



A MAPPING AND ANALYSIS OF LIVESTOCK FATTENING AND FINISHING ENTERPRISES AND BUSINESS MODELS IN KENYA

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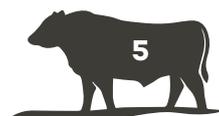
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Acronyms

ADG	Average Daily Gain
AHAs	Animal Health Assistants
AFC	Agricultural Finance Corporation
ASALs	Arid and Semi – Arid Lands
FAQ	Fair and Average Quality
FGDs	Focus Group Discussions
F&F	Finishing and Fattening
KALRO	Kenya Agriculture and Livestock Research Organisation
KCB	Kenya Commercial Bank
KES	Kenya Shillings
KIIs	Key Informant Interviews
KGS	Kilograms
KMT	Kenya Markets Trust
KWS	Kenya Wildlife Service
NRTTC	Northern Rangelands Trust Trading Company



EXECUTIVE SUMMARY



With an estimated demand of 705,000MT¹ of meat every year, its demand significantly exceeds the supply with Kenya importing animals from the neighbouring countries to meet the supply gap. The need is expected to grow in the coming year, and the quality demands by consumers will continue to rise, putting more pressure to the supply system. The current livestock production system (which is heavily pastoral) is unlikely to meet the growing demand for quality meat due to low productivity, lower quality animals and inconsistent supply. There is a need to explore alternative ways of meeting the demand and in the process, tap into the emerging business opportunity. Livestock finishing and fattening, particularly cattle, has been identified as a potential option for closing the meat supply gap. This study assesses the nature, scope and business viability of fattening and finishing operations in Kenya. It identifies the key constraints that need to be addressed for the finishing and fattening operations to be scalable.

The study assesses the different business models that are currently implemented in Kenya and looks at the economics and operational underpinnings of each model. The study identifies and analyzes the existing finishing and fattening business models and document the drivers of performance across finishing and fattening business models in different geographies within Kenya. The study was undertaken country-wide, covering different market routes in the arid and semi-arid areas (ASALs), during which a range of actors² was interviewed. It explores the linkages between the core market and supporting functions for the different business models and identifies the gaps in capacities, relationships, rules and incentives that need to be addressed for the finishing and fattening operations to be optimal.

Geographically, finishing and fattening operations are spread all over the country and across the different agro-ecological zones in Kenya. 85% of the operators surveyed are in Zones IV and V of the arid and semi-arid areas (ASALs) of Laikipia, Kajiado, Garissa, Kitui, Taita Taveta, and Kwale counties, while 15% of them are in the more highland areas of Nyeri and Naivasha. When considering the production objectives of the operator (to finish or fatten for market), and characteristics of the operation (intensity, animals, and ages kept and feeding regimes, marketing strategy), it is possible to broadly categorize the models under each of the operations into intensive, semi-intensive or extensive.

Under the intensive system, animals are confined and trough-fed, whilst under the extensive systems, animals are kept on open pastures. Those under semi-intensive are occasionally restricted and fed with supplementary feeding to attain market weight. The findings from the study showed that there was no clear-cut delineation between finishing and fattening models. In some situations, some animals were being finished while older ones were fattened within the same operation.

In terms of categorization, 30% of the operators surveyed were in the finishing business, whilst 70% of them were fattening enterprises. For finishing models, only one farm was engaged in the intensive finishing of beef cattle, while commercial ranches in Laikipia were practising semi-intensive and extensive finishing. For the fattening

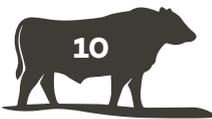


operations, 25% of those surveyed were intensively fattening cattle and 20% were engaged in semi-intensive fattening. In comparison, all the group and community ranches in Laikipia and Coastal counties (55%) were involved in extensive fattening of cattle on improved pastures. The preference for fattening beef cattle may be associated with the fact that beef, is by far, the most popular meat consumed in Kenya, representing 69% of meat consumed by volume or 527,520 MT in 2014, and the fact that the country is unable to meet the current demand for beef without imports.

Based on the financial analysis undertaken during this study, fattening and finishing businesses are financially viable. Still, the profitability varies significantly between the models mainly because of the different cost structures, and the meat prices realised in the market for the different business models. The finishing operations are generally more profitable due to the premium prices that meat from the finished animals attract in the market and the vertical integration by most of the operators of finishing models that allows them to optimise on the value realised on their meat. Across the board, the extensive models have higher profitability due to the lower costs of feeds compared to the intensive and the semi-intensive models.

There are strong commercial incentives among most of the actors in the livestock finishing and fattening market system. Nevertheless, the level of commercialization varies with the intensive and semi-intensive models demonstrating the highest level of commercialization. Among the extensive model operators, the level of commercialisation varies, e.g. fattening operations in the coastal region are more commercial compared to the Laikipia conservancies where the fattening operations are used to manage the community relationships and mitigate against security risk. For the livestock finishing and fattening market system to develop to scale, the main constraints that need to be addressed include; the high cost of feeds, the limited supply of animals for finishing, limited capacity in the management of finishing and fattening operations, access to finance and access to markets for the high-quality meat coming out of the fattening and finishing operations.

The livestock finishing and fattening operations remain a small part of the overall livestock market system but have the potential to grow. To address the constraints identified above, the study recommends several interventions. Considering that the level of efficiency across many of the finishing and fattening operations realising suboptimal levels of weight gain and keeping animals for long periods and in the process eroding the profits that come with selling young animals for a premium price, improving the efficiency of these operations will be critical. This may be achieved by focussing on taking younger animals straight into finishing to take advantage of the high feed conversion efficiency to produce the target weight gains from lower feed inputs, improving consistency of feed rations, and improving the scale and aggregation by better integration of F&F operations with pastoral production and ranching to address the supply of finishers and fatteners. To achieve this, F&F operators will require technical assistance on technical knowledge and good



management of F&F operations. Besides, as F&F sub-sector is dependent on the pastoral producers and markets, building on the current work of KMT in organizing the pastoralists, strengthening the livestock feed and animal health, as well as trade and transportation intermediaries will help improve the efficiency of the sub-sector. Similarly, encouraging partnerships and investments in meat processing and packaging would help secure a niche market for feedlot meat. More detailed recommendations on improving the sub-sector are provided at the tail end of the report.

CHAPTER 1:

STUDY BACKGROUND

1.1 Introduction

Meat consumed or exported from Kenya is mainly produced from cattle, sheep and goats, camels, pigs, and poultry. Among these livestock species, cattle produce most of the meat (77%) followed by sheep and goats (19%), and camels (4%)³. Kenya has a livestock herd of approximately 18.3 million cattle, 25.7 million goats, 18.7 million sheep, 3.3 million camels, 40 million indigenous poultry, 4.2 million layers, 3.7 million broilers, 1.2 million other poultry (Turkeys, Ducks, Quails, Guinea fowl, Geese, Pigeons and Doves), 2.2 million donkeys and an undetermined number of companion, game and aquatic animals (MoALF, 2017). With most livestock (70%) being produced by pastoralists, under extensive production systems and customarily kept as assets, livestock production in the country has primarily been subsistence-oriented characterised by low reproductive and productive performance, with minimum technology and human interference, and only traded when necessary.

As not enough meat is produced locally to meet the domestic requirements for animal protein, the country continues to import beef on the hoof from neighbouring countries. Livestock is imported from Ethiopia through Moyale and Wajir, from Somalia through Garissa, Wajir and Mandera, from Tanzania through Kajiado, and from South Sudan and Uganda through Turkana and West Pokot, respectively (Figure 1). This is also compounded by the heavy dependence on rain-fed pasture resources for the pastoral production systems which are prone to climate change-related threats including drought, dysfunctional rangeland resource management, as well as the subsistence-based approach to markets by the majority of producers.

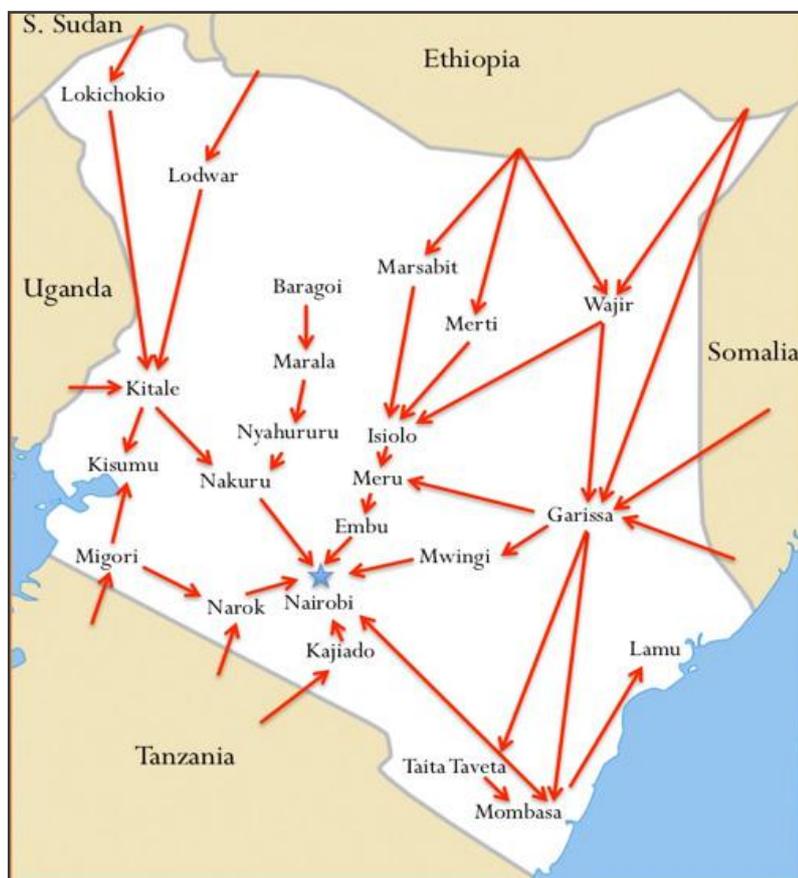


Figure 1: Livestock trade corridors (IDev, 204)



The livestock sector is fragmented, inefficient, poorly organized, and constrained by several factors. The livestock produced under extensive production systems generally have a slower growth rate, carcass yield, and meat quality compared to finished or fattened animals. This is mainly because of feed shortages, low genetic potential, and diseases which all limit the production of a sustained quantity and quality of animals to the market through the pastoral production system. With average off-take rates of 15% for pastoralist cattle, 13.2% for sheep, 27.3% for goats, and 1.7% for camels⁴, most livestock is sold after it has exceeded the optimal age for slaughter, thus reducing the sale price, due to the meat being of lower quality for market preferences. An estimated 14% of livestock sold in Kenya, out of which only 9% (mainly from privately owned ranches) are finished to meet market requirements.

These market constraints have inspired the growing interest in finishing and fattening (F&F) by entrepreneurial livestock traders and producers who have begun engaging in small and medium scale animal finishing and fattening enterprises to respond to the market dynamics and meet consumer preferences which shall require an intensification in management or production. However, to deliver such a large-scale systemic change, that benefits all players in the sector, there is need for information on the viable business models that can be implemented to drive the commercial uptake of finishing and fattening procedures. Kenya Markets Trust (KMT) commissioned this study to identify and document the existing finishing and fattening practices, understand market opportunities, and develop recommendations of the finishing and fattening models that are commercially viable and scalable within Kenya.

For this study, we set out some definitions central to the analysis conducted in the study. In this study, **finishing** is used to describe the beef production practice whereby livestock is fed (usually young animals between 2 - 3 years old) with a protein balanced, high energy diet for a set period under confinement, to increase the live weight and improve the degree of finish, thus attaining better grades at the abattoir and corresponding selling price. This can be either an **intensive** process, where animals are always confined and stall-fed, **semi-intensive** which involves some periods on grass and feeding in confinement, or **extensive** where animals are on quality open pastures until they are marketed. Finishing is differentiated from **fattening** practices where older animals (usually over four years), especially cattle, are fed intensively for a short period to attain a higher market live weight and improved body condition. The two practices also differ in the target markets and the type of animals being fed. As with finishing, fattening operations may also be intensive, semi-intensive and extensive depending on the scale and intensity of the management system. **Feedlots** are units where animals are confined, like in zero-grazing units for dairy production, and are trough-fed to finish or fatten cattle.



1.2. Rationale and drivers for the finishing and fattening operations

The livestock sector has a significant potential to increase competitiveness, and benefit millions of people. With the growing demand for meat and meat products, as a result of the ever-increasing middle class and increased urban population, the actors within the value chain need to take full advantage and move to close the demand gap sustainably. A more modern and efficient sector would require there to be improved productivity that guarantees a consistent supply of quality livestock whilst reducing environmental degradation. This demands a reorientation of livestock production from subsistence-based to a more commercially viable set up that will incentivize the producers to rear livestock breeds with optimum fattening potential, employ proper husbandry processes and sell off their livestock at the right age. Also, traders will be able to offer better prices for quality livestock which will be driven mainly by the ability of the end market to differentiate and offer a premium for quality livestock. Also, there is a need to organize the livestock markets to incorporate livestock grading, which will trigger a change in consumer behaviour.

Finishing and fattening practices are gaining popularity in Kenya as a result of increasing consumer demand for quality meat, as currently only 9% of the livestock sold are well finished⁵. Over the recent past, finishing and fattening practices have increased amongst entrepreneurial livestock producers along the trade routes, i.e., Laikipia North, Garissa, Baringo, and Taita Taveta counties. From the respondents interviewed for the study, even indigenous breeds respond to the fattening diets by producing acceptable carcasses, suggesting that finishing and fattening them in feedlots, and ranches, is a potential business opportunity for livestock producers.

The adoption of finishing and fattening operations, such as feedlots, is expected to improve both yield and the quality of meat produced. The implementation, on a significant scale, of intensive finishing and fattening schemes will not only increase meat production but will also make it more efficient. Animals raised under these conditions usually have a higher growth rate, good carcass characteristics, and higher meat quality compared to those under extensive pastoral production systems, therefore allowing the farmers to produce better quality meat throughout the year, thus evening out supply and optimizing on value generated. Furthermore, such schemes will act as a catalyst for the overall development of the beef industry across the country.



1.3. About the study

Kenya Markets Trust (KMT) is a Kenyan organization that works in partnership with the private sector, county and national government to unleash large scale, sustainable market growth by changing underlying incentives, capacities, and rules that shape how markets work. Working in three critical sectors, namely livestock, agricultural inputs, and water, KMT focusses on markets as they are the main mechanisms through which wealth is created, and growth occurs. KMT's long-term goal is to deliver large scale, systemic change in selected markets that shall benefit all players, including small businesses, larger firms, investors, producers, and consumers. To achieve this, KMT identifies markets with high growth potential, but which are saddled with systemic constraints and through working with key market actors, policymakers, and other stakeholders, they aim to address these constraints to improve competitiveness, efficiency, and inclusivity.

KMT has recognized finishing and fattening, through the use of feedlots, as one of the high potential investment areas which if the systemic constraints are addressed, can lead to an improvement in the competitiveness, efficiency, and inclusivity of the livestock sector in Kenya. KMT hopes to see an increase in the range of market opportunities, support competition in these sectors to eventually create a market system that is both profitable to investors, improves incomes for suppliers and is beneficial to consumers. However, KMT as an organization does not have access to comprehensive and reliable information relating to the extent of uptake of feedlots in Kenya, where they are located, their varied business models and commercial viability across the spectrum, their linkages to source and end-markets, as well as the relevance of geographical positioning. Bridging this information gap will support the organization's capacity to effectively engage in promoting, and supporting, the uptake of commercially viable feedlots.

Based on this premise, KMT commissioned this analysis of existing finishing and fattening business models as an essential entry into designing sustainable interventions on livestock fattening and finishing. The overall objective of the study was to identify the existing finishing and fattening practices (F&F) in Kenya along the major livestock trade routes and document the drivers of the finishing business across different geographies within Kenya. The study took a comparative approach that generated an understanding of the current market opportunities for beef that has gone through the different finishing and fattening regimes, vis a vis meat from the contemporary pastoral system. Also, the study undertook a review of finishing and fattening practices in the region and used this to make recommendations for improvement on existing Kenyan models. Based on the information and data collected, this study recommends F&F models that are commercially viable and scalable in Kenya. These recommendations will guide the livestock industry, particularly those in business, on the various options available to enable them to respond to market dynamics and consumer beef preferences.

CHAPTER 2:

STUDY APPROACH AND METHODOLOGY



2.1. Study overview

This study was undertaken country-wide, covering different market routes in the arid and semi-arid areas (ASALs), and drawing out the various finishing and fattening models. Data was collected in August 2019 covering F&F operations in Nakuru, Laikipia, Nyeri, Kajiado, Garissa, Kitui, Taita Taveta and Kwale counties. These counties were based on a mapping exercise that identified these counties as the predominant locations for finishing and fattening operations.

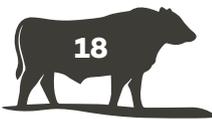
The main market/trade routes for livestock, in the arid and semi-arid areas (ASALs), were identified, and documented through a detailed review of literature, and expert interviews. This was complemented by primary data collection from the various finishing and fattening models, during which business model information of the different operations was collected. Information on the livestock species and breeds kept, sourcing and selection of finishers and fatteners, the feeding regime, F&F cycles, and operations, performance monitoring, marketing, the end markets for livestock and an operators' assessment of profitability was gathered.

Based on this information, a market, economic, and financial analysis of the different models was conducted. To complement the process, key informant interviews with government officials, pastoral producers, traders, service providers, and processors were also conducted.

2.1.1. Identification and documentation of the various F&F models in Kenya

From the review of existing secondary documents (Annex 1) and expert interviews, the study team identified and documented the existing F&F operations practised by different market actors in the different ecological zones, and interviews were conducted with these operators. A total of 20 F&F operators were purposively selected from the different ecological zones, based on their type of operation, knowledge of the livestock markets, F&F operations, and willingness to be interviewed. A checklist (Annex 2) was used as a guideline for the collection of the baseline information on the different operations. In assessing the F&F models, some of the critical parameters considered include:

- Ranch size in terms of land area;
- Basic characteristics of the socio-economic conditions of the ranches/feedlots;
- Livestock numbers, species and types of breeds kept under the model;
- The value chain of livestock marketing for the feedlots;
- Fattening cycles and duration of the commercial feedlots;
- Feed resources, nutrition, feeding practices and procedures, including the land area kept for grazing livestock and land area under cultivation, and farmers returns, and costs involved;

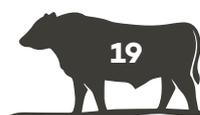


- Housing facilities and other production practices;
- Capital developments such as water facilities, fences, machinery, and buildings;
- Markets, marketing cycles and market characteristics, including offtakes, i.e., The number of animals sold, compared to those present at the beginning of the year;
- Constraints and opportunities of commercial feedlots;
- The markets, including the market requirements in terms of quality, quantity, pricing, timing and marketing points, the core market actors and their roles in getting the product from farms to customers.

2.1.2. Financial analysis and projections of the different models

Following the descriptive market analysis of each model, the team conducted a more in-depth analysis of the business models, including the value proposition, production system, and productivity. The business model canvas was used to structure the study of the business models and the analysis focused on the following key issues on the ranches and feedlot models;

- Process mapping: to explore the key steps that the livestock went through during the F&F processes, its constraints and how each of the business models generated value at each level. This is used to identify opportunities for upgrading and optimization by comparing the existing practices to regional and industry best practices;
- Resource and cost structures: to explore the primary resources that were utilized by each of the business models and how each affected the efficiency and effectiveness of a particular business model;
- Marketing channels and linkages: to explore the primary marketing channels through which the animals were marketed, and the scope for growth within these through serving any underserved or unserved markets;
- Revenue streams: to explore how each of the business models generated money and identify any unexploited potential. The study also analysed any significant seasonal variations, the risks involved in generating revenue and how this affected the investment and return on investments for the different business models;
- The potential impact of each business model on local businesses, job formation, income generation, community wellbeing, and quality of life. The study tracked value generation and distribution for each of the business models to establish how much value was created by each of the models, and how this was shared amongst the key actors in the value-chain as well as the contribution to the growth of the market system at large.
- Risk analysis: critical risks for each of the business models were evaluated, alongside the actions of the market actors, or potential instruments that they can use to mitigate these risks.



During the study, a range of ranches was visited, key informant interviews (KIs) and focus group discussions (FGDs) were conducted (Table 1). This included:

- 20 F&F operators from Laikipia ranches, Nyeri, Kajiado, Garissa, Kitui, Taita Taveta and Kwale counties;
- 11 key informants from government and service providers;
- Three processors;
- Three traders;
- Two FGDs with community groups/producers.

Table 1: Key study participants

Category of actors	Sub-types	Number (N=)	Locations
Ranchers	Commercial ranchers	4	Laikipia and Taita Taveta
	Group ranches	4	Laikipia and coastal counties
Intensive feedlots	Finisher	3	Naivasha, Laikipia
	Fatteners	9	Laikipia, Nyeri, Kitui, Kajiado, Garissa and coastal counties
Support services	Feed suppliers/consultants	3	Nyeri, Nairobi and coastal counties
	Financial services	2	Laikipia
Producers, traders and processors	Producers	2 FGDs	Laikipia, Taveta
	Traders	3	Nairobi, Laikipia, Garissa and coastal ranches
	Processors	3	Nairobi
Government and other actors	Government	4	Nairobi, Laikipia, Nyeri, Kitui, Kajiado, Garissa and coastal counties
	Other actors	4	Nairobi, Laikipia, Nyeri, Kitui, Kajiado, Garissa and coastal counties



2.2. Study limitations

Data on the numbers and geographical distribution, and financial and operational data for the different F&F models was not publically available given the nascent state of the industry. As a result, the team continued to build information on the sub-sector as the data collection, collation, and analysis continued.

As indicated earlier, the categorizations of models within each sector were not clear cut; as a result, the models were categorized depending upon their dominant characteristics, including ages and breeds of animals kept, level of intensity of management, target markets, and production characteristics.

As for the financial analysis, the study team collected as much “real life” operational data from the actors visited, as was available. While all of the actors did not collect their costs in the same way, and some of the actors did not even collect cost-based information at all, many actors provided us with full or partial financial details about their operations on a confidential basis.

CHAPTER 3:

STUDY FINDINGS



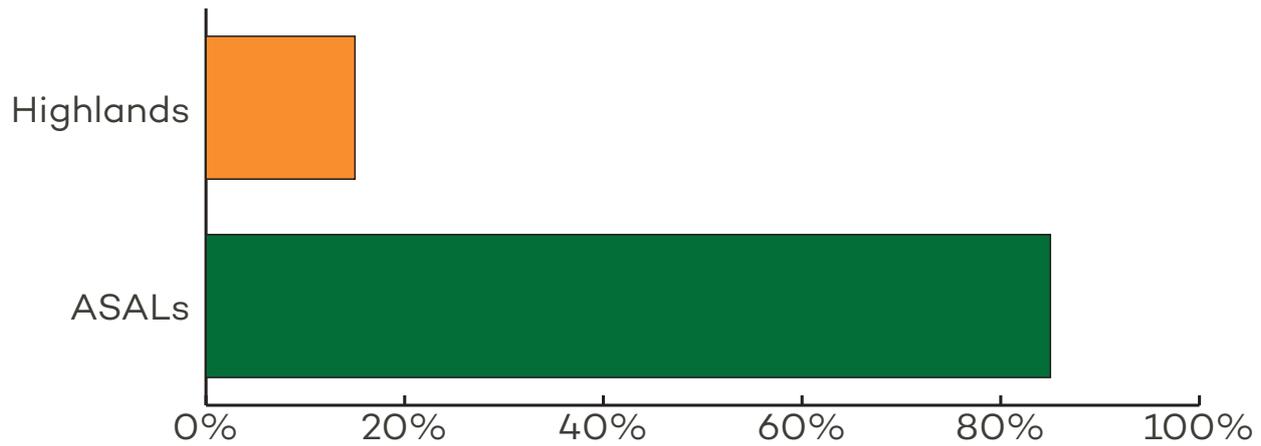
This section provides a detailed description of the F&F operations and models, which were surveyed, highlighting their geographical spread, current production practices, outputs, constraints, and identifies opportunities for improving the models. The information presented in this section was gathered from a combination of secondary data (literature review) and primary data collection including expert interviews and field missions to the different agro-ecological zones (counties) where the models were practised. For each model, the report provides a general overview of the operators interviewed, followed by a summary of the main characteristics of the F&F models in terms of size, location and intensity of the different management operations, including sourcing and selection of animals, feeding, feeding systems, and performance monitoring, and marketing. The report also provides an analysis of the critical supporting functions, and rules and regulations governing the sub-sector. Finally, the report provides a financial analysis of the different models and a viability assessment of the business models based upon the investment requirements and risks involved for each finishing and fattening model.

3.1. Overview of the finishing and fattening operators surveyed

Livestock production in Kenya is characterized by a diversity of climates, environmental conditions, animal phenotypes, and management systems. On the one hand, there is extensive livestock production where productivity is low alongside a parallel chain which incorporates formal finishing and fattening methods in ranches or commercial feedlots. The later involves intensive forage management, health control, and modern management practices and is estimated to supply approximately 2% of Kenya's red meat, selling to hotels, restaurants, and supermarkets targeting high-income consumers⁶.

3.1.1. Geographical distribution of the F&F operators

Geographically, finishing and fattening operations are spread all over the country and across the different agro-ecological zones in Kenya⁷. 85% of the operators surveyed are in Zones IV and V of the arid and semi-arid areas (ASALs) of Laikipia, Kajiado, Garissa, Kitui, Taita Taveta, and Kwale counties, while 15% of them are in the more highland areas of Nyeri and Naivasha. Geographically, most of the operations are in the ASALs, except Laikipia and Coastal Ranches, where climatic conditions are more conducive with less extremities, better access to grazing resources, and closer proximity to the terminal markets of Nairobi and Mombasa, respectively. These operators are further away from the pastoral markets, which are the primary sources of marketed livestock in the country. Graph 1 provides a summary of the geographical distribution of the operators surveyed.

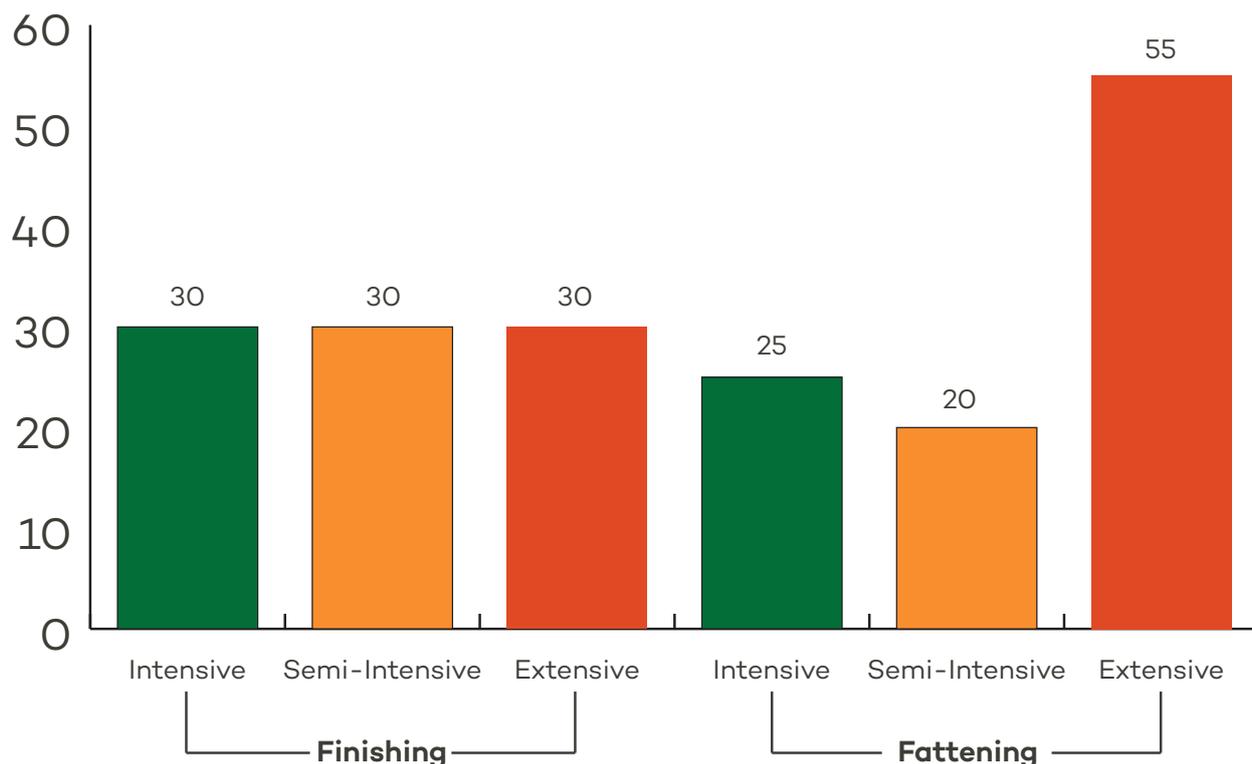


Graph 1: Geographic distribution of the operators surveyed

3.1.2. Types of finishing and fattening models

From the field visits, it is clear that there is a wide range of F&F models practised in the country. When considering the production objectives of the operator (to finish or fatten for market), and characteristics of the operation (intensity, animals, and ages kept and feeding regimes, marketing strategy), it is possible to broadly categorize the models under each of the operations into intensive, semi-intensive or extensive. Under the intensive system, animals are confined and trough-fed whilst under extensive animals are kept on open pastures, and those under semi-intensive are occasionally confined and fed with supplementary feeding to attain market weight. The findings from the study showed that there was no clear-cut delineation between finishing and fattening models. In some situations, some animals were being finished while older ones were fattened within the same operation.

In terms of categorization, 30% of the operators surveyed were in the finishing business, whilst 70% of them were fattening enterprises (Graph 2). For finishing models, only one farm was engaged in the intensive finishing of beef cattle, while commercial ranches in Laikipia were practising semi-intensive and extensive finishing. For the fattening operations, 25% of those surveyed were intensively fattening cattle⁸ and 20% were engaged in semi-intensive fattening. In comparison, all the group and community ranches in Laikipia and Coastal counties (55%) were engaged in extensive fattening of cattle on improved pastures. The preference for fattening beef cattle may be associated with the fact that beef, is by far, the most popular meat consumed in Kenya, representing 69% of the total meat consumed by volume or 527,520 MT in 2014, and that the country is still unable to meet the current demand for low quality or high-quality beef without imports⁹.



Graph 2: Classification of operators surveyed by category and model

3.2. Description of the different finishing and fattening models

3.2.1. The Finishing Models

Intensive Finishing Model

The objective of the model¹⁰ is to get animals to market by the time that they are 36 months old at an optimal weight of 500 – 600Kg. The animals, mainly steers aged 24 – 30 months, were brought into the feedlot at 250 – 300Kg. They were then confined and trough-fed on a protein-balanced and high energy diet for a period of six to eight months to attain the required market weight. There were three main sources of the cattle finished: steers from own raised cattle (cow-calf operation¹¹), purchased steers from the ranches, and select steers from pastoral markets supplied by contracted traders. While there were 1,000 finishing steers on the farm, a breeding herd of 3,000 animals of mainly Aberdeen Angus and 480 Dorper Sheep was kept.

The predominant breeds were the improved Boran and Aberdeen Angus. During the finishing operations, the selected steers were chosen based on their breed type, physical appearance, and frame size. The steers were initially backgrounded¹² to attain the feedlot requirements (300 Kgs live weight), after which they were intensively fed to achieve a daily weight gain of 1.5Kg/day at the cost of KES 150 feed per day. The



feed was prepared on-farm, and cottonseed cake was the most common source of protein, which was mixed with wheat, barley, Lucerne, Boma Rhodes grass, maize bran, hay, and molasses. The average daily weight gain (ADG) was the key indicator used to track the performance of the animals, and animals were weighed weekly.

The pre-selection slaughter inspection was based on target weights of 500 to 600 kilograms for steers, 45 kilograms for goats and 60 kilograms for lambs. Slaughters were conducted, depending on the market, on an average of 18 steers in batches of six steers slaughtered per week. The finishing operator had vertically integrated operations with his slaughtering facilities (some outsourced), storage and ageing facilities, cutting and packaging as well as his market distribution channels. The target is 50% of weight recovery for all of the slaughters, i.e., 230 - 280Kg carcass weight. After slaughter, the carcass was aged¹³ for 7 - 28 days depending on the customer preference. The market distribution channels for the operators included: deliveries to high-end hotels, restaurants and through his meatery based in Naivasha, Nanyuki, and Nairobi. In terms of the products sold, several options existed; premium cuts, premium meat, fair and average quality and standard quality meat. The prices vary from KES 2,500 - 3,000 for premium cuts and fillet, KES 750 per Kg for whole carcass and KES 550 per Kg for standard quality meat. Table 2 provides a summary of the performance characteristics of the model operator.

Table 2: Performance characteristics of the intensive finishing model

Indicator	Value/Description
Total herd	3,000 cattle and 480 shoats
Number of finishers	1,000 steers
The average cost of finisher at entry	KES 45,000
Length of the finishing cycle	6-8 months
Feed cost per day per animal	KES 150
Average daily weight gain	1.5 kg per day
Live weight at slaughter	500-600 kgs
Carcass weight	230-280 kgs
Average meat price	KES 750 per kg



Semi-Intensive Finishing Models

In this model, animals are selected at 24–30 months of age. They are then taken through a process of finishing that combines grazing, on improved or reserve fodder which includes both grass and legumes, and supplementation on concentrates and grains. The animals are generally kept closer to the pasture, and water was provided on location to ensure that there is minimal movement of the animals. The objective was to fasten the animal weight gain and to reach a live weight of 450 – 500 Kgs within a period of 6 – 8 months, with daily weight gains of 0.7 to 1Kg per day. This model was mainly practised in commercial ranches in Laikipia¹⁴.

With a total herd of 1,200 animals, the predominant livestock kept in these operations were beef cattle, with improved Boran, Simmental, Boran - Wagyu, and Simmental – Wagyu crosses as the main breeds kept in Laikipia Ranching Limited. Additionally, the operator was engaged in intensive finishing of sheep, mainly Dorper. The finishers were sourced primarily from own herd, and steers, mainly Aberdeen Angus sourced from Marania Ranch. The finishers were then fed on grass and legumes and were sometimes given Cattle Fattener sourced from Pioneer Beef & County Feedlots Limited¹⁵. With animals weighed weekly, the average daily gains per animal ranged from 0.7 – 1Kg with Wagyu and cross recording the highest gains of up to 2Kg per day. The target slaughter weights were 450 – 500Kg for the Boran and Simmental and 500 – 550Kg for the Wagyu crosses at three years of age, and slaughters were conducted at Nyanyuki Slaughterhouse. For the Dorper, the target weights were 35 – 60Kg at one year of age. The operator was slaughtering 7 – 10 steers per week and was achieving a carcass weight of 230 – 250Kg. The market distribution channels for the operator were his own meatery and high-end hotels. Table 3 provides a summary of the performance characteristics of the model operator.

Table 3: Performance characteristics of the semi-intensive finishing model

Indicator	Value/Description
Total herd	1,200 cattle and 60 sheep
Number of finishers	280 steers
The average cost of finisher at entry	KES 45,000
Length of the finishing cycle	6–8 months
Feed cost per day per animal	KES 300
Average daily weight gain	0.7–1 kg per day
Live weight at slaughter	450–500 kgs for Simmental and Borana, 500–550 for crosses
Carcass weight	230–250 kgs



Extensive finishing model

Under the extensive finishing model¹⁶, animals are selected for finishing after weaning (at 12 months) and fed purely on grass until they reach the target slaughter weight. The steers are put under rich fodder that includes Boma Rhodes grass and Lucerne consistently (with specific reserves made for the finishing purposes) for a duration of 15 - 20 months, with the target to reach a weight of 450 – 500Kgs of live weight.

The young finished animals fetch a premium meat price (KES 450 - 500 per Kg) compared to the older fattened animals and have a unique selling point of being grass-fed (organic meat) and are sold in high-end hotels and butcheries.

The level of investment in this model is relatively low compared to other models and mainly involves an own herd to produce the steers for finishing, abundant space to grow fodder and a management system for pest and disease control.

Table 4: performance characteristics of the intensive fattening models

Indicator	Value/Description
Total herd	400 steers
Number of finishers	100 steers
The average cost of finisher at entry	KES 36,000
Length of the finishing cycle	15–20 months
Feed cost per day per animal	KES 50
Average daily weight gain	0.5–7 kg per day
Live weight at slaughter	450–500 kgs
Carcass weight	200–230 kgs
Average meat price	KES 450–500

3.2.2. The Fattening Models

The fattening models are more prevalent in the livestock of Kenya compared to the finishing models, comprising 70% of the operations covered during this study. In the fattening models, the animals are fattened under intensive feeding (total confinement and feed lotting), semi-intensive feeding that involves both grazing and supplementary feeding or through an extensive system that is purely grass-fed¹⁷. The level of intensity varied across the ecological zones and was largely based on the availability of fodder. In locations with abundant fodder, the semi-intensive and extensive models are more common, whilst the intensive model is more common in locations that have a scarcity of fodder. Three main sub-models were identified:



Intensive Fattening Models

In this model, the feedlot operators brought purchased animals and fattened them in large paddocks using bought-in complete feeds or farm-grown/prepared feeds. The intensive fattening model was the most common emerging feed lotting system and occurred across all main ecological zones from Garissa, Kitui, Laikipia, Nyeri and Taita Taveta counties where the animals were confined and trough-fed on good quality hay and high energy and protein concentrate diets throughout the fattening period. The fatteners were indigenous Boran, mainly bulls and a few older cows, with the majority (80%) of them being over four years. As shown in Table 5, the average daily weight gains varied from 0.8 – 2Kg per day for a feed cost of KES 330 – 380 per day, and the most common feed that was given was Cattle Fattener, sourced from Pioneer Beef & County Feedlots Limited. The target weights at the market also ranged from 450 – 500Kg depending on the animal and management level of the operator. Table 5 provides performance levels of the intensive fattening operators surveyed.

Table 5: Performance characteristics of the intensive fattening models

	Values/description					
Indicator	Garissa	Kitui	Laikipia	Kajiado	Nyeri	Taita-Kisima
Number of fatteners		48 bulls	500	56 bulls	250	400 animals
Average cost of fattener at entry	25,000 – 30,000	20,000 – 35,000	30,000 – 35,000	33,000 – 35,000	30,000	30,000 – 32,500
Length of fattening cycle	90 days	75–90 days	180 days	90 days	120 days	90 days
Feed cost per day per animal	KES 360	KES 360	KES 50	KES 350	KES 120	KES 150
Average daily weight gain	1–1.5 Kg	1.5–2 Kg	0.5 Kg	1.5–2 Kg	0.7 Kg	1.5 Kg
Live weight at slaughter	440–450 Kg	375 Kg	380 Kg	312–479 Kg	380 Kg	400 Kg



Semi-intensive feedlots

This model is more common in coastal, and some Laikipia ranches, where the animals were confined and trough-fed for the day and let to graze in the other part of the day. The animals are allowed to graze and were supplemented with concentrate feed or grains for 120 days in order to improve the slaughter weight and meat quality. The availability of ample grazing land in the coastal ranches make grazing on natural pasture attractive, and viable. The lack of adequate water resources across the grazing field means that animals have to travel to a central place for water, and at this central location supplementary feeding is provided either using harvested grass or supplementary concentrates (sunflower, molasses, wheat bran, etc.). Also, there is a significant population of livestock traders from Northern Kenya who bring animals for finishing at the coast, and who practice grazing with some minimal supplementation.

The average herd size ranges from 500 – 2,000 for the animals under fattening but can go up to 10,000, with animals being fattened in batches of 300 – 500. The feed costs remain low compared to the more intensive fattening systems, at an average of KES 80 - 120 per Kg of weight gain depending on the level of supplementation, which varies significantly between seasons and different operators. Table 6 provides the performance level of the intensive fattening operators surveyed.

Table 6: Performance characteristics of the intensive fattening models

Indicator	Values/description	
	Coastal ranches - Lualenyi	Laikipia ranches
Total herd	2,000 animals	1,600 animals
Number of fatteners	76 animals	400 animals
Average cost of fattener at entry	20,000–30,000	32,500
Length of the finishing cycle	90 days	120 days
Feed cost per day per animal	KES 40	KES 60
Average daily weight gain	0.7 Kg/day	0.5–0.8 Kg/day
Live weight at slaughter	400 Kg	385 Kg



Extensive fattening model

Under this model, animals are grazed on natural pastures, with supplementary hay during periods when standing fodder is not available. This fattening model was mostly practised in the commercial ranches in Laikipia, and group ranches in the coastal and Laikipia counties (with varying levels of success). Different operational structures exist under this model, and some of the most common include:

- a. Fattening on pastures in the commercial ranches:** in this sub-model, a large number of animals (sourced from cow-calf operations in the ranch or purchased from the group ranches or pastoral markets) were raised on ranches that were well managed in terms of forage management, feeding, breeding, disease control, and other management practices before being marketed. In some instances fattening was achieved by using a combination of grazing and supplementation, with concentrate diet made from locally available feed resources, to improve the growth performance. Fattening on pastures is one of the most common models across all of the regions and has the highest throughput of animals. The primary target market for the animals is the middle-income meat market, with prices ranging from 280 - 350 per Kg of meat. Animals are mostly sold through animal traders to formal meat wholesalers like Choice Meat. There were emerging trends where the formal retail chains are getting into purchase contracts with ranches for the supply of meat. However, a number of the ranches indicated that they are hesitant to engage in such contracts because they lack a stable supply of animals to fulfil the contractual obligations. The production cost for this model is the lowest due to the low cost of feed at KES 50 per Kg of weight gain. However, the productivity remains low, and therefore animals stay for longer periods before going to the market, with it taking an average of 8 - 12 months to fatten the animals. However, most ranches still prefer this model due to its compatibility with their other operations, community outreach, conservation, and tourism.
- b. Fattening on pastures in group ranches:** This sub-model was similar above, but with less management intensity and success. Communities feed the animals on standing pasture with no supplementation. Areas that are known to have adequate, quality pasture is reserved for the fattening of bulls meant for the market. A herd of bulls from the shareholders, and non-shareholders of the group ranch, is then consolidated and grazed on the reserved pasture for up to six months in order to gain enough weight to be sold.
- c. Fattening on pastures in conservancies:** This sub-model is mainly practised by the Northern Rangelands Trust Trading Company (NRTT) which source animals from the neighbouring markets, group ranches and communities within the conservancies. The animals are then grazed on improved pastures and supplemented to achieve market weights.



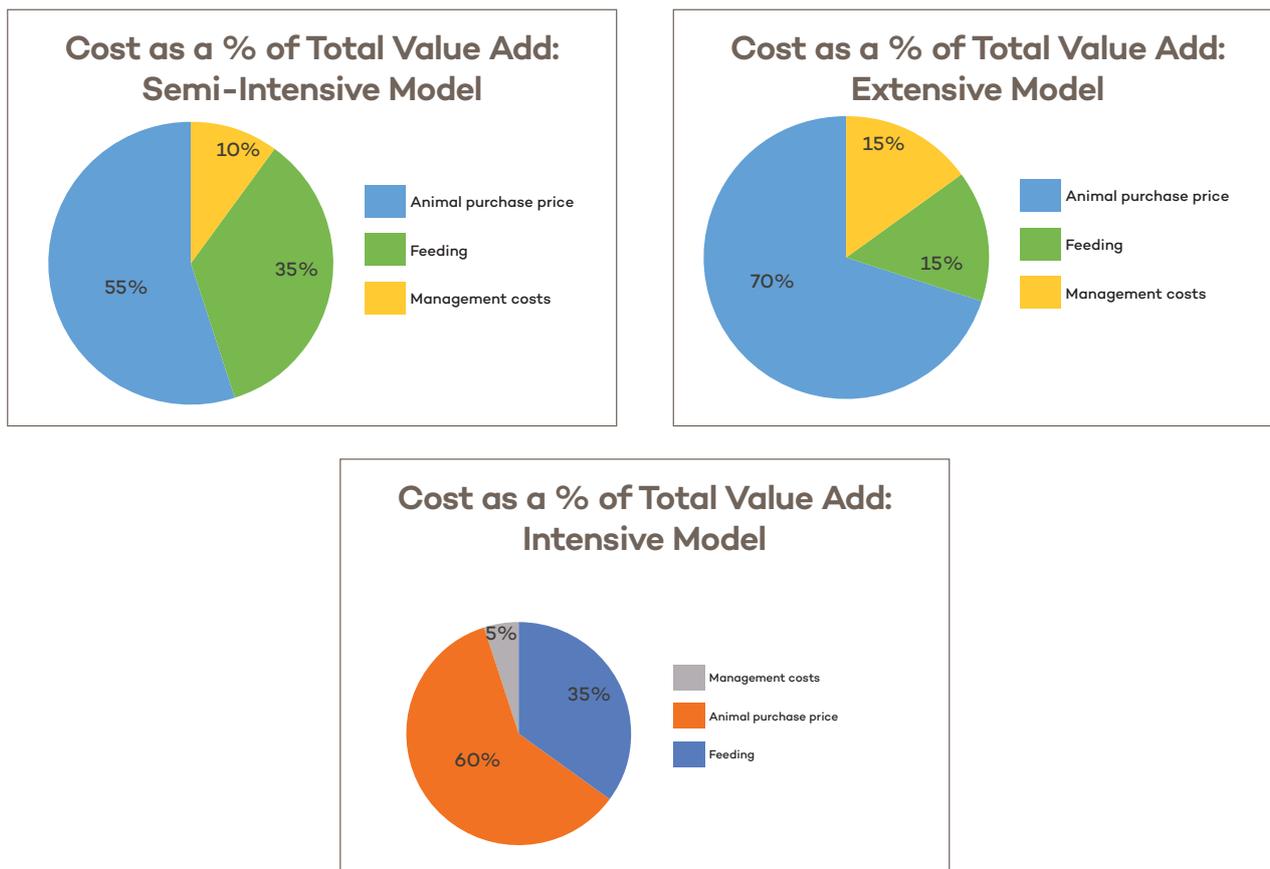
3.3. Financial analysis of finishing and fattening models

3.3.1. Costs analysis

F&F profit margins is a function of animal purchasing and selling prices, feed costs, utilization efficiency, and the time spent in the feedlot (Mkonyi et al., 2006; Malope et al., 2007; Mlote et al., 2012). The purchasing price for animals at entry into the finishing or fattening systems accounts for 60% of the costs under the intensive scheme, 50% of costs under the semi-intensive and up to 70% of the cost under the extensive systems. The significant difference is as a result of the different type of animals that are preferred under each model, and the target entry weight for the different systems. Under the intensive systems, animals get into finishing or fattening when they are younger and generally at a lower weight. However, producers under the intensive model have a strong preference for higher quality breeds (Sahiwal, Boran, Wagyu) that cost much more for young animals (steers). Under the semi-intensive, there are preferences for lower quality animals, mostly emaciated animals bought during the dry weather from pastoralist communities. Under the extensive systems, fattening is done on bigger animals that have a higher weight and therefore cost much more relative to the younger smaller animals at entry.

Feeds costs account for 30 - 35% of the total outlay under the intensive and semi-intensive systems, and 15% of the value add under the extensive systems. The combination of pasture and concentrate/grain feeding, under the intensive and semi-intensive systems, makes the cost of feeds significantly higher compared to the extensive systems. All the respondents identified that the main contributor to the higher costs was the feed in terms of the grains, concentrates, and mineral supplements. Management costs, mainly involving pest and disease control, animal health services and security account for 5 - 15% of the total value add. Costs are increasing as we move towards the more extensive systems due to the increased exposure to pests, and disease, which requires more regular application of the management practices, e.g. vaccination, dipping, etc.

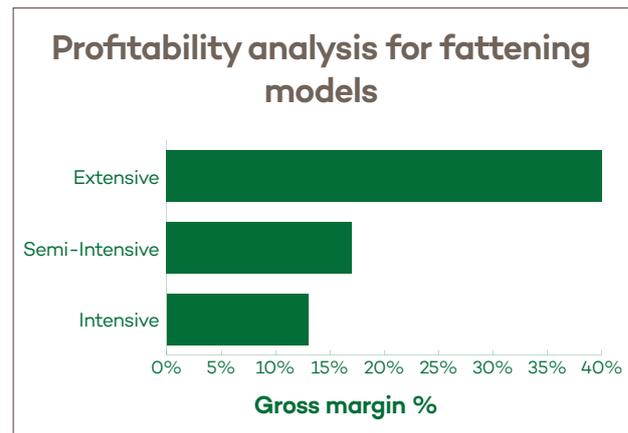
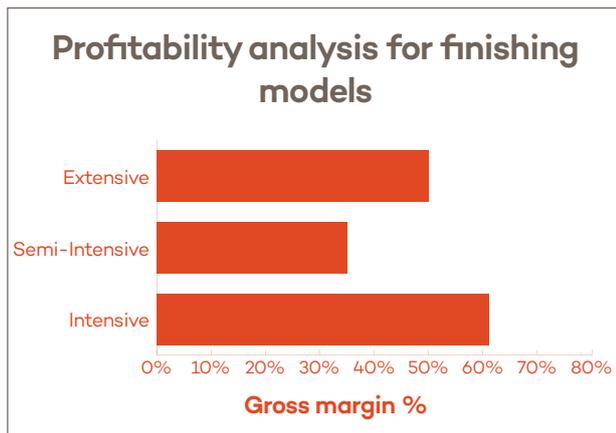
Most of the fatteners interviewed become more active in buying, and fattening, cattle during the dry periods of the year when cattle prices are low. The prices of fattening animals are estimated based on a body condition score, sex, and the body frame size of the animal. These tools are not reliable and transparent in determining the profitability of fattened animals as they depend on buyers' experience.



Graph 3: Cost of the different models

3.3.2. Profitability analysis

The figures below show the comparison of the gross margins across the different fattening and finishing models. From the financial analysis, the intensive finishing model is the most profitable, compared to the semi-intensive and extensive model. The significant difference in the profitability of the intensive model is mainly because the model achieves a higher weight gain per day (as demonstrated in the performance comparisons tables), the management costs are relatively lower, and the meat from the intensive systems generally attracts premium prices in the market when compared to the other two models. However, the profitability of the intensive model is mainly dependent on keeping the costs of feeds at a reasonable level. This requires investment in the production of fodder and a good supply of grain and other supplements. To keep the prices of feeds low, the finishers prefer to do their own formulation, and this requires a significant investment in inventory and storage of raw materials which supports purchasing during peak production periods and the ability to store for longer periods of time without affecting quality.

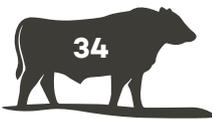


Graph 4: Profitability analysis of different models

Having complementary farming or other activities that produce the raw materials for feeds also adds to the competitive advantage of the intensive systems. Due to the high level of investment that is required for the intensive finishing and fattening models, they are less prevalent compared to the semi-intensive and extensive models. During the study, we also came across many enterprises that had started an intensive system but abandoned it midway due to the high working capital requirements (mainly for feeds). Most of those who abandoned the intensive system resorted to the extensive model or a semi-intensive model. Availability and cost of feeds were cited as the main challenges for the intensive model. However, most of the producers were aware of the benefits of the intensive model; higher weights gain per unit of feeds and lower management costs, respectively.

The extensive model is the second in terms of profitability due to the low cost of feeds as the animals freely graze in the fields on standing pasture and grass is harvested during the dry season. Secondly, meat from the extensive finishing model attracts a premium in the market when marketed as grass-fed (organic), but this market positioning happens to a lesser extent for the fattening model. The extensive model is only viable for producers with large tracks of standing hay that is produced at a low cost, e.g., the commercial ranches or group ranches. The costs of management are generally high under this model accounting for 10 - 15% of the value of the animal at the point of sale. The weight gain remains low (0.5 - 0.8 Kg per day). However, the study did come across instances where animals were able to reach a weight gain of 1 Kg per day, after grazing on improved pasture (Boma Rhodes with a mix of Lucerne) or quality pasture (natural pasture that has been reserved for fattening purposes). Consequently, improving the profitability of this model would require better management and improvement of pasture, whether planted or natural.

The semi-intensive model is the least profitable of the three models, mainly because of the high cost of supplementary feeding and relatively lower productivity (weight gain per unit of feeds). The higher management costs, as a result of exposure to pests and disease, also lower the returns for this model. The model is, therefore, more relevant for the fattening of animals rather than for finishing. As such, the prices received at



the market for animals taken through the intensive models, receive average prices with the only price advantage emerging during the dry season when pastoralists are unable to produce enough meat for market demands. The main positioning for most operators of the semi-intensive model is to take advantage of the cyclical variations in the meat market and not necessary to serve a particular market.

3.3.3. Performance drivers for finishing and fattening models

From the analysis, the main drivers for profitability in the livestock finishing and fattening business are; weight at entry, period to reach market weight, cost of feeds, and cost of management.

Weight at entry: This is not considered in absolute terms, but more from the weight of the animal relative to the age of the animal and is particularly important for the fattening models. Our interviews with operators of the fattening models indicated that the purchase of animals beyond 300 Kgs lowers the profitability of the operation significantly. As the initial entry cost is determined by the weight at entry, procuring animals with a higher body weight will increase the entry cost, and therefore lower the margin achieved from fattening. Consequently, the norm is to buy bigger animals that have a lower body weight compared to size because they are cheaper. However, experience by fatteners indicated that animals that have a better body condition (lower weight to size ratio) are more preferred because they gain weight faster. There seems to be an information gap amongst most of the industry actors around the conversion capability, or food efficiency, of animals with different conditions.

Period to market: From our expert interviews, it was ascertained that animals have an optimal period within which the weight gain is the highest. For younger animals, this period ranges from 15 – 24 months, whilst for older animals (emaciated animals) it ranges from 60 – 120 days depending on the condition to the animal. Keeping the animals beyond these periods doesn't necessarily add any value, and in some instances, the animals might lose weight. Within this period, the animals should also be fed consistently (quantity and quality), and any variations can also lead to weight loss. Some of the operators seem to keep animals for much longer than the optimal period and are therefore consequently not reaping the full benefits of their operations.

Cost of management: Keeping the animals healthy is crucial in ensuring that they gain the optimal weight. Pest and diseases lower the efficiency rates of the animals as they are required to utilize part of the feeds to deal with diseases. The cost of management is higher for the extensive systems, which have higher exposure to pest and diseases, compared to the confined animals under the intensive systems. Keeping these costs low through economies of scale is crucial for profitable finishing or fattening operations. Operations with bigger herd sizes have a lower per-unit cost of management due to the economies of scale that result from the larger herds.

Cost of feeds: This is the second most important, after cost at entry, driver of performance for finishing and fattening operations. 70% of the operators we



interviewed highlighted this as the most challenging aspect of fattening and finishing businesses as the bottlenecks range from the availability of adequate pasture to the cost of concentrates and other sources of protein and energy.

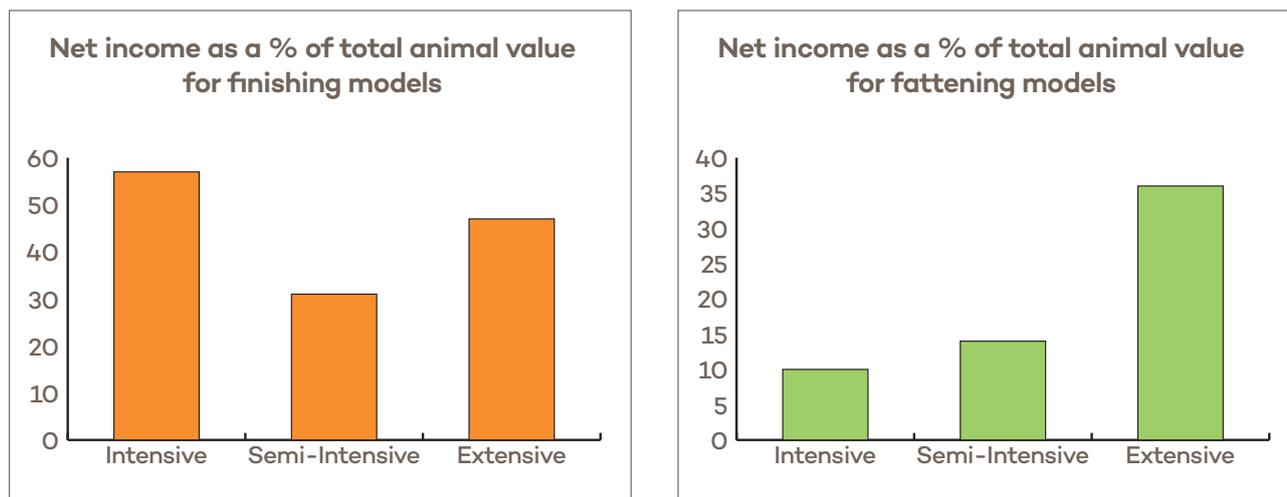
The graph below demonstrates the difference in performance drivers within the fattening and finishing models. For example, the weight at entry tends to be same for intensive and semi-intensive fattening models as they target the same type of animals but is much lower for extensive systems since animals get there when they are much younger. The only difference with finishing is that no timelines are set, the animals are grazed until they reach the required body weight.



Graph 5: Performance drivers for finishing and fattening

3.3.4. Investment requirement and break-even analysis

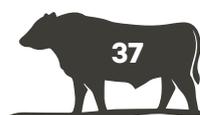
The graphs below show the net earnings as a percentage of the total value of the animal. From the analysis, finishing models generally tend to have a higher net income level compared to the fattening models. This is mainly because finished meat is usually of higher quality due to the younger animals, and therefore attracts higher prices in the market compared to the fattened meat, most of which is sold as FAQ or standard quality. However, the target market for finished meat is very niche and therefore small, and the room for growth may not be significant compared to the market for fattened meat.



Graph 6: Net income analysis

The study did not attempt to assess the return on investment for individual businesses implementing the different operation models due to some shortcomings. Firstly, the nature and level of investment vary significantly between the different models, which is mainly influenced by the production system (finishing or fattening) and the size of the herd. As such the return on investment varies significantly across different models and size of the operation, e.g., the economies of scale are much higher for the extensive model, and therefore bigger herd sizes will have a higher return on investment. Due to the many variations in the different parameters across the models, and the scope of operators interviewed for the study, it would be difficult to make comparisons across operators in terms of return on investment. Secondly, it was extremely difficult to assess the return on investment for the specific investments (mostly for the extensive investment) due to lack of data on the value of investments made by the operators (for example, the value of land, lack of adequate data for costs of establishing and maintaining the primary herd that produces the animals for fattening and finishing etc.). Besides, there are significant differences in the value of different resources between geographies; an example being the cost of grazing land in Naivasha was at least ten times the cost of land in Taita Taveta and Laikipia. Thirdly, within the extensive systems, there is the integration of multiple operations within the ranches (including conservancy, tourism, and accommodation) while within the intensive model there is integration with agriculture which makes it significantly difficult to allocate the cost of long-term investments that are not specifically developed for animal production. The carrying capacity for land also varies significantly between the geographies with higher carrying capacity among the coastal ranches compared to those in Laikipia, due to the balance between wildlife and livestock in Laikipia.

The main investments for extensive production systems mainly include; ample land to provide the required pasture, animal herd (for fattening and finishing), calf herd to produce the steers for fattening animals, holding facilities for security at night, animal health facilities including cattle dips and crushes, working capital to buy



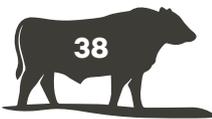
additional animals and to finance the operations. For the intensive models, data was more available regarding the level of investment required. However, there were significant variations in practices (feeding, quality of animal holding facilities, quality of storage facilities for feeds, etc.) between the producers interviewed for this study. Therefore, making a generalisation regarding the per-unit cost or total amount of investment required for an operation would be problematic. For example, the facilities used for storage of pasture and feeds vary from basic structures with just a roof to more advanced structures that allow for airflow and moisture management, with more advanced operators even having silage storage facilities.

Based on the available data, we have estimated the average level of investment, break-even point and pay-back period for a 100 animal herd, per cycle, for the finishing and fattening models under intensive, semi-intensive and extensive models as shown in Table below. From the analysis, the intensive finishing model has the shortest pay-back period for investments, while the extensive finishing model has the lowest break-even point, mainly due to the significantly lower level of investment that is required for the extensive model, but animals tend to take longer per cycle under the extensive model hence the longer pay-back period.

The finishing models have relatively lower pay-back periods compared to the fattening models. This is because the finishing model generally has higher profitability as a result of better productivity and better prices for meat in the market. Also, for extensive finishing models, the animals tend to get into the finishing at a lower price (per KG live weight) compared to the intensive models.

Table 7: Investment analysis for finishing and fattening methods

Models	Finishing models			Fattening models		
	Intensive	Semi-Intensive	Extensive	Intensive	Semi-Intensive	Extensive
Investment required KES (100 animals per cycle operation)	29,900,000	30,500,000	16,500,000	18,900,000	16,500,000	16,000,000
Break-even point (number of animals)	680	1,220	470	2,570	1,740	795
Investment pay-back period in years	3.5	6	5	13	9	7



Notes:

- The calculations are done for a 100 animal herd, per cycle of operation; consequent intensive and semi-intensive systems have two cycles in a year while the extensive systems have one cycle a year.
- The main investment considered in the calculation of the total investments includes; land, purchase of Herd (only for the fattening or finishing herd), animal holding facilities, feed processing facilities, transport facilities, and feed storage facilities. The nature of equipment generally varies from very basic, e.g., manual feed mixtures, to more sophisticated equipment as the level of intensity increases.
- The land costs are calculated as annualized lease fees for ten years to keep the land investment reasonable. This is also informed by the fact that most of the fatteners do not own the land, and most lease the land from the owners for a set period. Secondly, land in ranches is utilized for other activities and therefore can't be exclusively allocated to the livestock investments.

3.4. Supporting functions for finishing and fattening

The critical supporting functions for finishing and fattening practices were identified during the study. They included access to management capacities for operations, sourcing of fatteners and finishers, selection of animals for finishing, feed, animal health services, marketing, and access to financial services.

3.4.1. Access to management capacities

At the farm, the major important management decisions included the feedlot establishment and design, selection of the fattener/finisher animal, feeding regimes, monitoring of animal performance, animal health and disease control and marketing. While the commercial ranches in Laikipia had employed skilled managers, who supervised the operations, the intensive fattening feedlots were supported by Dr Gakuo Mwangi of Pioneer Beef & County Feedlots Limited in both the establishment process and setting up of the operations. For all the operators surveyed, the day-to-day operations were supervised by the farm manager with some level of input from the enterprise owners. In the coastal ranches, an informal feedlot consultant, Octavian Mghanga who was charging a daily fee of KES 10,000, was supporting the group ranches in establishing semi-intensive fattening operations. In the sourcing and selection of finishers and fatteners, while the Feedlot Managers were engaged directly in the selection of the animals, four of the operators that were visited reported that they relied on experienced traders, with links with pastoral markets, to supply them with animals.

Although feeding and nutrition was a critical capacity, none of the feedlots employed a nutritionist or feed formulator, although a few of the operators, especially those



preparing feeds themselves reported consulting a nutritionist to formulate the ration and feeding system. Considering that several feedlot operators were seeking ways of formulating the cheapest ration and that this was a highly skilled task that requires a great deal of time monitoring the feed quality and cost of ingredients, this was noted as a critical area of technical assistance that feedlot operators could benefit from. The study team consulted an Animal Feed and Additive Consultant, Dr Odera Owino, who highlighted the challenges of feeding and performance monitoring in feedlots. He noted that there were a number of these management practices, such as weekly weight measurements, heat stress and variations in feed intake that formed underlying performance issues affecting feedlots in Kenya. He observed that as the scale of operations of feedlots increased, addressing some of these seemingly minor management operations, such as reducing stress resulting from regular weight measurements and improving cattle sheds¹⁸ to reduce heat stress, will support operator gains in the performance of cattle.

3.4.2. Sourcing of finishers and fatteners

Generally, finishing and fattening operations need to be carefully integrated with the supply of finisher and fatteners. In all the feedlots visited, most of the cattle were not born in the same premise where they were being fed. Though the most direct sourcing option was from own raised animals (cow-calf operation) for the finishers and some fatteners, especially ranchers, all of the operators were also bringing in purchased animals. In contrast, all the intensive fattening operations were dependent on purchased animals, except Taita Taveta and commercial ranches which had their own breeding stock.

From the interviews with the actors, the major supply routes for the purchased finishers and fatteners were from the North Eastern and Upper Eastern routes, with few feedlots getting animals from traders in the Southern Maasai areas. Figure 2 shows the different supply chains for different F&F operators interviewed. The F&F operators had tapped into the intricate livestock supply chain from pastoral markets and developed relationships with livestock traders who supplied them with the required number and quality of animals.

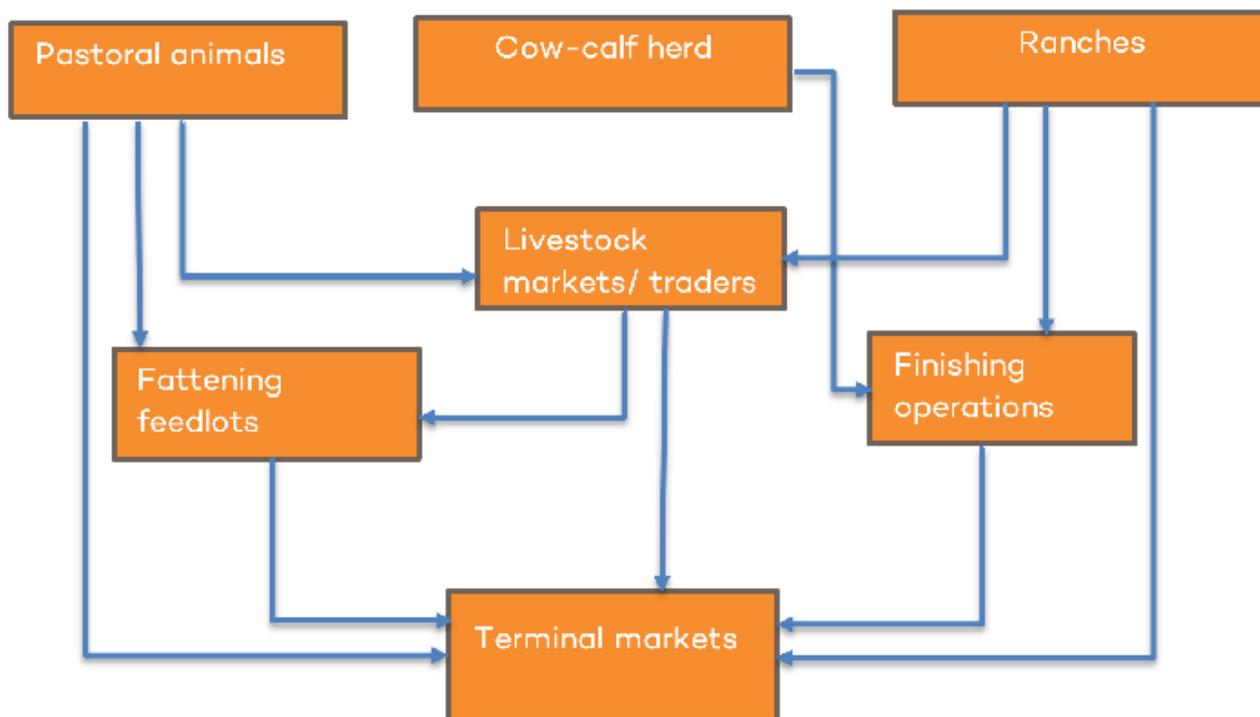


Figure 2: Different supply-chains for F&F operations

3.4.3. Selection of finishers and fatteners

The key considerations in selecting finishers and fatteners included breed type, physical appearance and frame size as well as the age and sex of the animals, as these factors affected the performance of the animals in the feedlot. Indigenous Boran and Sahiwal were the predominant breeds in most fattening operations, while improved Boran and other breeds including Aberdeen Angus, Wagyu, Simmental, Charolais, and their crosses were found mainly in the commercial ranches and intensive finishing operations.

Unlike in the Kenyan context, in modern beef production feedlots are typically well integrated with backgrounding operations¹⁹, which is in turn linked to cow-calf operations. In Kenya, although there was strong inter-dependency between feedlots and breeding - rearing (from pastoral production), no established channels linking the two parts of the market system existed. Pastoral producers do not necessarily produce steers for feedlots, nor were there any backgrounding operations that supply ready-to-feedlot weaners. As a result, feedlot operators are forced to purchase whatever animals closely meet their requirements within the pastoral markets. As a result, animals entered the F&F operations at an older age (over four years) and in poor body condition, thus more suitable for fattening operations than finishing.

A common complaint was in the variability in the performance of the fatteners, which related to the suitability in terms of genetics of the animals purchased. There was limited feedback between the F&F operators and producers of cattle which presents a key weakness in the system considering that breeding has a direct impact on the



traits that influence feed conversion efficiency and time to finish, both of which are major factors in the efficiency and profitability of the F&F operations. Without integration between breeding and finishing and fattening, the animals entering the operations were not of the same performance, even when put on the same feeding system, and management. Some ranches have been working with community groups to improve their breeds by improved lending bulls, but such operations remain very nascent. There is a big deficiency of breeding bulls in the market, one of the respondents indicated that they have been waiting to get breeding bulls from KALRO for the last two years (as the queue for bookings is too long).

3.4.4. Access to feeds

As shown in Table 3 below, the feed options for the different F&F operations varied across ecological regions and models, and they included: open pastures, open pastures with supplementation on locally available resources or concentrates, commercial concentrates, on-farm premixes using bought-in feeds.

Table 8: The type of feeds used in different models and ecological zones

Ecological zone	F&F model	Type of feeds used
North Eastern and Eastern	Fattening	Purchased concentrates, mainly cattle fatteners from Pioneer Beef & County Feedlots Limited
Laikipia and surrounding areas	Fattening	Improved open pastures with periodic supplementation of fattened steers
	Finishing	Improved pastures with additional commercially-sourced concentrate diets
Other central areas and Rift Valley	Fattening	Purchased concentrates, mainly cattle fatteners from Pioneer Beef & County Feedlots Limited
	Finishing – Naivasha	Farm prepared feed mixes
Southern Maasai	Fattening	Purchased concentrates, mainly cattle fatteners from Pioneer Beef & County Feedlots Limited
Coastal counties – Taita Taveta, Kwale	Fattening – intensive at Taita/Taveta	Farm prepared feed mixes – cottonseed cakes mixed with hay and molasses
	Fattening – semi-intensive in group ranches	Open pastures, hay and farm – prepared feed mixes

Considering that feed was a major cost item in the variable costs, across the systems, quality and cost was a key production consideration. The ever-increasing cost of feeds was a major constraint to production in most of the commercial fattening enterprises. One feedlot in Nyeri was rationing the concentrate diet, as a way of reducing the feeding costs. Similarly, Taveta Group Ranch had abandoned intensive



feedlots, once the initial feed was exhausted, letting the fattener back on the open pastures. This had led to lower performance levels of the fatteners compared to when they were on complete feeds. During the interviews, operators said that the search for alternative cheaper feed sources that can meet body requirements of beef cattle for the production of good meat quality was their current priority. Three of the intensive feedlots reported that they planned to base their feeding on on-farm products, but without proper technical assistance on feed formulation and identification of quick wins that will enhance productivity, they were likely to record poor performance as was already seen in some feedlots that have started doing farm-prepared feeds.

3.4.5. Animal health and disease control

The main activities in animal health management involved pest control through dipping or spraying, regular vaccinations against common diseases and continuously monitoring of the herd (including weight monitoring) to identify potential incidences of disease. East Coast Fever was one of the main challenges in the feedlot areas, and outbreaks of foot and mouth disease occurred in extensive operations, especially in ranching as a result of contact with pastoral cattle, wildlife, or livestock interaction with the poor management of newly purchased, un-quarantined animals.

To meet these functions, different operators had put in place different measures. All the ranches interviewed were at least employing one animal health personnel, mostly animal health assistants (AHAs), in addition to sourcing vaccinations from the Laikipia County Department of Veterinary Services. All the other feedlots were dependent on both the government veterinary services and private animal health services providers. Feedlots in Garissa, Kitui, Nyeri, and Kajiado also accessed additional extension support from Dr Gakuo of Pioneer Beef & County Feedlots Limited who was also supplying them with commercial cattle feeds. Group ranches in coastal counties, and community ranches in Laikipia, were also attending to their livestock, purchasing drugs from private agrovets and administering it themselves.

3.4.6. Marketing and slaughter of finished and fattened animals

All the F&F operations visited, except one, were dependent on conventional meat slaughter, processing, and distribution channels, with Choice Meat as the most common outlet. Morendat, on the other hand, had vertically integrated operations with its own slaughtering facilities (some outsourced), storage and ageing facilities, cutting and packaging as well as own market distribution channels. The major marketing channels for the operators included:

- Direct marketing majorly through Choice Meat and other abattoirs;
- Retail outlets through high-end butcheries and supermarkets;
- Food service providers through eateries, restaurants, and meat shops - some of the operators also have their meat shop outlets in Timau, Nairobi, Naivasha, and Nanyuki.



The prices paid for slaughtered beef from the feedlot depends on the age, quality grade, conformation, and carcass weight, with other quality parameters such as bruising, determining the class of the carcass. In terms of the products sold, several options existed; premium cuts, premium meat, FAQ and standard quality. The prices vary from KES 1,000 – 3,000 for premium cuts, 450 – 700 for a premium, 310 – 380 for FAQ meat and 250 – 280 for standard quality meat. For the lower market segments, feedlots and ranches faced competition from traders from pastoral areas with more efficient supply chains.

3.4.7. Access to finance

Most of the finishers and feedlot operators reported that they used their capital to make the required investment, and access to credit for finishing and fattening operations remain very nascent. All the operators interviewed indicated that working capital financing (acquisition of animals and feeds) remained a major challenge as the existing finance options don't fit the timelines and cashflow trends for the finishing and fattening business. Nevertheless, some financial institutions met during the study, such as Agricultural Finance Corporation (AFC) and Kenya Commercial Bank (KCB) indicated their willingness, and interest, to finance the F&F operators. For example, AFC has a livestock and fisheries development loan product that is meant to finance dairy and beef production, sheep and goat production, piggeries, and beekeeping. The product is designed for groups, and individuals, and has a repayment period of 2 – 5 years at annual instalments and a six-month period before repayment starts, allowing operators to fatten and dispose animals. However, for one to access the product, they have to demonstrate the suitability of the project, have experience in the proposed enterprise and provide tangible security for the loan.

For example, a livestock finance product that is offered by a leading bank in the country requires a full settlement of the credit provided after six months. This product assumes that all the livestock will be disposed of at once, and the market will be available after the six month period. In reality, the finished or fattened animals do not gain weight at the same rate, and they are disposed of in small batches as they attain the required weight and in response to the market demand at the time. Two producers (a rancher and community livestock marketing cooperative) that had accessed the product faced significant challenges in making the repayments and have not accessed the product again after the first bad experience. A second rancher who was interviewed has since abandoned the intensive feed lotting for a semi-intensive system due to the lack of working capital to procure enough feeds for the animals. They have to supplement supply to their retail chain by purchasing animals from neighbouring farmers who stock a few high-quality animals.



3.5. Informal rules and regulations in finishing and fattening

3.5.1. Relationships between F&F operators and neighbouring pastoral communities

Some of the relationships that existed between F&F operators, especially ranchers and neighbouring pastoral communities include integrated fattening at a fee, grazing/tenancy at a fee, and informal supply agreements, and marketing services for pastoral cattle. Some commercial ranches in Laikipia such as Borana and Mugie ranch operated on custom grazing agreements where the neighbouring pastoral producers paid grazing fees during periods of drought to access the ranch pastures.

Other than these agreements, these ranches also had an integrated fattening system, where neighbouring communities, or traders, paid a management fee for grazing whilst retaining ownership of cattle throughout the feeding period. However, they did not actively participate in the day-to-day feeding operation.

After reaching the market weight, the fattened bulls were sold, and the ranch management charged 6% marketing fees per animal. They retained ownership of the animals, but the producer ensures that they have a financial interest in producing animals that finish/fatten well, which is a powerful incentive to target their breeding strategies to deliver such characteristics. Furthermore, with better organization of producers into groups, it would be easier for them to contract them for the regular supply of feeder cattle for feedlots.

The coastal ranches had tenancy agreements with traders from Garissa who paid monthly grazing fees to access pastures for their animals. All of these traders also kept breeding herds in the ranches – the breeding herds were usually charged at a lower fee compared to bulls destined for the market (Table 4). In both coastal ranches, and Laikipia commercial ranches, the neighbouring pastoral or tenant herds also supplied bulls directly to the feedlots operated by the ranchers.

Other than the ranches, the Northern Rangelands Trust Trading (NRRT) were also buying animals from the neighbouring pastoral community and markets and putting animals in the Ol Pejeta ranch for fattening. Table 9 provides the costs associated with the different agreements between the ranchers and neighbouring pastoralists or tenant herds.



Table 9: Costs of tenancy, grazing and marketing agreements between ranchers and pastoralists

Costs	Amount	
	Coastal ranches - Lualenyi	Laikipia ranches
Bulls – cost per month	KES 180	KES 450
Cows – cost per month	KES 150	KES 450
Management costs for fattening bulls	–	600
Disease control costs	Dipping @ KES 12 per animal per month	Inclusive of above management cost
Commission on sale – market	–	6%

3.5.2. Conflicts between tenant herders and group ranches in the coastal counties

Conflicts between commercial ranchers in Laikipia and neighbouring pastoralists occasionally occurred, especially during the droughts when invasions of the ranches occurred. To reduce the risk of invasions, commercial ranchers tended to keep their livestock herd, as the invasion of idle ranches were more common than ranches with livestock. Additionally, the ranches had developed some relationships, including the provision of free, or at-fee, grazing to pastoralists when they were facing distress such as droughts.

In the coastal ranches, conflicts arose between tenant herds and neighbouring ranches or Kenya Wildlife Services (KWS) over illegal grazing within the ranches, game reserves and conservancies. It was also common for members of the group ranches to evict tenant herds, when the managing committees of the group ranches mismanaged the tenancy fees paid by these tenants, as a way of forcing the management to account for the lost money. There were also unconfirmed reports of poaching, by the herders of the tenant herds or pastoralists, and politically instigated evictions from ranches or invasions of ranches by pastoralists.

3.5.3. Formal and informal fees and costs en-route to markets

Livestock destined for slaughter were subject to formal and informal fees arising from disease control regulations. Formally, livestock movement is subject to legislation meant to reduce risk of disease control, such as the acquisition of a No Objection and Movement Permit issued by the Department of Veterinary Services as per the Animal Disease Control Act Cap 367. There was also the transportation costs, which varied with the distance of operation to the destination markets. Besides this, the livestock was subject to informal costs including bribes at police control points, especially when animals were moved in the night. Table 10 shows some formal and informal costs associated with livestock movement to market along some of the trade routes.



Table 10: Formal and informal costs associated with livestock movement to markets

Costs	Amount			
	Garissa	Kitui	Laikipia ranches	Coastal ranches
Costs of movement permits	KES 500	KES 500	KES 500	KES 500
Transport costs to market	KES 4.5–5/Kg	KES 3.5–4/Kg	Transport cost covered by processors	KES 4.5 – 5/Kg
Other informal costs	KES 1,500/lorry (day) to Nairobi	KES 1,000/lorry (day) to Nairobi	KES 1,000/lorry (day) to Nairobi	KES 1,000/lorry (day) to Nairobi
	KES 2,500/lorry (night) to Nairobi	KES 2,000/lorry (night) to Nairobi	KES 2,000/lorry (night) to Nairobi	KES 1,500/lorry (night) to Mombasa

3.5.4. Government policies and strategies for improving the Sub-Sector

The Government, both at national and county level, has begun to make investments, and create incentives in the livestock sector, some of which may impact the F&F sub-sector. Some of these include the following.

World Bank is currently supporting the Laikipia County in conducting a feasibility analysis of establishing integrated feedlots in the county. The objective of the project is to optimize Laikipia’s animal production capability to better align with market opportunities both locally and internationally and to stimulate the development of advanced processing capabilities in the county’s red meat sector. From the consultations with the stakeholders, a number of intervention models will be developed, including the establishment of a special-purpose company that will lead the process of modernizing the county’s livestock sector through commercializing and intensifying its production and processing capabilities. This shall also improve the reliability of supply in terms of volume, price, and quality, and have a positive impact on the economic livelihoods of the animal producing communities in the county. Alongside this, the county is piloting a livestock information and traceability system in partnership with the KCB Foundation, World Vision, and Kenya Veterinary Association which will inform the basis of food safety, trade, and disease surveillance, in addition to helping farmers’ access livestock insurance and financial services.

In the coastal counties, conflicts over grazing lands and human-wildlife conflicts have been on the rise. In addition, the management of the group ranches have continued to deteriorate. At the time of this study, a number of the community ranches were attempting to improve their ranching operations, albeit still experiencing some challenges. For example, while the Lualenyi ranch had started semi-intensive fattening operations, the Taita Taveta group ranch had started the same but had abandoned



the operation due to the challenges in accessing feeds. Across all the regions, access to and the high cost of feeds were making the price of feedlot beef too high to be absorbed by the local markets. It was also observed that while most of the intensive fattening operators were located in areas such as Garissa, Kitui, Kajiado and Taita Taveta, feed producers and raw material suppliers were concentrated around Nairobi and central Kenya, resulting in high transportation costs to these distant feedlots. While it is estimated that Kenya imports 70% of the raw materials needed for the manufacturing of animal feeds, it is difficult to purchase high quality feeds even in the market, and fraud is common²⁰. The feed industry is being regulated by the Fertilizer and Animal Feedstuff Act and an Animal Feedstuff Bill, 2016 has been developed and is under review to address the gaps in the Act. Even in the pastoral production areas, access to grazing resources remains one of the major constraints to the production of adequate quantity, and quality, animals that can be fattened and finished in the F&F operations.

The government, in collaboration with the stakeholders, has been implementing the disease-free zones in the coastal counties. As per the Livestock Policy, 2019, the country is targeting zonal eradication of foot and mouth disease and contagious bovine pleuropneumonia, as well as the declaration of freedom from bovine spongiform encephalopathy. Additionally, the construction of the Bachuma Livestock Export Processing Zone in Taita Taveta county aimed at promoting livestock export, by meeting the strict health and safety standards of the international market, is on-going. However, while the deadline for these ambitions still exists, they are slow and poor coordination, and collaboration between the national and county government has set back Kenya's disease reporting obligations internationally.

CHAPTER 4:

CONCLUSION AND RECOMMENDATIONS

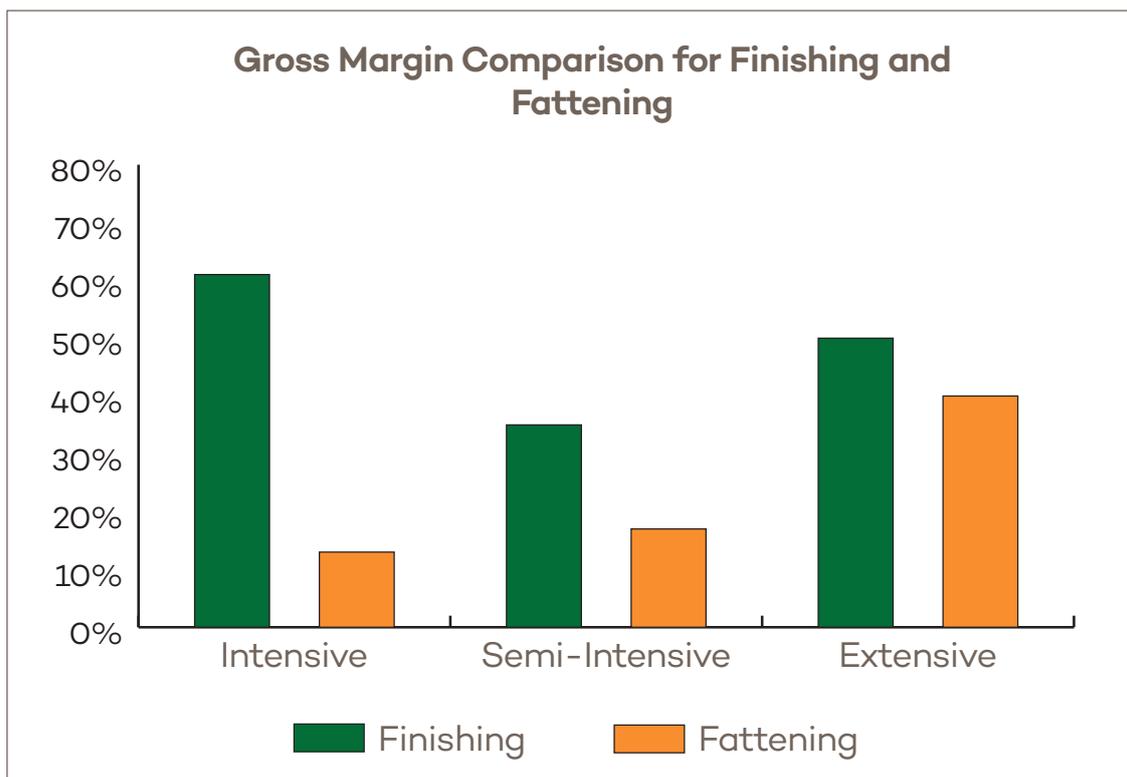


4.1. Summary of findings

4.1.1. Viability of fattening and finishing business

Eighty per cent of the respondents, interviewed for this study, collaborate the proposition that fattening and finishing is a viable enterprise that can help unlock the value in the livestock market system. Some of the respondents hold the opinion that the market is not viable, mainly due to the high cost of feeds and lack of an organized meat market that ensures all producers get a good return for their investment.

From the financial analysis, the finishing operations tend to have higher profitability (both gross and net profit) compared to the fattening operations as a result of the higher efficiency ratios and the premium prices paid for the higher quality meat that is produced by the finishing operations. This makes finishing operations more viable financially, although they serve a very niche market that requires a high level of compliance with the required specifications and in many cases, a vertically integrated operation in order to meet the needs of the market. Greater investment is required for the finishing operations compared with the fattening operations, especially in establishing their own herd to guarantee the supply of young animals for finishing. Good young animals from improved breeds tend to cost more (per unit weight) due to the limited supply compared to the older animals, and there is generally a lack of dedicated breeders in the market. Consequently, the main operators of finishing operations have established their own herds to guarantee a supply of young animals for finishing.

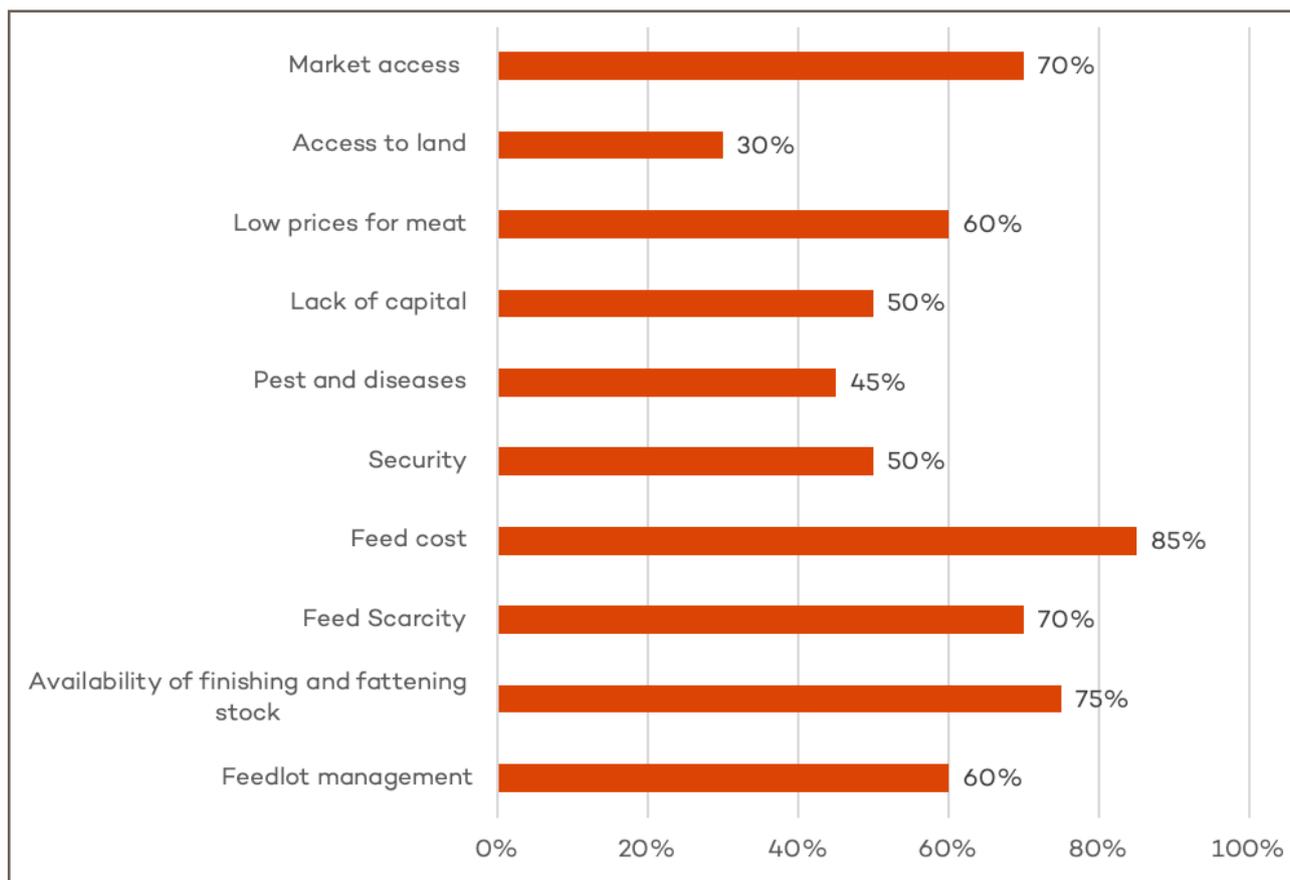


Graph 7: Gross margin analysis of F&F models



4.1.2. Constraints for beef finishing and fattening

From the discussions with the operators, feedlot management, inadequacy of appropriate stock for finishing and fattening, feed scarcity and marketing challenges were identified as the major problems hindering the performance of finishing and fattening operations. The table below summarises the percentage of respondents who mention each of the constraints as key issues for their business or the number of instances where the interviewer observed the issue as a problem.



Graph 8: Key challenges to the finishing and fattening businesses

Operators noted that the profitability of the current models was too low, considering the high prices and poor quality of purchased animals and costs of available feeds. Many of the operators who were operating profitable and scalable finishing and fattening operations have made significant investments in feed processing facilities in an attempt to reduce their costs of production. Those doing their own formulation can achieve the same weight gain of 20 - 30% less compared to those who are buying formulated feeds. However, this remains very nascent with only 20% of the intensive and semi-intensive producers doing their own food formulation due to the high level of investment required, for machinery, bulk purchases and transportation of the raw materials, and this poses a key barrier for many of the players combined with the low level of technical knowledge on feed formulation using locally available materials.

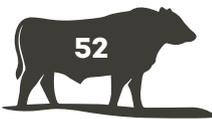


4.1.3. A shift in commercial incentives

There is an emerging trend among the pastoral communities towards a more commercial oriented animal production system. Our conversations with communities and group ranches indicated that there is a keen interest in improving their products to order to meet the needs of the market. However, the lack of proper management structures and technical capability amongst the community ranches remains a major bottleneck in changing the operations towards a more commercial approach. Among the ranches, beef production is now considered as an important revenue stream to complement the revenue generated from conservation activities and tourism. Also, it is seen as a key link to the communities and to help in the mitigation of the risk of conflict. All the ranchers interviewed for the study indicated that livestock would form a core part of their business in the coming years and that they shall be taking a more commercial approach to production. However, 60% of the commercial ranchers interviewed for this study indicated that access to enough quality animals for finishing and fattening remains a key constraint for full commercialization of the beef production enterprise. To mitigate this challenge, three ranchers have established, or are in the process of establishing, their production herds to complement the supply from the neighbouring communities and markets.

4.1.4. Limited capacities among key actors in the market system

Many of the players interviewed demonstrated a keen interest in developing scalable fattening and finishing businesses, but many didn't have a clear pathway on how to achieve that. A significant proportion of the finishing and fattening enterprises was struggling with their feeding regimes and had been exploring different options in an attempt to keep the costs of production manageable. Only three operators (15% of the operators interviewed) had a properly developed feeding regime that they stuck to throughout the fattening or finishing process. Most of the other operators reported tweaking their feeding regime based upon the availability of feeding resources. In many instances, this led to animals losing weight as they adjusted to a new regime before recovering. As highlighted above, 60% of the operations have indicated capacity as one of their challenges to optimal production. There is a general lack of knowledge on feed formulation, suitable fodder options for the different locations to help improve the quality of pasture and how to optimize the existing resources. There is over-dependence on concentrates for the intensive feedlots making the costs of operation very high, and consequently presenting very low profit margins.



4.1.5. Weak linkages among the players in the market

Access to market and communities to source animals for finishing or fattening remains the weakest linkages in the chain. Except in a few cases (three of the interviewed operators – 15%), the level of linkage between the pastoral system and the finishing and fattening business remains very limited. Where linkages exist between ranchers and communities, the primary incentive is risk management and not commercial production. For communities, the objective is to mitigate against the loss of animals during drought, whilst for the ranchers, the incentive is to mitigate potential conflict with communities due to invasion. Consequently, communities don't supply steers to the ranchers for finishing but use the fodder resources in the ranch during the drought season to avoid the loss of animals. As a result, most animals from the pastoralist communities end up in fattening operations and to a lesser extent into finishing operations. Most fatteners have to rely on the supply of animals from livestock markets which provide animals that are too old, and therefore not suitable for the business. Older animals have a lower rate of weight gain (30 - 50% compared to young animals), and they generally attract a lower price in the meat market.

4.1.6. Access to finance

50% of the respondents sighted lack of adequate capital as a major constraint, especially the fatteners, because the window of opportunity that is presented by the drought is usually short. In addition, the inability of most ranches to pay upfront for the animals that are taken for fattening under the community partnership programs also limits the number and quality of animals the community members are willing to provide to the ranches since they want to retain the animals that are more marketable (those with good health) and only provide the ranches with those that are less marketable. This increases the period that is required to make the animals ready for the market. Two of the ranchers operating the community partnership model that were interviewed for this study indicated that they are not able to pay upfront for the animals because they don't have the required working capital to do so. It will require an average of KES 6.5M to pay for 200 animals at entry. The ranchers indicate that the current products offered by the banks are not suitable for this sort of operation. Many institutions will not provide the grace period of 6 months which is required to fatten/finish the animals. For those who do, they require a lump sum payment for the whole loan, but the animals will be sold in small batches (20-50 animals) per month because they attain the target weight at different intervals. In addition, the commercial ranches and community ranches indicated that they had intentions of investing in improved fodder, but the resources to make such investments are not currently available.



4.1.7. Limited supply of animals for finishing

75% of the operators highlighted the limited supply of animals for finishing as the main challenge to the finishing and fattening business. The breeding business remains very nascent in the country, especially for beef animals. Most of the current animal breeding enterprises focus on dairy animals since it offers better returns, and the demand is much higher than for beef animals. During the study, we only came across one dedicated breeding enterprise at the coast region that produces young animals (Borana and Sahiwal bulls) for sale to ranches and feedlots. However, the identified business was in the process of establishing a finishing operation to run an integrated business model and tap into the opportunities that they have identified in the meat market. They have recently signed contracts for meat supply with some of the main retail chains, and they would like to finish the steers and sell them as meat. As a result, most of the operators keep their herd which guarantees a minimum supply of young animals which is then supplemented with those from the market. No single operator was dependent on their own herd for the supply of animals.

4.2. Recommendations

The study identified a number of systemic constraints to the F&F sub-sector, including inefficiencies, limited integration between the sub-sector and the suppliers of fatteners and finishers, high costs of feeds and challenges in the enabling environment.

Below we identify some of the important market interventions that can address these challenges:

4.2.1. Market interventions to address the inefficiencies within the F&F sub-sector

From the findings of the assessment, it was clear that the sub-sector was operating below its potential as a result of challenges in technical capacities, limited integrations with pastoral production and markets, and high feed costs among other actors. Some key areas of intervention to address these issues include:

- **Improve the efficiency of the intensive feedlots:** The intensive feedlots need to focus on producing high quality, well-finished steers all year round. Ideally, the feedlot operators should focus on taking younger animals straight into finishing to take advantage of the high feed conversion efficiency to produce the target weight gains from lower feed inputs. Also, the feedlot operators need to improve current operations by ensuring the consistency of the feed rations to ensure the weight gain is consistent throughout the fattening process. A greater focus on finishing as opposed to fattening will generate higher returns for the producers. Finishing remains very limited in the entire market system, and there is significant room for growth.



- **Improve scale and aggregation to unlock the supply chain efficiencies:** The integration of F&F operations with the production of animals, especially with pastoralist systems to ensure a consistent supply of high-quality animals for both finishing and fattening should be a focus. This will require the organization of producers into production and marketing groups that are linked to fattening and finishing services through the purchase of animals or providing services for a fee. Commercial ranchers can then achieve high-efficiency levels, and high returns, compared to intensive feedlots for fattening operations due to the abundance of pasture. Creating greater linkages between the commercial ranchers and the community would be useful in increasing the scale of the fattening and finishing operations, as well as to leverage the opportunities in the meat market.
- **Provision of technical assistance to finishing and fattening operations:** Technical knowledge and good management are the decisive factors in determining the success of the finishing and fattening operations and considering that most of the operations were relatively new, they faced several performance challenges. Providing training to the managers of such operations and linking them to service providers (government and private) who can continuously provide advice to enhance improvement, will be key in upgrading the operations and business proposition for fattening and finishing.
- **Strengthening of support services for the sub-sector, including improving access to capital, supporting improvements in the feed inputs markets, transportation, and infrastructure services:** Of critical importance is feed, which is the single most costly item of variable costs in a feedlot enterprise, and whose main constraint is in the challenges with the supply of raw materials and low-quality ingredients. While the feedlot operators attempt to look for alternative feeds in an attempt to reduce costs, especially without the inputs of livestock nutritionist, they are likely to face performance challenges as was noted by the Nyeri feedlot. Therefore, working with the feedlot operators on feed formulation and developing of suitable fodder options will be important in improving the quality of feeds, and pasture available, and how to optimize the existing resources.
- **Improving efficiencies within the ranches:** Considering that the ranches have relatively larger landholding, and are already operating a cow-calf operation, opportunities exist for the introduction of backgrounding operations that will be value-adding. For example, weaners from the ranches can be improved by growing them out to a heavier weight, and higher condition score before they enter the feedlots to attain a better finish within a shorter time. This will require improving the feed resources on the ranches. Furthermore, when steers are backgrounded, they achieve consistent weight gain and have less input time, as the rate of growth during finishing depends on the rate of growth before finishing. Additionally, to achieve better productivity, livestock breeds, management processes, feeding, and disease control within the ranches will need to be improved.



4.2.2. Improve integration between F&F sub-sector and pastoral production and markets to address the supply of quality and quantity of fatteners and finishers

Although the F&F sub-sector is dependent on the pastoral producers and markets, for the supply of fatteners and finishers, there were no established channels linking the two parts of the market system. As a result, pastoralists were not meeting the market requirements of the F&F operators. Some of the interventions that can help address these challenges include:

- **Building on the current support from KMT** to improve livestock production through better organization of the pastoralists, strengthening the livestock feed and animal health, as well as trade and transportation intermediaries that are aimed at enhancing the production and health of animals, will help ensure that there are adequate quality and quantity fatteners and finishers entering the feedlots. Such intervention will be particularly important in coastal ranches and in Laikipia commercial ranches that integrate pastoral producers in their F&F models. KMT should support these ranches in changing production behaviours of their neighbouring pastoralists by providing feedback to them on the market requirements, and implementing interventions to address them, such as improving their grazing resources, better breeding and selection of young steers for markets and aggregation of livestock to finish more livestock. Facilitating crowding in of the integrated F&F models currently implemented by Mugie and Borana ranches, and implementing similar approaches in the coastal ranches, will facilitate the re-orientation of the pastoral producers in these localities towards commercialized integration between producers and F&F sub-sector.
- **Breed improvement:** Animal genetics is a key factor in achieving efficiency in fattening and finishing operations. It is a big determinant on the feed conservation ratio with improved breeds (main Borana and Sahiwal crosses, sentimental and Wagyu) recording higher conversion rates compared to indigenous breeds. Consequently, through establishing better relationships, the ranches and communities that allow them to improve the breeds in key in improving fattening and finishing operations by ensuring the supply of quality animals from the communities. An alternative is to have dedicated breeding operations, but the scale for this remains very small to meet the demand for animals for fattening and finishing.
- **Fodder and feed improvement:** The quality of fodder is the most crucial factor in the beef production system. Whether you are looking at young steers (post-weaning) that are being backgrounded for fattening or finishing, or animals that are already into fattening or finishing, the quality of feed determines how fast the animals can gain weight. Currently, the main fodder available is natural pasture whose nutritional value is very low and therefore takes longer to prepare animals for market. On the other hand, reliance on concentrates reduces the profitability of the fattening and finishing business and makes it



less attractive considering the meat prices offered by the market. To make the business proposition for fattening and finishing stronger, we need to develop proper fodder management and fodder improvement systems. Improving the fodder component of the feeds formulation, by adding more proteins and high energy content with the need for grains, will help manage the cost of feeds.

4.2.3. Market interventions to support markets for feedlot beef

Considering the relatively higher costs of feedlot beef, it will be able to compete with pastoral beef in the low and middle-income sales channels for meat marketing. Encouraging partnerships and investments in meat processing and packaging would help secure a niche market such as supermarkets, high-end butcheries, restaurants, and hotels where prices are higher, as was observed among some actors during the study. KMT is currently supporting the processing actors to develop more productive and safe business models by strengthening skills, facilities and buying relationships, to generate a 'pull' incentive back up the value chain, as well as promoting greater awareness about meat quality and safety.

4.2.4. Interventions to improve the policy and legislative

Interventions to create a favourable environment for the F&F sub-sector include:

- Addressing conflicts, invasions and wildlife-human conflicts that have direct impacts on the security of the F&F operations, especially in the coastal and Laikipia ranches;
- Reducing costs associated with markets such as multiple taxations by the counties and informal fees charged as animals move to markets;
- Reducing import tariffs on raw materials for animal feed inputs while strengthening quality assurance of current inputs available in the market.



Endnotes

- 1 Estimated using 2017 population estimate (47m) and a capita meat consumption of 15-16KG per year
- 2 20 F&F operators from Laikipia ranches, Nyeri, Kajiado, Garissa, Kitui, Taita Taveta and Kwale counties; 11 key informants from government and service providers; 3 processors; 3 traders; and 2 FGDs
- 3 End market analysis of Kenyan livestock and meat: a desk study
- 4 Behnke, Roy and David Muthami for IGAD 2011. The Contribution of Livestock to the Kenyan Economy. IGAD Livestock Policy Initiative.
- 5 iDev International, 2018; Kenya Livestock and Meat Market Analysis for Cattle, Goat and Sheep, Kenya Market Trust.
- 6 iDev International, 2018; Kenya Livestock and Meat Market Analysis for Cattle, Goat and Sheep, Kenya Market Trust.
- 7 Agro-ecological zones are land units defined on basis of combination of soil, landform and climatic characteristics. In Kenya, there are 5 agro-ecological zones, with 80% of the land being ASALs and high and medium potential areas covering about 18.6% and the rest being water and mountains.
- 8 Garissa, Kitui, Kajiado, Kisima (Taita) and Nyeri feedlots
- 9 iDev International, 2018; Kenya Livestock and Meat Market Analysis for Cattle, Goat and Sheep, Kenya Market Trust.
- 10 Morendat is the most prominent intensive finishing model
- 11 The breeding and raising of own cattle
- 12 Defined as the practice of growing, feeding and managing of steers and heifers from weaning until they enter a feedlot and are placed on a high concentrate finishing ration.
- 13 Aging is the process of holding carcass or wholesale cuts at refrigerated temperatures to allow “natural processes” to improve tenderness and flavor of meat so that if properly cooked it will more satisfying to the customer.
- 14 The Laikipia Ranching Company Limited was one of the typical semi-intensive finishers surveyed
- 15 At the time of the study, the feeding of the cattle fattener was discontinued due to costs and animals were only on improved pastures and legumes.
- 16 The model is practice by Borana Ranch Limited in Laikipia County
- 17 The categorization is based on the predominant feeding regime (extensive mainly depend on natural pasture grazing and intensive mainly dependent on formulated feeds with animal fed under confinement).
- 18 Other studies (Koknaroglu et al; 2005) have shown that providing an overhead shelter with open lots improved the average daily gain of beef cattle in warm and hot environments via increased dry matter intake and feed conversion efficiency.
- 19 The growing, feeding and managing of steers and heifers from weaning until they enter a feedlot and are placed on a high concentrate finishing ration
- 20 ABS TCM Limited and SNV, 2013, Study of the Kenyan Animal Feed and Fodder Sub-Sectors: Kenya Feed Industry Policy and Regulatory Issues.

ANNEXES



ANNEX 1: REVIEW OF SECONDARY DATA

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ANNEX 2: LIST OF RANCHES IN LAIKIPIA AND COASTAL COUNTIES

Ranches in Coastal Counties and Laikipia County

	Coastal Ranches	Laikipia Ranches/Conservancy
1	Mgeno ranch	Borana Ranch
2	Kambanga ranch	Mugie Ranch
3	Kasigau ranch	Laikipia Ranching Company
4	Maungu ranch	Marania Ranch
5	Mbale ranch	Ol Pejeta Wildlife Conservancy
6	Wushumbu ranch	Sosian Wildlife Conservancy
7	Bura ranch	Northern Rangeland Trading Trust (NRTT)
8	Dawida ranch	Laikipia Nature Conservancy
9	Bachuma ranch	Ol Jogi Ranch
10	Oza ranch	Loisaba Conservancy
11	Teri b'	Segera Ranch
12	Mramba	Musul Group Ranch
13	Mbulia ranch/conservancy	Kimanjo Community Ranch
14	Ndara b'	Ilingwesi Community
15	Kishamba b'	Tandala Ranch
16	Lualenyi ranch	Enasoit Ranch
17	Taita ranch	El Karama Conservancy
18	Rukinga ranch	Waragus Ranch
19	Sagalla ranch	Mogwoon Ranch
20	Kutima ranch	
21	Choke ranch	
22	Amaka ranch	
23	Wangala ranch	
24	Ndara	
25	Izera ranch	
26	Mwasui ranch	
27	Mkuki ranch	
28	Kishushe ranch	



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