasibility of the proposed abattoirs. This study is conducted with the main objective of assessing the performance and economic viability of abattoirs in the ASAL areas. Detailed literature review of available studies was undertaken to provide documented information to achieve the study's objective.

It was observed that pastoralists in the ASAL areas do not provide adequate livestock numbers for the meat market due to their limited market participation in the meat market. The implication of limited livestock numbers and limited market participation is that under the current production and marketing conditions pastoral livestock production systems do not provide regular and adequate supply of quality live animals to the market, which adversely affect the efficient utilization of meat processing capacity of the existing abattoirs. This analysis recommends that the establishment of new export abattoirs in different ASAL counties has to proceed with great caution and take into account the availability of live animals for processing.

1.0 Introduction

1.1 Background

Livestock production is the dominant economic activity in the ASAL counties. These counties are home to nearly 70% of the national livestock herd. However, the potential of the livestock sector to increase the incomes of producers, create employment, reduce poverty and food insecurity in ASALs remains largely unexploited. A comprehensive analysis of the investment opportunities that are most likely to contribute to the achievement of these development goals need to be identified in a systematic manner to avoid mistakes that could be made from an incomplete assessment of the strengths and weaknesses of proposed interventions. Several studies document the constraints facing the development of a robust livestock system in Kenyan ASALs. These constraints relate to low population density, limited success of interventions to increase primary productivity; degradation of natural resources, conflict in managing common resources, weak links to national economy and low priority for public investment.

Kenya's domestic market is rapidly growing, and the country is a net importer of beef. Returns to the livestock sector in ASALs, and indeed Kenya as a whole, are dependent on both domestic and international demand for livestock products. Yet the livestock marketing system in ASALs is poorly developed to serve the domestic and international markets. One option that has been considered for improving the livestock marketing system in ASALs is the establishment of abattoirs. Moving abattoirs and marketing infrastructure closer to producing areas would increase value addition and local employment. An essential condition for successful abattoir operations is a guaranteed supply of animals. It is therefore important to understand the livestock keeping trends and establish the maximum sustainable offtake in terms of cattle, meat, and other livestock products.

1.2 The need for abattoirs

Recently, several large-scale meat processing abattoirs have been established in the ASAL areas of Kenya in response to the emerging meat export opportunities to the Middle East and north African countries. There are also several meat export abattoirs under construction, and more are planned to be established in the near future in different regions of the country. These developments are in the right direction toward diversifying and increasing Kenya's foreign exchange earnings and improving the livelihoods of livestock producers and other actors engaged in the livestock related activities. One of the major challenges facing the meat export abattoirs has been the competitiveness of these firms in the domestic and export markets due to underutilization of their meat processing capacities, (Asfaw and Jabbar, 2008). It has been observed that the live animal throughput is inadequate and, as a result, the existing meat processing facilities operate at less than 50% of their operational capacities, for example the Lomidat Abattoir in Turkana County. This is apparently due to inadequate supply of the required quality of live animals for meat processing by the export abattoirs. Export abattoirs are competing with the demand for live animals for domestic consumption, and for formal and informal (cross-border) trade. The key problem is that when the meat processing abattoirs are not operating at their optimum capacity, they are not minimizing their costs of operations and they are facing cost disadvantage, which makes them less competitive in the domestic and international meat markets, (Asfaw and Jabbar, 2008). Meat export abattoirs are also required to ensure a consistent and continuous supply of meat in order to meet the demand of the customers in the importing countries. Thus, there is an urgent need to devise alternative strategies to ensure adequate market supply

of quality live animals to meet export abattoirs processing needs in order to improve their efficiency and competitiveness.

1.3 Objectives of the study

The main objective of this study is to get a better understanding of performance and economic viability of abattoirs in the ASAL areas and draw key implications for meat value chain development in the country.

1.4 Scope

This was an analysis conducted in selected counties around the old North Eastern province. The counties represented were: - Isiolo, Turkana, West Pokot, Wajir and Mandera.

1.5 Methodology

Data to address the research objectives was collected from secondary sources. Detailed literature review was undertaken to provide documented information on different study topics.

1.6 Organisation of the report

The remaining sections of this paper are organized as follows. Chapter 2 gives a synopsis of the livestock meat value chain; Chapter 3 reviews the current meat and meat products development initiatives in the ASAL areas while Chapter 4 looks at the current status of abattoirs in ASAL counties. The last sections of the study reviews the economic and market considerations for setting up abattoirs in ASAL areas and proposes some alternative options for sustainability of the abattoirs.

2.0 Synopsis of the livestock meat value chain

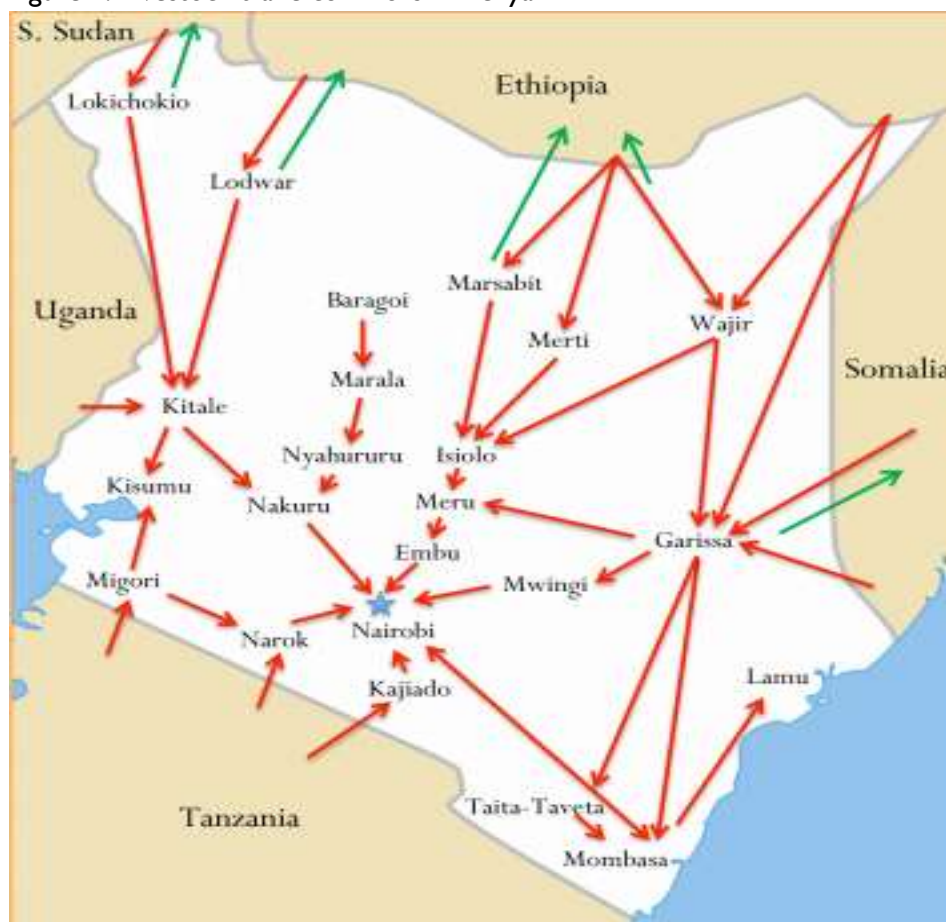
2.1 Current production systems

The red meat, comprising beef, mutton, goat and camel meat, accounts for over 80% of all the meat consumed in the country in general. The white meat from poultry and pork accounts for about 19% of the meat consumed (EPZA, 2005). Approximately 80 to 90 % of the red meat consumed in Kenya comes from livestock raised by pastoralists under extensive production system within Kenya and neighboring countries mainly Tanzania, South Sudan, Ethiopia and Somalia (Farmer and Mbwika, 2012). Kenyan pastoralists account for 65-70 % of the Kenya red meat supply the remaining 20-25% comes from informal cross border trade with neighbouring countries. Private ranches contribute 2–3% of total meat production in Kenya, principally for the high value market.

In Kenya, the average per capita consumption of red meat is about 15.5 kg with an annual production of about 600,000 metric tons (International Development, 2014). Despite the seemingly abundant meat and consumer markets, Kenya is a meat deficit country to the tune of 300,000 metric tons (I Dev report – Meat Sector in Kenya 2014). At the same time, the industry is very inefficient with huge losses occasioned by hot meat retail chain, low value addition, poor processing skills and worst of all, the food sanitary risks due to lack of bio security, cold chain and access to water and poor hygiene and inspection practices (Carron et al., 2017). The potential of the Kenyan market seemingly is increasing along with the population

that livestock is also exported from Kenya to neighbouring countries: mainly camels and goats to Somalia, and shoats to Ethiopia. However, the volumes/number of animals exported are relatively low compared to the volumes sourced from these countries.

Figure 2: Livestock trade corridors in Kenya



Source: Adapted from International Development (2014)

2.3 The off-take rates and the meat sub-sector in Kenya

In smallholder mixed farming systems and also in pastoral systems, animals are kept for multiple functions, and sale or other forms of disposal are not regular phenomenon; rather sales are sporadic based on immediate cash needs. In this regard, one of the key questions to ask is: what proportion of the live animals from such herds will leave the livestock herders for off-farm slaughter or export or other kind of uses.

According to data from the Kenya National Bureau of Statistics, the number of animals slaughtered has been increasing over time. The number of cattle and calves slaughtered rose by 7.4 per cent from 2,590.0 thousand heads in 2017 to 2,781.7 thousand in 2018. Similarly, the total number of goats and sheep delivered to slaughterhouses increased by 11.3 per cent to stand at 10,247.6 thousand heads in 2018.

The cities of Nairobi and Mombasa are the key terminal markets accounting for 75% of country's meat consumption with an average of 25.8 kg and 21.2 kg per person respectively. Nairobi city alone requires monthly supply of approximately 27,839 head of cattle, 71,555 sheep and goats, and 685 camels. Mombasa requires a monthly supply of about 8,178 head of cattle, 21,021 sheep and goats and 201 camels (I-Dev, 2014)).

2.4 Demand for meat, meat products and by-products in different market segments

Meat consumption is a measure of the demand for meat products and a means to assess growth in the sector. There is huge and rapidly growing demand for meat in Kenya fueled by population growth, urbanization and rise in people's income (Bosire et al. 2017; Gamba et al. 2005). Nairobi and Mombasa are the leading demand centres for slaughter animals and therefore serve as the main terminal markets. As the demand for meat continues to rise, it is projected that Kenya will find it increasingly difficult to satisfy its local demand for beef and sheep meat through domestic offtake rendering the country increasingly reliant on importation. The bulk of meat consumed in Kenya is low quality and mostly comes from animals raised by pastoral communities. Quality preferences however vary among consumers. Willingness to pay premiums for quality, reliability and cleanliness is higher among higher income consumers (International Development, 2014). In line with higher willingness to pay for quality among high income groups, some abattoirs seek to produce superior quality meat and meat products which they sell to high end hotels, restaurants, supermarkets and in export markets at a premium. The abattoirs that target high end consumer segments include the Kenya Meat Commission (KMC), and other privately-owned enterprises such as Quality Meat Packers, Farmer's Choice, Alpha Fine Foods, and Ngare Narok Meat Industries. Ranches form the main source of animals slaughtered for this high-quality meat trade.

2.5 Description of the policy and regulatory issues faced by abattoirs

The following are the laws and policies that are used to regulate the establishment of abattoirs in Kenya:

- 1) Public Health Act – An act of Parliament to make provisions for securing and maintaining health.
- 2) Animal Diseases Act – An act of parliament to provide for matters relating to the diseases of animals.
- 3) Meat Control Act – An act of Parliament to enable control to be exercised over meat and meat products intended for human consumption and over slaughterhouses and places where such meat is processed and to provide for import and export control over such meat and meat products.
- 4) Food, Drugs and Chemical Substances Act – An act of parliament to make provision for the prevention of adulteration of food, drugs and chemical substances.
- 5) Prevention of Cruelty to animals' Act – An act to make better provision for the prevention of cruelty to animals; to control experiments on animals.
- 6) National Bio Safety Authority Act – aims at facilitating responsible research and minimizing risks that may be posed by genetically modified organisms.
- 7) Veterinary Surgeons and Veterinary Para-Professionals act – An act of Parliament to make provision for training, registration and Licensing of Veterinary Surgeons and Veterinary para professionals to provide for matters relating to animal health services and Welfare.
- 8) Fertilizers and Animal Foodstuffs Act – An act of parliament to regulate the importation, manufacture and sale of agricultural fertilizer and animal foodstuffs and substances of animal origin intended for the manufacture of such fertilizer and foodstuffs.
- 9) Kenya Meat Commission Act – An act of parliament to establish a commission to purchase cattle and small stock, and to acquire, establish and operate abattoirs, meat works, cold storage concerns and refrigerating works for the purpose of slaughtering cattle and small stock, processing

by products, preparing hides and chilling, freezing, canning and storing beef, mutton, poultry and other meat foods for export or for consumption within Kenya.

- 10)** Uplands Bacon Factory Act – An act of parliament to provide for the constitution of the Uplands Bacon Factory (Kenya) limited.
- 11)** Cattle Cleansing Act – An act of parliament to provide for the cleansing of cattle.
- 12)** Rabies Act – An act of parliament to provide for the suppression of rabies.
- 13)** Animal Breeding Policy (in Draft form) – Aims to promote sustainable use, development and conservation of its domestic and emerging animal genetic resources.
- 14)** Livestock feeds Policy (in Draft form) – Will detail standards that manufacturers have to maintain while making feeds.

2.6 Coordination platforms to facilitate the value chain activities

Frontier Counties Development Council (FCDC), has set up a Sector Forum for Agriculture & Livestock (SFAL) as an instrument to enhance cooperation, coordination and information flow between counties on issues related to Agriculture and Livestock. County Executive Committee Members (CECs) for the respective agriculture and livestock departments meet every three months, and the SFAL secretariat within FCDC implements requests and decisions taken by the Forum. This is the most relevant coordination platform to also coordinate activities along the meat value chain in the ASAL areas.

2.7 An overview of existing abattoirs

Various counties in the ASAL areas have the desire to export livestock and meat which has seen construction of export grade abattoirs in these areas. However, most of these abattoirs have not been finalized yet. There are a number of licensed abattoirs in Nairobi, its environs and in Mombasa as presented in Table I. Almost all the abattoirs are operating below their full capacity while others are not in operation. Most of these abattoirs provide market for animals coming from the pastoral areas. Much of the meat from these abattoirs is sold locally to wholesalers and retailers.

Table I: Major licensed abattoirs in Nairobi and Mombasa end markets

Abattoirs	Catchment livestock markets	Capacity	Status
Njiru	Northeastern-Isiolo, Moyale and Garisa, Migori, Laikipia, Kitui, Mwingi	100 cattle/day	Operating
Kiamaiko	Garissa, Mandera, Marsabit, Isiolo Migori, Kuria, Suba Kajiado, Narok, Turkana, Samburu,	200 shoats/per day	Operating
Neema	Kajiado, Samburu, Isiolo, Narok and Baringo counties	4,500 heads of cattle/day.	Operating Currently slaughtering 1,000 goats and sheep and 900 cows per day

Abattoirs	Catchment livestock markets	Capacity	Status
Dagoreti	Garissa, Mandera, Marsabit, Isiolo Migori, Kuria, Suba Kajiado, Narok, Turkana, Samburu, Kapenguria, Nandi, Kericho, Bomet, Laikipia Kitui, Mwingi, Machakos, Makueni	400 cattle/day	80% cattle and goats 50% sheep
Mlolongo	Garissa, Mandera, Marsabit,	15 camels/day	Closed
Mariakani-Mombasa	Not specified	50 cattle/day	Unknown
Bisil	Not specified	50 cattle/day	Unknown
Kiserian	Kajiado, Narok, Isiolo	50–100 cattle/day and 200 shoats/day	50% cattle and 65% shoats
Ongata Rongai	Not specified	30 cattle/day and 6–8 shoats/day	Unknown
Licensed Export Abattoirs			
Hurlingham Quality Meat Packers	Not specified	50 head of cattle	Operating
KMC Mombasa	Marsabit, Wajir, Isiolo, Garissa, and the porous borders; Tanzania, Ethiopia, South Sudan, Uganda and Ethiopia	300 head of cattle	150 head cattle/day
KMC Athi River	Marsabit, Wajir, Isiolo, Garissa, and the porous borders; Tanzania, Ethiopia, South Sudan, Uganda and Ethiopia	1,000 head of cattle; 1,200 sheep and goats on a three-shift basis	1,000 cattle/ week; 1,000 Shoats/day
Halal-Ngong	Not specified	250 head cattle	Closed
New Mombasa Mnangoni	Not specified	120 head cattle	Closed
Farmers choice (pork)	Country wide	300 pigs	Operating
Choice Meat (subsidiary of Farmers Choice)	Country wide	150 head cattle 250 sheep and goats/day	70 head cattle/ Day 55 sheep and goats/day
Kenmeat EPZ Limited	Not specified	Not specified	Operating Deals with chilled, frozen and vacuumed meat products

Source: Mbwika and Nthuli (2004); updated January 2012 as quoted in Farmer and Bwika (2012)

Table 2 gives an overview of the total stock of livestock in the country in comparison to the total number of animals slaughtered by licensed abattoirs. In general, very low off-take rates in form of slaughter is observed over different time periods for both cattle and shoats. For example, the total number of cattle slaughtered by licensed abattoirs as a percentage of total stock in the country ranges between 12 -14% for the entire period. For the shoats, the highest off take rate for period 2013 -2017 is 21% recorded in 2017. This shows that there is limited purchase of live animals by licensed abattoirs in comparison to their capacities as indicated in Table 1. The proposed abattoirs in the ASAL counties are likely to suffer from the same problem of inadequate supply of live animals. This will adversely affect the efficient utilization of meat processing capacity of the proposed export abattoirs in the ASAL areas.

Table 2: Comparison of total stock and total number of slaughtered animals by Licensed Abattoirs

Livestock Type	Year	Total stock	Total Slaughtered by Licensed Abattoirs	Total slaughtered as a percentage of total stock (%)
Cattle	2013	18,138,500	2,147,300	12
	2014	18,247,632	2,076,700	11
	2015	18,728,076	2,274,500	12
	2016	20,529,190	2,460,200	12
	2017	18,338,809	2,590,000	14
Sheep and goats	2013	41,238,304	6,084,800	15
	2014	44,595,265	6,138,500	14
	2015	41,889,581	6,560,800	16
	2016	45,729,676	8,220,200	18
	2017	43,443,561	9,206,700	21
Pigs	2013	432,979	264,300	61
	2014	430,844	257,200	60
	2015	462,033	282,900	61
	2016	504,395	313,600	62

	2017	554,301	360,100	65
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Source: KNBS Statistical Abstract, 2018 and FAOSTAT, 2019

3.0 Review of abattoir initiatives in the ASAL areas

3.1 Projects undertaken by donors, the private and public sectors

The World Bank has committed Ksh 800 million on equipping slaughterhouses in four counties to promote local and export market for livestock products. The abattoirs, which are part of the economic stimulus programme, are being constructed in Garissa, Wajir, Isiolo and Mandera counties.

3.2 Benefits and opportunities offered by the abattoirs in ASAL areas

The following benefits and opportunities are envisaged in the setting up of an export abattoir:

Slaughter facilities: As a meat producing facility, the abattoir in the ASAL areas aims to change the business processes within the meat value chain from selling off the hoof (live animals), to selling slaughtered animals for increased profitability and market share.

Drought response facilities: The purpose of an Abattoir is to help the pastoralists slaughter their animals and not suffer losses during the drought periods. It acts as a facility for early and immediate drought response by slaughter destocking through mobilizing livestock through the peripheral buying centers.

3.3 Review of existing and proposed county abattoirs

Another task in this assignment was to review existing and proposed County abattoirs in the ASAL counties so as to evaluate how the counties have proposed to respond to the infrastructure gaps in the meat market. We found a few reports and feasibility studies detailing the facts about the abattoirs in the ASAL counties. We have summarized some key points from the studies in Table 3.

Table 3: Review of existing and proposed County abattoirs

Study	Key facts
Marsabit County abattoir	<p>Proposed capacity: Kill and fabricate 700 animal units per week.</p> <p>Ownership: A partnership between the County Government Marsabit and potential investor is recommended to ensure coordination and representation of all stakeholders.</p> <p>Business model: Multi Species abattoir largely focusing on slaughter and basic animal and primal fabrication then move into value added fabrication in year 2.</p> <p>Estimated facility cost: Ksh 233 million.</p> <p>Opportunities: Ability to serve secondary processors (both county and national); Niche markets (i.e. ethnic, Halal); Regional value-added brand and emerging export markets in Africa, Asia and Africa.</p> <p>Threats: Competition for supply of livestock could be high due to initiatives by the neighbouring counties to also establish abattoir; livestock costs could be higher due to competition; national and international competition could increase thus rendering the new</p>

Study	Key facts
	facility less profitable and population expansion close to the facility location is probable.
Isiolo County abattoir	<p>Proposed capacity: 1000 goats and sheep, 50 camels and 200 cattle per day.</p> <p>Ownership: The Slaughterhouse is owned by the ministry of Agriculture but upon completion it will be devolved to the county Government.</p> <p>Business model: Operate a dual processing strategy including toll processing and own brand. They propose to do slaughter and fabrication to customers that want to add value by further Processing (i.e. sausages, minced meat, burgers etc.).</p> <p>Estimated facility cost: Funded through the ministry of Agriculture under the economic Stimulus Programme and the African Development Bank (AfDB) at a cost of Kshs. 850 million</p> <p>Opportunities: No other facility in the area offering similar Services.</p> <p>Threats: Unexpected prolonged dry spells, cattle diseases, initial cash flows deficit, high strict international standards and other existing slaughterhouses.</p>
Nasukuta export abattoir, West Pokot	<p>Proposed capacity: Unknown.</p> <p>Ownership: West Pokot County.</p> <p>Business model: Multi Species abattoir.</p> <p>Estimated facility cost: Kshs 161 million, funded by the European Union, through the Ministry of Devolution and ASAL, under the EU-IDEAS program.</p>
Lomidat abattoir, Turkana County	<p>Proposed capacity: Slaughter 300 bulls and 600 small livestock every month.</p> <p>Ownership: Managed by Lomidat Pastoral Multipurpose Co-operation Society (LPMCS), a community managed and owned abattoir.</p> <p>Business model: Multi Species abattoir.</p> <p>Estimated facility cost: Kshs 60 Million.</p> <p>Opportunities: The only abattoir capable of slaughtering for export, this can be utilized, and many animals could be collected and sent to Lomidat for slaughter and freezing. There is great potential and possibilities of airfreighting frozen meat to Nairobi, Kampala and Juba.</p> <p>Threats: Low off take rates by households.</p>

Source: Author's compilation

4.0 Economic and market considerations for setting up abattoirs in ASAL areas

If a county is to support establishment of an abattoir, the following considerations are of paramount consideration:

- i) Will there be a consistent supply of required quality of animals?
- ii) Does a steady demand for meat products exist in the target markets?

Establishment of abattoirs in production areas will likely be economically viable if:

- i) Local demand is high so that the abattoir serves the local market; and
- ii) Processing, transportation, and storage costs are low to allow for competitively priced meat products to reach distant domestic, regional or international markets. These costs depend mostly on availability of energy and transportation infrastructure. Transport is critical for livestock markets and broader development, but costly.

If an abattoir is viable in a given ASAL county, the county government support must be in the form of provision of public goods and services. In other words, public funds should not be invested in abattoirs. Instead, private risk capital should be encouraged to explore opportunities while the county government concentrates on creating an enabling environment for the private sector to thrive. For example, as highlighted, transport is critical for the development of livestock markets and broader development but costly. Therefore, county governments would do well to invest resources to reduce the costs and riskiness of transportation of refrigerated products. Poor transport infrastructure makes the marketing of some products such as offals very inefficient.

In some cases, the quality of local animals may not meet the requirements of high end domestic and/or export markets and finishing of animals may have to take place in areas outside the ASALs. Focusing on export markets may require the establishment of disease-free zones, which are difficult to enforce at present and the low intensity of production makes them uneconomic.

In addition to transport and energy infrastructure, County government in collaboration with the National government should provide a conducive environment for commercial and NGO financing institutions to operate. This is because credit is critical for both producers and traders.

It is important to remember that modern slaughtering is only a minor step in the value chain, which may not have a major impact on the sector as a whole. A more comprehensive intervention by county governments would focus on increasing the availability of feed resources, animal health services and infrastructure. Therefore, having finishing and fattening of livestock as integral parts of the value chain may allow access to high value domestic and export markets in addition to provision of other services like security to the livestock traders.

4.1 Main requirements and considerations in order to access key export markets

Various importing countries have specific requirements which the counties who have established export abattoirs must meet in order to export. Some of the requirements are listed briefly in the next section.

Disease free zones: Meat must come from a disease-free country, or a certified disease-free zone (DFZs), especially where BSE (Mad Cow Disease) is a threat. The establishment of DFZs is a flagship project within Kenya's 2030 vision. The government expects to establish four DFZs by 2030. The first being at the Coast, covering the counties of Kwale, Mombasa, Kilifi, Tana River, Lamu and parts of Taita-Taveta. The other

three zones will be established in the Laikipia-Isiolo complex, Uasin Gishu and Garissa Counties. However, none of these has been established yet in the ASAL counties.

Halal: All the animals must have been slaughtered in accordance with the Islamic law. In order To prove this, the processing plant must be certified by the Kenya Bureau of Halal Certification (KBHC).

Meat Inspection Certificate: A “Meat Inspection Certificate”, issued by the government of the exporting country must be presented every time the product arrives to the importing country. Furthermore, the importing country’s authorities can carry out numerous inspections and controls to validate this certificate.

Registered Exporter: The exporting company has to be registered as a licensed meat exporter.

HACCP: The product, the processing facilities and the livestock management practices must meet the international quality standards for hygienic food handling aiming at preventing biological, chemical and physical hazards, ideally implementing the HACCP systematic approach (Hazard Analysis and Critical Control Points) in all their processes.

4.2 Options for sustainability of abattoirs in ASALs

Several county governments have recently embarked on the formation and establishment of county regional economic blocs to foster development in their regions. Article 189 of the 2010 Constitution of Kenya gives opportunities to governments at each level to cooperate and to set up joint authorities in performance of their functions, therefore enabling counties to forge collaborations to spur economic growth and development within their regions. The Frontier Counties Development Council (FCDC) is a regional economic bloc composed of the County Governments of Lamu, Tana River, Garissa, Wajir, Mandera, Marsabit, Isiolo, Turkana, Samburu and West Pokot. The Council was formed in March 2016, when Governors from seven member counties signed a memorandum of understanding. The composition has since grown from 7-member counties to 10 as of September 2019.

The Region-based development blocs are not new in Kenya. This has been practiced since early 1970s through establishment of Regional Development Authorities (RDAs). Their mandate is to plan, implement and coordinate development programmes in regions under their jurisdiction to ensure development through integrated planning and management.

FCDC region has already embarked on joint projects demonstrating the potential benefits of intercounty collaboration. FCDC has signed a Memorandum of Understanding (MoU) with the Water Sector Trust Fund (WSTF) for implementation of water related projects. The MoU offers investment opportunities in areas of rural water and sanitation, urban water and sanitation, water resource management, climate change and disaster management, result-based and commercial financing and research and special programmes. Through the FCDC, the counties in the ASAL areas can extend the collaborations to establishment and sustainability of the abattoirs. The ASAL counties need to pool together and tap into underexploited local and international markets. In order to enhance the collaboration, the ASAL counties need to enact enabling legislation to operationalize the FCDC and guide the management, distribution and sharing of resources.

In addition to the collaborations among the counties through the economic blocs, the sustainability of the abattoirs can be enhanced by formalizing and improving the supply chain. A formalized market with clearly communicated prices and a shortened supply chain will allow pastoralists to realize higher sales prices and thus create incentives to supply more livestock. Through a higher level of industry formalization, we expect

to see greater supply efficiency and margins. Suppliers will realize that supplying cattle is an opportunity to generate a stable income and be incentivized to grow the domestic herd for meat production. ASAL counties could also collaborate with other counties in higher potential agro-ecological zones for establishment of feedlots and increase the supply of quality animals.

5.0 Conclusions and recommendations

The main objective of this study was to assess the economic viability of setting up additional abattoirs in the ASAL areas. The analysis is based on the review of literature obtained from different sources. Several significant conclusions are drawn from the reviews, which may provide useful insights towards the designing and implementation of strategies to ensure adequate market supply of quality live animals to meet export abattoirs processing needs. This also enhance efficiency and competitiveness of the meat industry.

It is observed pastoralists in the ASAL areas have limited livestock holdings and limited market participation. The implication of limited livestock holdings and limited market participation is that under the current production and marketing conditions pastoral livestock production systems do not provide regular and adequate supply of quality live animals to the market, which adversely affect the efficient utilization of meat processing capacity of the existing export abattoirs. Furthermore, this analysis also indicates that the plan for the establishment of new export abattoirs in different ASAL counties has to proceed with great caution and careful assessment of the availability of live animals suitable for export abattoirs.

Analysis of the detailed cost structure of export abattoirs was not within the scope of this study. However, it is very important that the proposed export abattoirs examine their operational efficiency and cost structures in order to improve their overall efficiency rather than just concentrating on the supply side constraints. In the future, a detailed study of cost structure for export abattoirs and a detailed analysis of the current livestock value chains will be required to identify entry points to increase livestock off take rates and reduce costs of operation.

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7.0 Annexes

7.1 Case study of a Lomidat abattoir in Turkana county

The central role of the Lomidat Abattoir in the Turkana Livestock Industry

In this section, the potential for adoption and replication of The Lomidat Abattoir Market/Business Model in other sub counties of Turkana was examined, by assessing the implications, costs and possible benefits both in the short and long run.

Lomidat was built in 2006 at a cost of Kshs 60 Million by AMREF Italy and Terra Nuova with funding from the Italian Government. It is managed by Lomidat Pastoral Multipurpose Co-operation Society (LPMCS) a community managed and owned abattoir about 9 km from the town of Lokichoggio that serves the needs of pastoralists in the County. Lomidat is the only abattoir in the whole Turkana County designed to slaughter meat for export. The other numerous slaughter slabs in Turkana cannot slaughter meat for export. Its current capacity are 50 cattle and 200 shoats per day, but with a potential target to slaughter 300 bulls and 600 small livestock every month. However, it is only managing 50 bulls and 300 shoats every two months. Thus, currently the abattoir is underutilized.

The Lomidat Abattoir seeks to meet the socio-economic needs of the pastoralist livestock farmers by linking the livestock markets to the abattoir. It produces high integrity export quality meat and meat products sustainably.

The benefits and opportunities offered by the Lomidat abattoir operational model

Slaughter facilities: As a meat producing facility, Lomidat abattoir aims to change the business processes within the meat value chain from selling off the hoof (live animals), to selling slaughtered animals for increased profitability and market share. The Lomidat abattoir in Turkana, northern Kenya has modern slaughter facilities and well-trained personnel. It is a state-of-the-art facility that provides pastoralists with ready markets for their produce. Prime cuts of meat, sausages and striped meat are among the Lomidat abattoir 's products.

Cottage industries: Lomidat abattoir utilizes bones, horns, hides and skins to make valuable products and art crafts; and makes soap from waste fat.

Biltong is traditional dried meat known as *ngatosa* among the Turkana community is also produced at Lomidat Abattoir.

Satellite market centres: Lomidat has built five satellite market centres equipped with weighing scales to buy and collect animals for the abattoir in these areas: iKanakurudio, Letea, Lokangae, Lokori and Namouroputh. A sales yard at Kakuma has been rehabilitated. Each of these have minor infrastructure such loading ramps and scales. There are set auction days in order to create a permanent market linkage. These are being transformed into live animal markets established and operated by the cooperative. Through this, Lomidat abattoir aims to ensure a regular supply of animals for slaughter, become a centre for grading and testing animals, while the market is an alternative source of income.

Drought response facilities: The original purpose of Lomidat Abattoir construction was to help the pastoralists slaughter their animals and not suffer losses during the drought periods. The facility was established as a not-for-profit venture. It acts as a facility for early and immediate drought response by

slaughter destocking through mobilizing livestock through the peripheral buying centres at Letea, Lokangae, Kakuma, Kanakurudio, Lokori and Namouruputh. The original purpose has now been expanded into a profit-making organization.

Extending reach by mobilizing suppliers: The Lomidat Pastoral Multipurpose Co-operative Society Ltd raises awareness on market opportunities for livestock in livestock holding-grounds and pastoralists 'kraals to identify potential sellers and sensitize them on prices and purchase runs by the abattoir truck.

Promoting fodder banks: Terra Nuova and Vétérinaires Sans Frontières-Belgium worked with the Lomidat abattoir to promote through farmer field school fodder production of various native grasses: *Cenchrus ciliaris*, *Chrysopogon plumulosus*, *Cymbopogon* sp., *Enteropogon macrostachyus*, *Sehima nervosum* and *Eragrostis superba* in Naweregai, Kapelbok, Lorus, Riokomor, Pokot Central, Amolem and Termach. Fodder seeds are harvested and propagated to new areas whilst the harvest grasses are transformed into hay bales.

Refrigerated trucks for meat transport: Meat is a highly perishable product with a short shelf life. Lomidat has cooling facilities and a refrigerated truck to transport meat to distant and secure extra county markets in Nairobi and Juba. Maintaining this cold chain has opened up new markets for the pastoralists of Turkana, allowing them to compete on product quality and safety in the cities. This has the advantage to having the full value of the animal in terms of by-products within the county.

Reducing the distance to be covered: The distance from the Turkana pastoralist to the market has been reduced by establishing markets or processing facilities closer to the producers. The Lomidat abattoir provides a market close to the producers in the district through the five-satellite market centres.

Foci of youth training: Lomidat has been a centre of transition of training the youth in skills at meat training institutes as well as in handicraft manufacture amongst others. Butchers and flayers (who do the slaughtering and cut the carcass into halves) recruited from the local community have attended training at the Meat Training Institute and the Kenya Meat Commission. Other training has covered hygiene, occupational safety, first aid, animal health, HIV/AIDS, and craftwork using bone.

Conferring ownership on local people and encouraging investment and commitment by local people: The Lomidat Pastoral Multipurpose Co-operative Society, which runs the Lomidat abattoir, is a hybrid of a cooperative and a company. While it was established with donor funds, it is owned by the 1,600 cooperative members who have bought shares and who earn dividends when it earns a profit. The cooperatives have the possibility of raising capital from their members by charging membership fees and through sales of shares. This has helped the pastoralists get organized and to retain them occupy a key position in the marketing chain.

Improving gender equity: Pastoralist women are often ignored in development. Lomidat is unique in the sense that women are three-fifths of the members of the Lomidat Pastoral Multipurpose Co-operative, which supplies animals to the Lomidat abattoir in Kenya.

Local government participation: The Turkana county government and The Turkana County Council have played a very constructive role in providing about 1,000 hectares of land to the cooperative. The county government is keen on providing KSh10 million to the abattoir to support the project.

Constraints to the Lomidat model

Supply of live animals is a major challenge for Lomidat and currently animals are sourced from Lokangai, and Kibish. A low offtake level per household among the livestock producers is a problem because livestock are not kept as commercial produce but as investment and wealth. In order to get the required volumes Lomidat has to go to many places and build the bulk by collecting a few animals at a time. Lomidat requires 300 steers and 600 goats per day to be viable. Currently Lomidat is working with a trader in Lokanga who collects 50-60 goats and sells to Lomidat. Lomidat sends a vehicle to collect the animals for slaughter from the production areas. Lomidat is looking for such agents in Oropoi and other areas. Lomidat is working with LMA and VSF Germany in Lorugum. Referral centres have been constructed in these areas where livestock are weighed, and traders paid according to live weight. This system is not functional because the producers and traders are not happy with the live weight payment system.

In November 2013 the abattoir was closed due to a conflict between the abattoir management and the community. The conflict centered on: -

(i) the price that Lomidat offered for livestock that was considered by the community to be lower than that in the live animal market, and (ii) Lomidat was not paying cash to producers. In February 2014, PALFINGER from Austria invested KSh 11 million to support procurement of livestock on a cash basis. This was the situation as at May 2014.

In a stakeholder workshop the Lomidat manager explained how the abattoir seeks to ensure that producers get the best price for their livestock and not sell their animals in barter trade. In Lokanagai pastoralists use barter trade for their animals and get very little value from such trade. Lomidat believes that the livestock prices that producers get from traders are not competitive, and that the traders are the people benefiting from the livestock trading business at the expense of producers.

Producers and traders need to be trained in the weight system slowly but surely and carefully for them to accept it and adopt it. The problem is that as long as the live weight price is lower than the visual price, traders and producers will not use the system; because they will incur losses.

Analysis of the Lomidat business model

Lomidat's major clients are Tullow Oil; BGB Kenya: big and smaller hotels in Lokichogio; Nairobi market; Muthaiga and Alpha Fine Foods; Sudan Juba market; the Nairobi Market and the Lodwar market. Lomidat is currently transporting 500 kg/week slaughtered animals to Sudan. The Sudan market is attractive to Lomidat because the price mark-up is higher although the volume is small. There is too much competition in the Nairobi market which is discouraging for Lomidat. Lomidat has plans to build a depot at the Lodwar market as their expansion program and strategy.

Lomidat could play a very significant and central role in the Turkana livestock industry with proper coordination structures and linkages with the LMA and CMLC. Being the only abattoir capable of slaughtering for export, this can be utilized, and many animals could be collected and sent to Lomidat for slaughter and freezing. There is great potential and possibilities of airfreighting frozen meat to Nairobi, Kampala and Juba. This could resolve the livestock raids problems that have almost crippled the Turkana livestock industry.

Based on the above, the study examined whether the adoption and replication of the Lomidat Abattoir Market/Business Model in other sub counties in Turkana is possible; the Implications, costs and possible benefits both in the short and long run.

Kakuma has a population just over 125,000. Kakuma Refugee Camp serves refugees who have been forcibly displaced from their home countries due to war or persecution. It was established in 1992 to serve Sudanese refugees, and has since expanded to serve refugees from Somalia, Ethiopia, Burundi, the Democratic Republic of Congo, Eritrea, Uganda, and Rwanda. Kakuma camp, in Turkana County, is receiving record numbers of refugees for the second consecutive year. Over 14,000 new arrivals had registered as asylum-seekers by the end of August 2013, joining another 21,000 who arrived in 2012. These refugees are coming mainly from South Sudan. With its total population approaching 125,000, Kakuma meat consumption and demand has increased drastically. There exist two livestock markets in Kakuma, the formal market conducted at the Kakuma livestock sale yard under the Livestock Marketing Association (LMA) and the informal Livestock Market conducted at the Kakuma Refugee Camp. Large numbers of livestock are sold and slaughtered at the Kakuma refugee Camp compared to the Kakuma Livestock sale yard.

Lodwar has a population of approximately 48,316. These two towns have the most important ingredient for establishing an abattoir that is - a fairly large population therefore meat market.

Lokichar with a population of 44,233 is the third likely town due to its likely growth with the high-income earning staff at Tullow oil.

However, the very high cost of building high end abattoirs (KSh 60 million) is not sustainable. In addition, the model combines cattle and goat slaughter whereas Turkana is a goat country and should focus on goat. The study recommends evaluation of the government slaughter-slabs and houses by improving hygiene and inspection, construction meat cutting facilities for butchers, skin bulking, and ornament making. Lomidat should open an on the job training component for retaining of local slaughter men, flayers and meat handlers.

There are proposals to construct additional abattoirs in Turkana, but these are likely to be white elephants without a sizable market. Three abattoirs are to be constructed through the economic stimulus program Lokichar, Lokitauang and Lorgum. We should avoid —we want a big one like Lomidat syndromell approach. The Lomidat abattoir is currently underutilized and the process should allow this abattoir to operate to full capacity before establishing another abattoir.