

Livestock Value Chain Mapping in Kajiado and Narok Counties, Kenya

Lucy Wangai, Michael Cheloti*, Arthur Onyuka and William Arwa

Kenya Industrial Research and Development Institute (KIRDI), Kenya

***Corresponding author**

Michael Cheloti, Kenya Industrial Research and Development Institute (KIRDI), Kenya.

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ABSTRACT

The livestock value chain encompasses a comprehensive range of activities involving various actors that facilitate the conveyance of the final product to the consumer through different stages of collection, processing, production, and final delivery. This case report presents the findings from the mapping of livestock value chains in Narok and Kajiado Counties, Kenya. The study aimed to determine the status and gaps within the value chain, as well as the technological needs of enterprises engaged in the value chain. The ultimate goal was to foster innovation, enhance the productivity of Small and Medium Enterprises (SMEs), improve managerial and technical skills, strengthen local supply chains, and reduce gender disparities within the value chain. The study employed well-structured questionnaires and interviews in both counties to capture the technological status and needs, map all stages of the value chains, outline the main activities and actors, and identify existing gaps. Three primary value chains in the livestock subsector were identified: dairy, beef, and leather. Each of these value chains was studied and analyzed separately. The activities and actors involved at each stage, from inputs and production to transformation and marketing, were examined. The findings highlight intervention areas and provide recommendations to improve the three value chains.

Keywords: Livestock, Value Chain, Mapping, Counties, Entrepreneurship

Introduction

This study involved the mapping of livestock products and by-products value chains, combined with technological needs assessments in Narok and Kajiado Counties, conducted by the Kenya Industrial Research and Development Institute (KIRDI) on behalf of the Ministry of Investment, Trade and Industry (MITI). Funded by a grant from the World Bank Group (IBRD-IDA and World Bank) under the Kenya Industry and Entrepreneurship Project (KIEP), the purpose of this sectorial value chain mapping approach was to strengthen local value chains with a focus on the commercial aspects undertaken by Kenyan Micro-Scale and Medium Enterprises (MSMEs) in collaboration with larger entities. This involved determining their strengths, weaknesses, commercial viability, constraints, and the environmental, technological, and social sustainability characteristics of the value chains. As part of the Bottom-up Economic Transformation Agenda (BETA), the Kenyan government has designated value chain development as a key strategy to bolster growth and competitiveness across select sectors. The findings presented in this report are derived from field visits and data collection in Narok and Kajiado Counties, Kenya.

Review of Literature

Narok and Kajiado are two distinct administrative units out of the 47 devolved units commonly known as Counties as per the revised Constitution of Kenya, 2010.

Kajiado County is located in the southern part of Kenya, bordering the Republic of Tanzania to the southwest, Taita Taveta County to the southeast, Machakos and Makueni Counties to the east, Nairobi County to the northeast, Kiambu to the north, and Narok County to the west. The County covers an approximate area of about 21,872 km². Kajiado County is divided into five sub-counties: Kajiado North, Kajiado Central, Isinya, Mashuru, and Loitokitok. The County headquarters is in Kajiado town, along the Kitengela-Namanga road.

Narok County is situated in the Great Rift Valley in the southern part of the country, bordering the Republic of Tanzania to the south, Kisii, Migori, Nyamira, and Bomet Counties to the west, Nakuru County to the north, and Kajiado County to the east. The County headquarters is in Narok town and covers an approximate area of about 17,950.3 km², representing 3.1% of the total area in Kenya, making it the eleventh largest County in the country. The County is named after "Enkare Narok," meaning the river flowing through Narok town. Narok County has six sub-counties: Narok North, Narok West, Narok East, Narok South, Trans Mara

West, and Trans Mara East. The County headquarters is in Narok town, off the Narok-Bomet road.

These two Counties are classified as Arid and Semi-Arid Lands (ASAL) and share commonalities in the agricultural sector as a key driver of their economies. One of the major agricultural sub-sectors in this region is livestock. The sub-sector has made strides towards improved livestock production and incomes. However, significant challenges remain, as most farmers practice traditional pastoralism rather than modern methods of rearing beef and dairy cattle. In parts of Eastern Africa, pastoralists reportedly survive exclusively on milk due to the bimodal rainfall enabling year-round milking. The main products from pastoralism include meat, milk, blood, wool, hides, skins, manure, and labor.

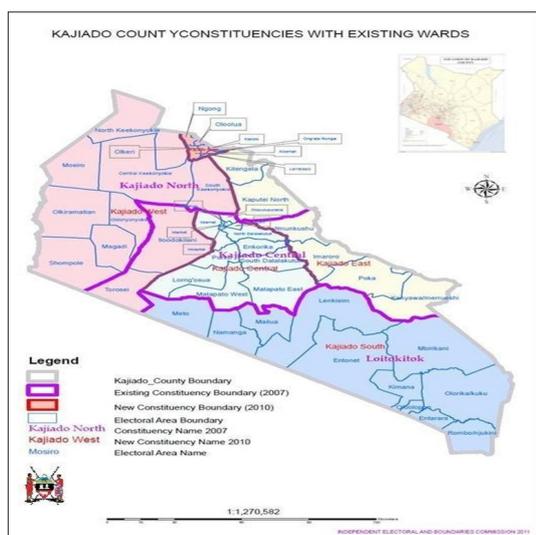


Figure 1: A Map Representation of Kajiado County.

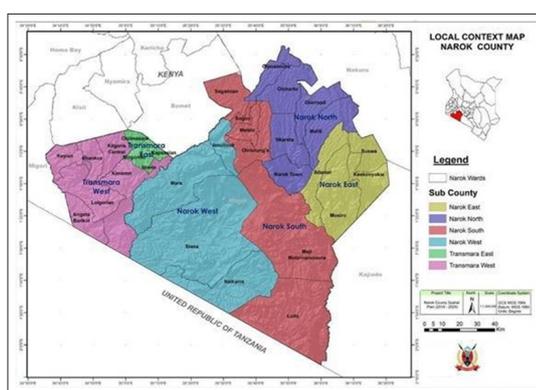


Figure 2: A Map Representation of Narok County.

In Kenya, arid and semi-arid lands (ASALs) occur in approximately 84% of the total land surface area and are occupied by about 20% of the population [1]. Livestock production is the key economic activity in the arid and semi-arid lands (ASALs) of Kenya [2] and it supports more than 14 million people and at least 70% of the country's livestock population [3]. The value of pastoralism in Kenya is however not properly understood, even though it is said to be huge and instrumental in cushioning the pastoralists' livelihoods [4]. Other benefits of pastoralism include being source of prestige, wealth, dowry and being a mode of dispute settlement [5]. Pastoralism exploits unfavorable

environmental conditions for productivity. It endures and remains gainful within the ASALs in spite of environmental stresses such as recurrent droughts and floods that showcases pastoral resilience [6]. Pastoral household income from livestock and livestock product sales is characterized by seasonal fluctuations, which forces them to diversify their income sources by engaging in activities such as selling firewood and charcoal [7].

The major inputs to dairy production systems include purchased supplemental feed, grown fodder, veterinary and breeding services, vaccination, tick and other vector control and labor. The inputs for the large-scale dairy and meat systems are costs of antibiotics and acaricides [8]. The feeding systems employed by smallholder dairy farmers, range from cut-and-carry for stall feeding supplemented with purchased concentrate feed in areas of high population density where extensive system is not workable, to free grazing on natural pastures in marginal areas. The major outputs from cattle include draft power, beef, cash, and milk, [9] are all important and farming households may target any of them as the major output. Live form is the chief livestock-related off take. However, milk is the primary product of pastoral herds. Milk production from the pastoral herds is largely never quantified [4]. Some of the constraints of dairy production include poor feed resource quality and scarcity which hinder productivity [10]. Milk is marketed through two distinct channels, formally and informally. The formal channel is mainly comprised of large-scale processors, while the informal sector that accounts for 86% share of the milk market [11] is mainly driven by middlemen. Approximately more than 90% of milk consumed at the household level is raw unpasteurized milk sold by informal small-scale milk traders [12]. It has also been documented that most of the milk produced and traded, in the informal value chains, does not meet composition, contamination standards (microbial and chemical) stipulated by the Kenya Bureau of Standards [12]. These chains are characterized by, traditional processing, predominant retail practices and products; limited inputs and infrastructure such as water, electricity, sanitation, and refrigeration; do not undergo health and safety regulation; some operators are not licensed and do not pay statutory fees; and little public sector support [13].

Data of the actual milk production and consumption volumes as well as the supply and value chains in pastoralist systems of Narok County are scanty and identification of safety risks has not been implemented in Narok County. Thus, investigation of the dairy value chains in the pastoral and agro-pastoral areas of Narok County allow for identification of possible entry points for intervention and designing appropriate policies that would enhance the development of the sub-sector. The statistical data indicates that the beef value chain in Kenya and especially the Kajiado County has great economic potential for actors [12]. It also points out that current cattle production systems in the country and the attitude of pastoralists calls for concern about the future of the beef chain and its economic impact on pastoralists.

Methodology

Based on the objectives of the project to increase productivity, innovation and competitiveness of the Kenyan SMEs through strengthened and increased uptake of innovation, technology and improved managerial and technical skill, a value chain approach was chosen to identify the existing gaps in the livestock sub-

sector in Narok and Kajiado Counties. Value chain analysis seeks a pro-poor approach to improve efficiency, improve quality and inclusion in economic activities. It seeks to analyze all activities and actors right from the input level through to distribution and transformation up to when goods are accessed by the final consumer. Value chain approach results in enhanced competitiveness, increased market access, improved livelihoods, inclusivity and an overall poverty reduction. This resonates with the objectives of this project.

A value chain framework was used to identify the key value chains in the livestock sub-sector in the two Counties. Three value chains were selected based on their competitiveness, sustainability and capacity for inclusivity;

- i. Dairy
- ii. Beef
- iii. Leather and leather products.

For each value chain, the key stages were identified and mapped along with the key actors right from the input stage up to the

consumer. Tools were developed for conducting the study to allow for data collection on the following issues:

- Ownership and management structures
- Actors involved
- Technology in place and technology needs
- Skills levels and gaps
- Risks and challenges within the value chains
- Supporting services
- Quality management
- Waste management and possible symbiotic relationships among chain actors
- Marketing and distribution

Literature review was conducted and information gathered was corroborated by information from key stakeholders and informants interviewed. Visits were done to SMEs facilities and further interviews conducted along with observations on production processes and facilities.

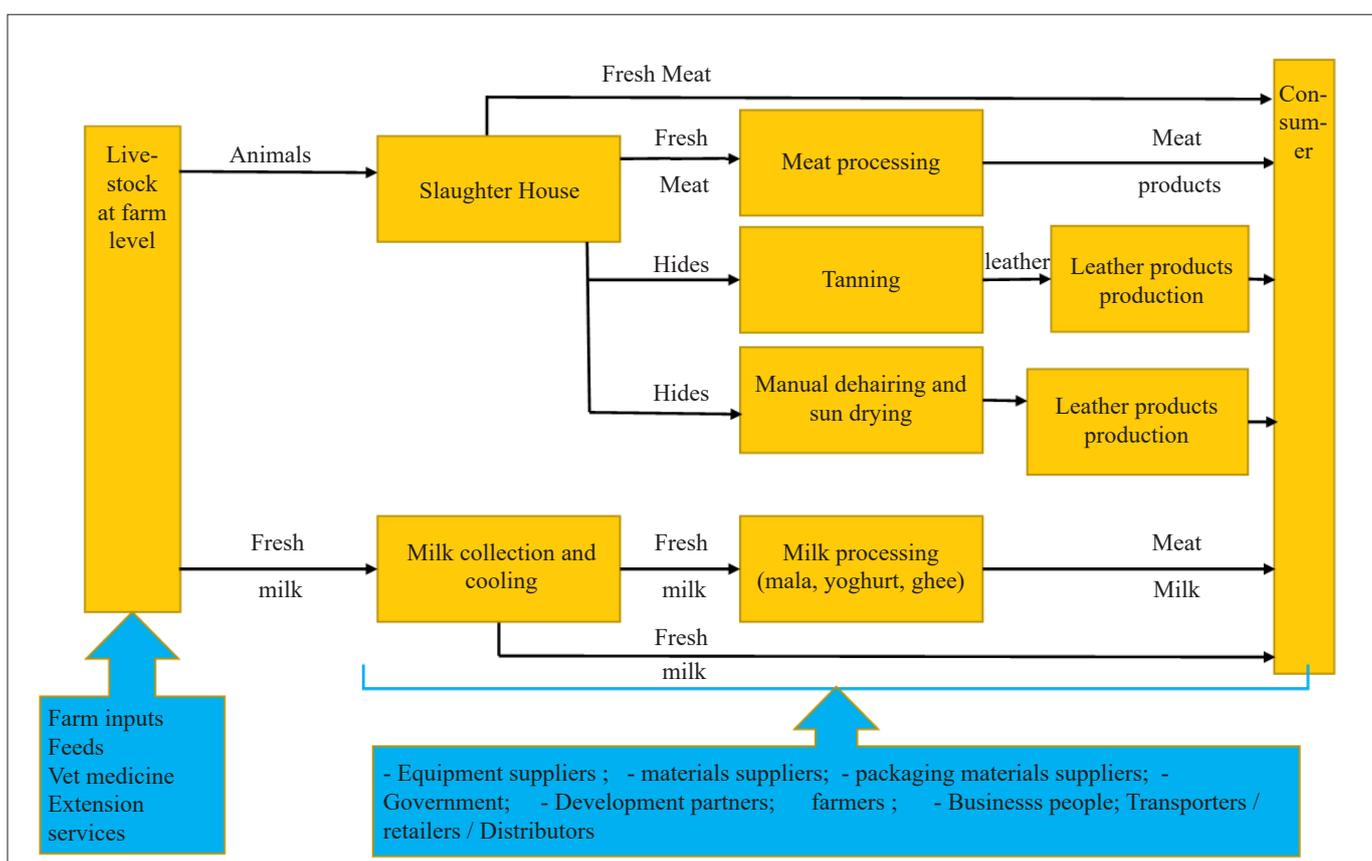


Figure 3: livestock value chain framework

Study Findings

Dairy Value Chain

The dairy value chain in Narok and Kajiado Counties involves milk collection, preservation, processing (yogurt, mala, and ghee), marketing, and distribution. These activities are primarily managed by cooperatives and women's groups, supported by County governments and development partners.

Small-scale farmers dominate the value chain, rearing indigenous breeds through free-range grazing and nomadic practices. Migration based on pasture and water availability leads to

fluctuations in milk supply. During droughts, milk production drops as cows are moved in search of pasture, and the remaining cows produce less milk due to poor feeding. Efforts to support improved pasture and fodder production have been made, such as SNV providing improved fodder seeds and equipment.

Key Stages in the Value Chain

1. **Animal Rearing:** Involves animal feed suppliers, agro-vet shops, and extension services. Both Counties have a reliable network of well-stocked agro-vet shops sourcing directly from Nairobi.

- Milk Collection and Cooling:** Farmers are organized into cooperatives and women’s groups for milk collection and cooling. Milk is collected at designated centers and sold as fresh milk locally. During surplus production, it is sold to processors in Nairobi.
- Milk Processing:** Limited value addition is done, with a focus on yogurt and mala. Processing methods are rudimentary, using charcoal or firewood for heating and improvised water baths for cooling. Packaging is manual, with containers sourced from Nairobi.

Technologies in Place

- Modern Coolers:** Milk collection centers are equipped with coolers (2,000-3,000 liters). In towns, smaller outlets use freezers (200 liters).
- Quality Assurance Equipment:** Lactometers and alcohol guns are used to test for contaminants.
- Energy Supply:** Main grid power with backup generators for cooling; biomass is used for pasteurization. Water is supplied by vendors using tankers or jerry-cans.
- Plant Layout:** Facilities often have cluttered and constrained workspaces.
- Waste Management:** Waste includes cleaning water and spoiled milk, with varying disposal methods, such as septic tanks, soak pits, or ground surface disposal.

Process Management and Optimization

- Training:** Staff are well-trained through various programs, but optimization of operations is lacking.
- Management:** Enterprises are registered, comply with licensing and quality standards, and maintain financial records. However, technical reporting is minimal.

Gaps Identified

There are gaps in technology, technology use, and skills needed to enhance the dairy value chain in these counties.

Table 1: Showing Technology gaps and Business management gaps for the Dairy Value Chain

Technology Gaps	Business management Gaps
<ul style="list-style-type: none"> Lack of modern equipment for value addition Lack of engineering skills or support for maintenance No supply for spare parts No monitoring of equipment performance No quantification of waste Not aware of performance indicators No innovations / identification of innovation No effort to optimize process or minimize waste 	<ul style="list-style-type: none"> Low level skills Poor record keeping No knowledge on IP No documented strategies or policies No planned programme on skills upgrade Financial reporting but not much of technical reporting No innovations / identification of innovation

Beef Value Chain

The beef value chain in Kajiado and Narok Counties begins with the rearing of animals at the farm level. Key actors include animal feed suppliers, agro-veterinary (agro-vet) shops, and

extension services. Both Counties have a robust network of well-stocked agro-vet shops sourcing supplies directly from reliable manufacturers and distributors in Nairobi.

Main activities in the beef value chain:

- Animal Rearing:** Local farmers rear animals for slaughter. Agro-vet shops provide seeds, veterinary medicines, and supplements.
- Animal Markets:** A significant market exists in Ilbisil, Kajiado County, which supplies beef to Nairobi slaughterhouses.
- Slaughtering:** Slaughterhouses, mostly privately owned or leased, are used for slaughtering animals. Examples include Enkare Nairigie in Narok County and Kekoonyoike in Kajiado County. Employees, often former owners, bring experience and reinforce operational management.
- Meat Inspection:** County governments oversee beef quality, while veterinary officers ensure sanitary standards through regular inspections.
- Meat Marketing:** Meat is marketed within urban centers and also supplied to Nairobi. Businesspersons and middlemen source meat from Namanga in Kajiado County and Ewaso Ngiro in Narok County.

Technology

- Slaughterhouses:** Utilize basic and traditional tools such as flaying knives, axes, stun guns, halving saws, and hooks for hanging carcasses.
- Utilities:** Water for cleaning is sourced from vendors who get it from boreholes. Electricity is used primarily for lighting, not operations.



Figure 4: Typical slaughterhouses

Types of Waste: Wastewater, blood, hair, dung, and non-edible meats.

- Disposal:** Wastewater is channeled to lagoons, and solid waste is dried for manure. The Kekoonyoike slaughterhouse partners with an energy company in Athi River to utilize solid waste.
- Environmental Compliance:** Slaughterhouses are aware of their waste management obligations. NEMA regularly inspects their premises, although lagoons occasionally overflow during the rainy season, posing environmental hazards.



Figure 5: Waste management at slaughterhouse showing wastewater drainage, lagoon and solid waste

Gaps Identified

Technology Application and Upgrade: There is a need for improved technology and management practices to enhance the beef value chain’s efficiency and sustainability.

Table 2: Showing Technology gaps and Business management gaps for the Beef Value Chain

Technology Gaps	Business management Gaps
<ul style="list-style-type: none"> Lack of modern equipment for efficient operations No value addition – no meat being processed. Meat sold directly to market straight from slaughterhouse Most operations are manual No monitoring of equipment performance No quantification of waste Waste management expensive 	<ul style="list-style-type: none"> Low level skills Poor record keeping No knowledge on IP No documented strategies or policies No planned programme on skills upgrade No financial or technical reports No innovations / identification of innovation

Leather Value Chain

The leather and leather goods value chain in Narok and Kajiado Counties is underdeveloped. The primary activities identified include:

Preservation, Collection, and Marketing

Hides Hides from slaughterhouses are preserved either by sun-drying or using industrial salt. They are then packaged and collected by third-party traders or tanneries for further processing in neighboring counties

Tanning

- ENSDA Tannery** in Narok County, managed by the Ewaso Ngiro South Development Authority (ENSDA), sources hides from Narok and neighboring counties.
- Isinya Tannery** in Kajiado County, a historical facility now being revitalized by the Kajiado County government for vegetable tanning.
- Traditional Tanning:** Local Maasai methods involving de-hairing and sun-drying.

Leather Goods Production

- Shoes:** Produced by Jayp Leather Works in Ewaso Ngiro, Narok County.
- Seats:** Made from rawhide by Treasures of Africa.
- Maasai Artifacts/Ornaments:** Produced by Maasai women in Namanga.
- Various Products:** Belts, bags, and sheaths.

Collection and Processing

- Hides Collection:** Hides are collected by tanneries like AlphaRama in Athi River, Machakos County. AlphaRama contracts and trains personnel in slaughterhouses on preservation and packaging.
- Tanneries:** Besides ENSDA in Narok, there is no operational tannery in Kajiado County. However, traditional methods and small-scale production continue.

Equipment and Production

- Jayp Leather Works:** Utilizes sewing and cutting machines for leather production in Ewaso Ngiro.
- Traditional Methods:** Locals use basic tools for Maasai artifacts and ornaments.

Challenges

- Underdeveloped Infrastructure:** The leather value chain lacks modern facilities and technologies.
- Poor Record-Keeping:** Few enterprises have proper record-keeping or reporting mechanisms.
- Management:** Some enterprises are registered and have basic management structures, but overall, the sector needs improvement.

Recommendations for Improvement

- Investment in Modern Technologies:** Upgrade facilities and introduce modern tanning and processing methods.
- Training and Capacity Building:** Provide training for better preservation, processing, and management practices.
- Enhancing Market Access:** Improve marketing strategies and access to broader markets for leather goods.
- Strengthening Management Structures:** Establish robust management and record-keeping systems across enterprises.

Improving these areas can significantly enhance the leather value chain’s efficiency and economic contribution to the local communities in Narok and Kajiado counties.

Value Chain Actors

The livestock and livestock by-products value chain in Narok and Kajiado Counties involves various actors including farmers, traders, processors, transporters, wholesalers, retailers, and final consumers. Both the National government and County governments play a crucial role in supporting the value chain through regulations, licensing, and provision of infrastructure such as water and electricity.

Beef Value Chain

- Input Supplies:** Farmers (rear animals), transporters, middlemen (link farmers to abattoirs), and meatpackers in slaughterhouses.
- Regulation:** Veterinary officers ensure compliance with Ministry of Health regulations.
- Processing:** No significant value addition; meat is directly channeled to consumers through wholesale and retail butcheries.

Dairy Value Chain

- Input Supplies:** Milk, packaging materials, and ingredients provided by distributors like Techpack, Kadolta Supplies, Thermopack, and Promaco (all based in Nairobi).
- Actors:** Farmers, transporters, regulators, and consumers.
- Regulation and Quality Assurance:** Kenya Bureau of Standards (KEBS), Dairy Board, County government, and Ministry of Health.
- Cooperative Role:** Co-operative members work together in processing and production.
- Donors and Development Partners:**
- Funding and Support:** ENAI Africa, UK Aid, European Union, SNV Africa, and Carlo (machinery, training, licensing).

- **Marketing and Distribution:** Branding of vehicles, shows, workshops, exhibitions, media advertisements, flyers, word of mouth, and partnerships with large cooperatives like Kenya Co-operative Creameries (KCC).
- **Consumers:** Households, schools, and hotels.

Animal Feeds Supply

- **Input Supplies:** Local farmers, millers, and manufacturers such as Pembe Feeds, Fugo, Unga Farm Care, and Coopers.
- **Distribution:** Supplied to farmers through agro-vet shops.
- **Regulation:** Poisons Board and KEBS ensure product quality.

Leather Value Chain

- **Input Supplies:** Accessories, hides, and chemicals suppliers.
- **Production:** Group members involved in leather goods production.
- **Consumers:** Buyers of leather products.

In summary, each segment of the livestock value chain is supported by a network of actors and regulatory bodies, with contributions from donors and development partners enhancing the capacities and reach of these enterprises. Effective marketing and distribution strategies ensure that products reach a wide range of consumers, while regulatory bodies maintain quality standards across the value chain.

Challenges and Recommendations

Challenges that were identified across both Counties and the three value chains, are largely common and therefore similar interventions will be necessary in order to promote growth of the value chains. This is summarized in Table 3 below:

Table 3: Showing Challenges/ Risks and Recommendations/Opportunities across Value Chains

Value Chain	Challenges / Risk	Recommendations / Opportunities
Dairy	<ul style="list-style-type: none"> • Unreliable power supply • Low supply of milk during drought • Diseases and low milk prices • High cost of inputs • Low milk consumption during the cold seasons leads to wastage • High competition from big co-operatives • Lack of modern equipment 	<ul style="list-style-type: none"> • Modern equipment • Wide product range such as milk powder, cheese, butter • Wider market • New energy sources such as solar power
Beef	<ul style="list-style-type: none"> • Inconsistent supply • Lack of modern equipment • Down-sizing of herds during drought • Lack of funding due to low security • Poor animal husbandry • High cost of animals • Low value for injured/sick animals 	<ul style="list-style-type: none"> • Modern equipment • Training of veterinary officers • Training of flayers • Construction of the leather and meat processing plants • Introduction of zero crazing
Leather	<ul style="list-style-type: none"> • Lack of working sites/areas • Lack of funds • Low-quality items / soles • High cost of inputs • No readily available inputs 	<ul style="list-style-type: none"> • Access to foreign market • Working shades • Capacity building in terms of sales and marketing • Access to affordable treated leather
Animal feeds	<ul style="list-style-type: none"> • Logistics- poor infrastructure • Finances • Low-quality raw materials such as maize and other ingredients • Unavailability of ingredients 	<ul style="list-style-type: none"> • Upgrade of production technology • Financial support
Agro-Vets outlets	<ul style="list-style-type: none"> • Insecurity • Bad debts • Low quality of feeds • Short shelf life of products • Seasonal consumption • Delay in supply • Government intervention in supply that is a competitor • Lack of funds • High cost of supplies • Inconsistency in supplies, both quality and quantity 	<ul style="list-style-type: none"> • Consistent and guaranteed supply of products • Infrastructural support • Training/Capacity building • Accessibility to grants and loans • Affordable/price reduction of supplies • Quality control

Conclusion

The livestock subsector plays a pivotal role in the economies of Kajiado and Narok Counties, primarily characterized by pastoralist practices. However, the value chains associated with this subsector remain underdeveloped, with minimal value addition. These value chains are deeply intertwined with cultural practices, including the nomadic lifestyle and gender roles, where the beef value chain is predominantly managed by men, while the milk value chain is largely overseen by women. Seasonal fluctuations in animal migration significantly impact the performance of these value chains.

Numerous areas for intervention exist to enhance the livestock value chains. These include:

1. **Technology Supply/Upgrade:** Providing access to and upgrading technologies essential for livestock production and processing.
2. **Technical Skills Upgrade:** Enhancing the technical skills of actors involved in the value chains to improve efficiency and productivity.
3. **Managerial Skills:** Providing training in managerial skills to effectively manage operations and resources within the value chains.
4. **Record Management Skills:** Improving record-keeping practices to facilitate better decision-making and planning.
5. **Establishing Marketing/Market Linkages:** Developing market linkages and strategies to increase market access for livestock products.
6. **Financing:** Enhancing financing mechanisms to support small and medium enterprises (SMEs) in acquiring technologies and necessary infrastructure.

While SMEs in these value chains possess knowledge of technological applications, there is a need to facilitate access to these technologies. Addressing these intervention areas will contribute to the overall development and sustainability of the livestock value chains in Kajiado and Narok Counties, ultimately benefiting the local communities and economy.

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Figure 6: Some of the products: hand-made leather artifacts and seats made from raw hides in the two Counties

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