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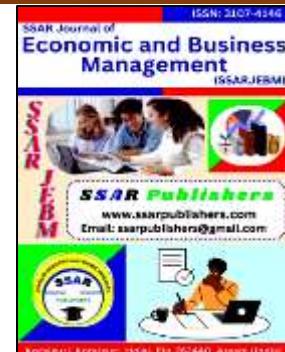
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CONSUMPTION IS THE END, AND PRODUCTION IS THE MEANS – EVIDENCE IN LITERATURE: USING CONSUMER ‘COMMANDS’ TO TRANSFORM LIVESTOCK PRODUCTION AND MARKETING PROCESSES IN PASTORALIST AREAS

By

Corresponding author: Ekiru Francis Anno

Unicaf University (UUM), School of Doctoral Studies, Lilongwe, Malawi.

ABSTRACT: Pastoralists are the predominant owners of livestock in numerous African nations. The marketability and consumption of these livestock resources are significantly impeded by negative perceptions and distrust among consumers, as most livestock are sourced from regions characterized by disease and quarantine. Additionally, climate change is depleting vital natural resources necessary for the production of healthy and productive livestock, while pastoralists continue to employ traditional farming practices that do not meet market demands. The inadequate and restricted animal health and production practices utilized by pastoralists do not meet the anticipated consumption levels in local and external markets, which was the primary focus of the study. The study employed a semi-systematic literature review design, analyzing 480 documents sourced from Scopus, Web of Science, Google Scholar, and ResearchGate databases, applying predetermined inclusion and exclusion criteria, which ultimately yielded 91 documents for inclusion in the study. The prioritized areas for review included pastoral livestock production and marking interventions, livestock production practices, livestock health management, market development in pastoral regions, management of livestock market brokering, empowerment of pastoral communities, and the policy environment and enablers. The study reveals that livestock and products from pastoral regions are significantly unaccepted in local and consumer markets due to quality and safety concerns. Products generated using old methods lack appeal to the contemporary consumer market, which prioritizes quality and safety in its purchases. The study advocates for the modernization of livestock farming practices to align with contemporary market demands, thereby enhancing the robustness, profitability, competitiveness, and sustainability of stakeholders' strategies. It emphasizes the need to address existing and emerging livestock diseases, incentivize livestock commercialization by using science and market as determinants of livestock production practices, create a more favorable business environment for farmers and market participants, transform the knowledge, skills, and attitudes of pastoral livestock farmers and traders, and invest in policies that support the economic transformation of pastoral regions.

KEYWORDS: Business environment, Pastoralism, Animal health, Livestock production, Livestock markets, Livestock policy, Community resilience, Supply, Demand, Livestock commercialization.

INTRODUCTION

Pastoralism is a system of animal husbandry in which domesticated animals, referred to as "livestock", are allowed to graze over extensive

vegetated areas, historically practiced by nomadic populations who migrate with their herds. The production system centers on the herding of

animals, often domesticated livestock including cattle, sheep, goats, donkeys, camels, and horses. Pastoral communities exhibit significant mobility, as they pursue their herds, transitioning between grazing areas and water sources in accordance with seasonal changes or the depletion of local resources. Livestock is integral to pastoralist civilizations, providing sustenance, wealth, and social standing. While pastoralism enhances productivity through innovation and adaptability, diversifies food production for food security, promotes regenerative grazing, and secures the adaptive potential and resilience of livestock, the subsistence nature of pastoral farming systems, which is predominantly based on sociocultural intentions and largely employs traditional practices, has diminished the perceived value of livestock resources produced within pastoral ecologies and systems from the consumer's viewpoint.

Many pastoral regions designated as disease and quarantine zones suffer from inadequate assurances regarding routine disease detection and management, insufficient provision of nutrient-rich forages and feeds for livestock, limited protection against disease-inducing factors and practices such as high mobility, underutilization of concentrates and mineral supplements, and diminished consumer preference for livestock and livestock products from these areas. Conversely, pastoral regions are optimal for the extensive cultivation of livestock resources. The availability of additional means of production and the capacity to adapt pastoralists' livestock farming practices to meet market demands, along with fostering entrepreneurship among livestock farmers, represent a significant paradigm change in pastoral livestock farming. Given that markets prioritize value and safety, pastoralists must reassess and invest in resilient, acceptable, and competitive livestock production methods that account for farmer capacity development, animal health management, value addition, quality standards, market access efficiency, and the establishment of disease-free pastoral ecosystems.

Turkana is one of the greatest pastoral regions in Kenya for livestock production; yet, over 95 per cent of its animal resources are generated through traditional practices and utilised for sociocultural purposes. Local and worldwide markets will not be

persuaded of the worth and quality of livestock resources from such locations until the existing conditions are confronted, necessitating a comprehensive transformation of livestock production operations in accordance with established policy and market norms and practices. This study examines the transformation of livestock farming in pastoral areas to match with optimal conventional techniques that provide high-quality livestock outputs, hence enhancing market demand and consumption of the resulting goods.

2.0 METHODOLOGY

A semi-systematic approach was chosen for this review due to its balanced and adaptable methodology, facilitating a thorough examination of the complex dimensions of livestock production and marketing processes. This approach broadens the literature scope, incorporating both theoretical and empirical studies from diverse disciplines and contexts. The inclusion criteria encompassed research publications published in peer-reviewed journals and studies focusing on livestock production and marketing in the broader Horn of Africa and analogous situations in other regions of Africa. The exclusion criteria encompassed documents unrelated to pastoral livestock farming and marketing practices, those demonstrating overt commercial bias, papers pertinent to the study yet published in popular sources, and documents flagged for plagiarism investigation. The documents sourced from the Scopus, Web of Science, Google Scholar, and ResearchGate databases totaled 480. These were rigorously screened using established inclusion and exclusion criteria, resulting in 91 pertinent documents included in the study, as illustrated in the figure below (Figure 1):

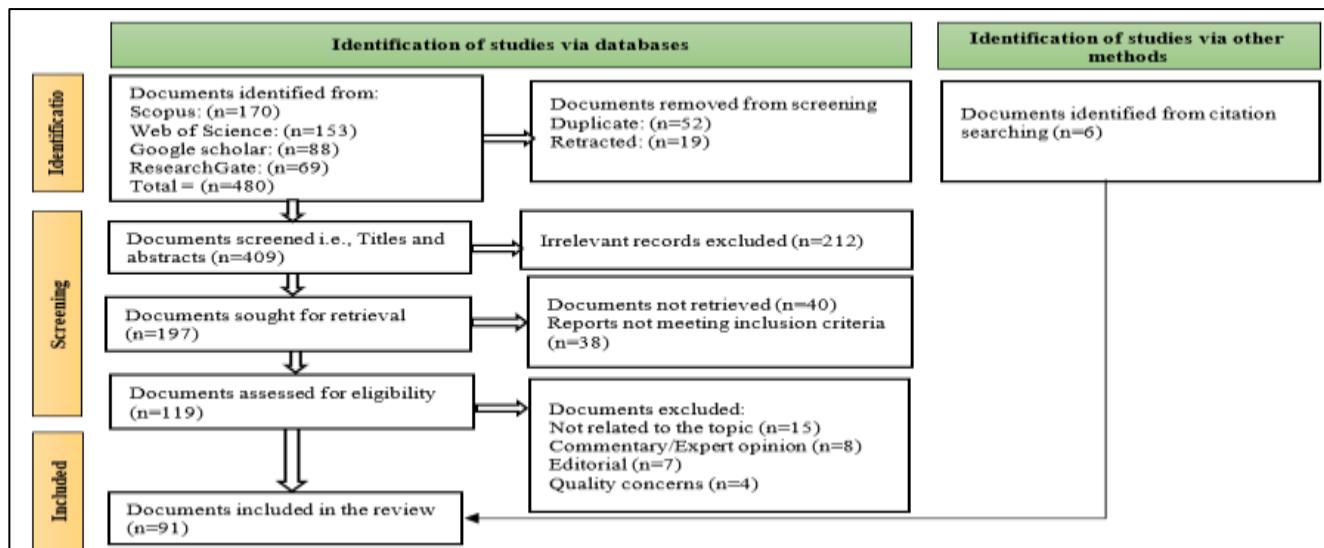


Figure 1: Semi-Systematic review documents selection framework

3.0 LITERATURE REVIEW

3.1 Interventions in Livestock Production and Marketing

3.1.1 Pastoralism and rural livestock farming

Pastoralists are individuals raising livestock on rangelands, relying on herd mobility and family labour. They manage various domesticated animals, with distinct family roles contributing to economic, social, and cultural functions. Pastoralist communities harness traditional knowledge linked to ecological systems to nurture their livestock resources and livelihoods. Pastoralism thrives in specific agroecological conditions, utilizing natural vegetation sustainably in marginal areas unsuitable for crop farming. Pastoralists' and their livestock's adaptation to variable environments includes rotational grazing and governance strategies, making them effective risk managers in challenging physical landscapes. According to Ameso et al. (2018) and Dido (2019), the major objective of pastoralists is to keep a large herd because the size of the herd is a significant factor in determining the social status of the pastoralist with regard to the community.

Mumba et al. (2018) provides further evidence that this intention is supported by the fact that the practice of pastoralists holding a significant number of live animals is not only an expression of cultural factors but also a by-product of the stresses that are exerted by the environment. The number of living animals that an individual

possesses is typically used as a metric for determining the level of power and social authority that they possess within the community. According to Islam et al. (2016), Ethiopia has the biggest livestock population in Africa and the tenth-highest population of any country in the world. According to Yiram, Ahmed, and Mohammed (2017), clan-based institutions play a significant part in the social, economic, and political life of pastoralists. These institutions facilitate governance of pastoral livestock farming operations and utilization decisions.

3.1.2 Food security determination in pastoral areas

There is a limited definition of food security in pastoral settings, with the primary emphasis being placed on interconnections with livestock supply, utilization of livestock resources, and stability of pastoral production systems and livelihoods (Hatab, Cavinato, and Lagerkvist, 2019). For the most part, the literature on livestock in drylands has focused mostly on production and consumption, while disregarding other elements and actors along the value chain, such as markets and marketing activities (Eltholth et al., 2015; Bren d'Amour et al., 2017). This is a significant gap in knowledge.

According to Blummel et al. (2015), the loss of pastoral livelihoods and the threat to food security in developing nations are both attributed to

urbanisation, climate change, and increased food and economic instability. These factors are collectively responsible for the deteriorating situation of livestock farming in pastoral areas. According to the FAO et al. (2020) and Blencha (2016), reducing food loss and waste along the livestock value chain can alleviate pressures on fragile ecosystems. Additionally, this action can lead to a reduction in greenhouse gas emissions, an increase in the efficiency of livestock systems, and an improvement in food security and nutrition.

3.1.3 Livestock industry performances

The livestock industry is one of the subsectors of agriculture and allied activities that is expanding at the highest rate. Despite the fact that livestock farming is frequently cited as a viable option for the growth of household income, there has been very little research conducted on the participation of pastoralists in the livestock trade. This finding is in line with the findings of Seleka and Kebakile's (2017) study on the export competitiveness of Botswana's beef industry. Sarkar (2020) and Enahoro et al. (2019) claim that it is difficult for livestock producers to sell their animals because of a lack of access to land, restricted livestock production resources, and a lack of excellent marketing options. Because of these limitations, it is difficult for pastoralists to engage in livestock activities that are diverse in intention. As a result of the close relationship that pastoral households in the Karamoja cluster region have with their livestock, it has been submitted in a number of studies that livestock trade in pastoralist context is an economic activity that is voluntary undertaken. During times of drought, people are forced to face hardships, and the struggle to make it until the next rainy season becomes something that they must endure. Due to the fact that poor livestock producers have limited bargaining power in the market, they sell their herds at rates that are considered to be throwaway. According to Seleka and Kebakile (2017), credit-channelling agencies need to be strengthened and turned into more active organisations in order to assist firms that are destined for markets in obtaining the economic returns that they want. Livestock play important roles in farming systems in developing countries, helping provide food and income,

draught power, fertiliser and soil conditioning, and household energy.

3.2 Livestock Production Practices

3.2.1 Livestock farming systems

The research conducted by Dido (2019) on livestock production systems, as well as the research conducted by Ameso et al. (2018) on the role of non-livestock sectors in the development of pastoral areas, both demonstrate that there is sufficient investment in non-livestock sectors in pastoral systems. However, there is only a limited emphasis placed on the enhanced production and marketing capabilities of the pastoral economy. Numerous studies, such as Lubungu (2016) and Shibru (2017), demonstrate that organising livestock production interventions with strong ties to markets can assist farmers and local entrepreneurs in entering new markets and becoming more competitive. According to Mwangi, Ngigi, and Mulinge (2015), the establishment of a conventional livestock production culture will transform pastoral production intentions that are heavily rooted in the traditional economy into an embracement of market access capabilities that will accelerate the participation of pastoral communities in the development of the dryland economy.

Stock routes are notorious for a number of negative outcomes, including significant livestock weight loss and even death, as well as a lack of enough feed, water, and resting spots, as well as theft and robbery. Due to the fact that the majority of traders are unaware of the current market prices or the methods by which to measure them, the majority of the time, prices are determined through the process of bargaining (Berihun, 2017; Yiram, Ahmed, and Mohamed, 2017). According to Lubungu, Sitko, and Hichaambwa (2015), the primary component of the livestock trade is livestock farming on a global scale. This is due to the fact that beef and milk products are consumed in a significant number of marketplaces. According to Murendo et al. (2020) research, Zambia is home to two major beef producers in Southern Africa: small-scale farmers and commercial-scale farmers. The various characteristics of these two distinct types of farmers determine the choice of market channel

and prices. When it comes to these results, Sikamwaya and Guiyu (2020) state that a suitable production and marketing strategy for animal resources is for producers to raise their productivity while simultaneously lowering their transaction costs. Both the prices that clients pay and the quantities that are exported are increased as a result of this, which may result in the country gaining foreign exchange.

There are both opportunities and obstacles to market access. Abay et al. (2018) conducted a study on access to markets using livestock production decisions, and Yiram, Ahmed, and Mohammed (2017) conducted a study on pastoralism and clan conflicts. Despite the fact that several studies have shown the effect that access to markets and weather conditions have on livestock production, there is a lack of knowledge regarding whether or not livestock production systems respond to variations in weather risk and access to markets, and how they do so. Ethiopia's value of livestock production and consumption remains well below potential, and this has hindered the overall contribution of the livestock industry to the national economy (Bachewe et al., 2018; Jagnani et al., 2017). This is despite the fact that Ethiopia has vast resources for livestock. Production orientation, livestock portfolio allocation across various livestock types, and investment in enhanced livestock inputs are essential components in the process of establishing a robust connection between livestock production and marketing investments (Jensen, Barrett, and Mude, 2017; Bachewe et al., 2018).

3.2.2 Market adaptability to changing business contexts

As stated by Amare, Mayrotas, and Edah (2018), the decisions that smallholders make about the production and trading of livestock are extremely important in order to effectively adapt to the dynamics of the market and the chances for trade. Gebremedhin et al. (2017) discovered that persons who keep animals in remote areas or in places where the rain is unpredictable are less likely to produce animals for the market, either by selling live animals or dairy products. This is the case regardless of whether the animals are kept for milk or for meat. There are limitations on livestock marketing and exports. According to Eshetu and

Zewudu (2016), the majority of African countries have livestock production systems that are primarily focused on subsistence, and the productivity of these systems is extremely poor. According to the findings that were presented in Addis (2017) and Yiram, Ahmed, and Mohammed (2017), the worldwide restrictions of livestock export production are described as the low productivity of the animals and the absence of production systems that are orientated towards the market.

The research conducted by Mmbengwa (2015) on communal livestock farming and the research conducted by Mbatha (2021) on livestock production and marketing for small emerging farmers both indicate that some of the obstacles that inhibit small-scale African farmers from developing include inadequate production methods and restricted access to markets. Enahoro et al. (2019) and Mbatha (2019) both arrived at the same conclusions in their respective studies. Some people believe that diversifying production and marketing tactics makes it simpler to obtain high economic returns from marketplaces, which in turn helps livestock production and marketing increase and flourish. According to additional data presented by Dixit et al. (2015), poor grazing methods and a lack of health interventions are the primary contributors to the low quality of livestock goods produced. A lack of information, poor infrastructure, cultural issues, and low participation in key parts of the livestock production value chain, such as production, marketing, distribution, and the growth of places where people can buy livestock and livestock products, are also factors that have a negative impact on the productivity of livestock (Mbatha, 2021).

3.2.3 Value of pastoral livestock resources

Frija et al. (2020) and Abay and Jensen (2020) claim that livestock is a store of wealth in many different situations and that it contributes to income and employment at the community and family levels in Africa. They both state that livestock is a source of wealth. It has been demonstrated in the research conducted by Staal, Wanyoike, and Ballantyne (2019) on the topic of how livestock impacts the economy that the production of livestock also has an impact on economic development. This is because the

participation of livestock owners and policyholders in ensuring that productivity is achieved and economic returns are used to improve the lives of those who are dependent on livestock is a significant factor in this development. According to Enahoro et al. (2019), a holistic approach to livestock keeping, in which all husbandry techniques are integrated and well-managed, is the means by which a sustainable development of agricultural production can be realised through policy enablers. For the same reason that Desiere et al. (2018) conducted a study on the production and consumption of livestock products in Sub-Saharan Africa, both now and in the future, it is possible that the production of foods derived from animals may slow down as a result of inadequate policy frameworks.

Livestock farmers in Sub-Saharan Africa are often confronted with significant production and marketing obstacles, which impede them from evolving into successful commercial farmers (Mmbengwa, 2015). According to Ndoro, Muthara, and Chimonyo (2015) and Asante et al. (2016), small rural farmers confront production issues that are comparable to those that their counterparts in southern Africa encounter, giving them a competitive edge in local markets. According to the findings of the Mbatha (2021) study, there is a particular set of rural farmers who are capable of resolving the majority of production issues if they are provided with the information and abilities necessary to take a more holistic environmental approach to rural development.

3.3 Livestock Health Management

3.3.1 Animal health services

A healthy animal grows well and fast enough to reach maturity and good health gives animals a longer economic and productive life. Healthy animals give maximum production or performance, produce good-quality products, are economical and easy to keep, and will not spread diseases to either animals or human beings. Livestock markets contain both advantages and disadvantages. According to research conducted by Knight-Jones et al. (2016), markets for live animals are frequently the epicentres of the spread of various infectious diseases in a wide range of production systems around the world. In Cameroon, the majority of livestock trading is

carried out through a market system. This has led to contributions such as those made by Motta et al. (2019), who state that it is essential to raise awareness of the hazards associated with livestock trade systems and markets in order to develop interventions that are both targeted and based on evidence.

Egbe et al. (2016) state that there is a pool of infectious diseases that are prevalent in all market classes. The implication of this is that the risks of disease are comparable at every stage of the supply chain for animals. Because of their key position along the livestock supply chain, animal markets are also good places for gathering information, communicating, and minimising disease risks and their repercussions (Egbe et al., 2016; Little, Tiki, and Debsu, 2015). This is because animal markets are located in areas where disease prevention, control, and management are particularly important. However, as Motta et al. (2019) and Muguniere et al. (2016) discovered in their research on the factors that influence the prices of livestock and the role of the private sector in the livestock trade, there are still a great deal of things that stakeholders and policymakers who are based on livestock do not know about animal markets and how they impact public health. The technical restrictions that are placed on feed and nutrition, genetic structure, health and disease issues, producer incentives, land tenure systems, marketing institutions, and input-providing institutions are addressed and further decreased through the implementation of efficient policy frameworks (Desiere et al., 2018).

3.3.2 Scale of market access for pastoral enterprises

According to Molotsi et al. (2017) and Manyeki, Balazs, and Kano (2021), the small herd size, diseases, poor grazing, high mortality rates, poor extension services, inadequate market information, insufficient provision of marketing infrastructures such as marketing yards, inadequate dipping services, and cultural practices are the factors that determine the scale of market access in the Southern Africa region and other production contexts that are comparable in Sub-Saharan Africa. The majority of farmers in Zambia and Botswana are negatively impacted by the veterinary cordon fence. This is due to the fact that

they are unable to sell their products anywhere throughout the country due to restrictions that have been implemented as a result of high disease rates and the implications on public health (Eshetu and Zewudu, 2016). A number of factors, including the prevalence of contagious and killer animal diseases, recurrent drought, low nutritional standards, inadequate marketing infrastructure, lack of an adequate marketing information system, poor product quality, and inadequately skilled manpower, are the primary factors that impede the production of high-quality livestock products (Togarepi, Thomas, and Bankono, 2016; Addis, 2017).

3.4 Livestock Markets Development and Functionality Management

3.4.1 Accrueable benefits from livestock resources

The objective of markets is to facilitate the acquisition of livestock for a number of purposes, such as breeding, fattening, gifting (marriage, parties, and fines), or slaughtering and eating (Berihun, 2017). Markets connect producers and customers by providing consumers with the opportunity to purchase livestock. Studies conducted by Abebe, Tadie, and Taye (2018) and Shabana and Matanda (2019) on market factors and determinants of livestock commercialisation define a livestock marketing system as a collection of channels, intermediaries, and activities that facilitate the transfer of goods and services from producers to consumers. This is in contrast to the definition of a marketing system, which can be defined as the collection of product channels, market participants, and business activities that facilitate the transfer of goods and services from producers to consumers. Additionally, according to Ayele (2019), marketing encompasses all of the commercial operations that are associated with the movement of commodities and services from the point where they are initially manufactured to the point where they are first utilised.

On the other hand, Roba et al. (2019) contend that livestock traders are involved in a wide range of activities, such as the distribution, further transformation, and promotion of livestock and livestock products across a variety of market categories. According to Berger (2015), marketing is related to a variety of functions that add utility,

or value for clients, to farm production. These functions include time utility, form utility, and location utility, which are all examples of marketing functions. According to Isako et al. (2019) and Ryschawy, Desenhaus, and Bertrand et al. (2017), market access is a crucial component in the market participation and risk management of pastoralists. This, in turn, results in a higher rate of selling animals and livestock products. Marketing has a more significant role in adjusting herd sizes during the drought in high-market access areas where pastoralists participate in livestock markets, but only in relatively modest amounts and at varying rates over time (Roba et al., 2019). This affects herd sizes in locations where there is better access to markets.

3.4.2 Purposive livestock selling intents

According to Roba et al. (2019), families in pastoral areas sell livestock in order to meet their economic demands for things like food and clothing, as well as for expenditures related to education and medical care. In accordance with the findings of Isako et al. (2019), there is a transportation system that involves trekking for the bulk of animals to be transported to primary, secondary, and terminal markets. According to Isako et al. (2019) and Shabana and Matanda (2019), wealthy traders transport live animals to feedlot operators, export abattoirs, and large markets by means of trucks. The performance of livestock traders in various market sectors is hindered by a variety of socioeconomic issues, including but not limited to culture, religious traditions, beliefs, war, poverty, and limited business capital start-ups (Asfaw, 2018; Abebe, Tadie, and Taye, 2018). Population growth, urbanisation, income growth in developing countries, growing urban centres, international influences (globalisation and more liberal international trade), and technological advancements in the production, communication, and transportation sectors are the primary drivers of livestock and livestock product consumption (Shabana and Maranda, 2019; FAO et al., 2020).

According to Shabana and Matanda (2019), Asfaw (2018), and Berihum (2017), there are issues with marketing livestock due to the fact that there is not enough feed, there is not enough water, animals become ill or die, and there are not enough

veterinarians. All of these factors contribute to the slow expansion of markets. According to Aggrey, Kuganza, and Muwanika (2018) and Kembe and Omondi (2018), a livestock marketing system that is effective has a significant and favourable impact on the commercialization of livestock. As per findings in Dido (2019) and Kassa, Anshiso, and Fantahun (2017), small-scale livestock trade in livestock-producing areas and primary markets needs to be efficiently organized to prevent exploitation and the emergence of rivalry during trading. This is because pastoralists sell their livestock to other people through marketplaces. It has been demonstrated by Aggrey, Kuganza, and Muwanuka (2018) as well as by Kembe and Omondi (2016) that the cultural behavior of livestock keepers and traders has a positive and significant effect on the commercialization of livestock. This is due to the fact that livestock are kept and/or sold in large numbers in order to satisfy social, cultural, and economic needs.

3.4.3 Perception and consumption of products from pastoral areas

The absence of an efficient grading system, the market information system, the promotional activities, significant supply-related constraints, the prevalence of diseases, and traditional production systems are all factors that hinder domestic consumption, official exports, and high demand for animals by export abattoirs in many livestock markets in Africa, as stated by Bachewe et al. (2018), Kibona and Yuejie (2021), and Addis (2017). Evans et al. (2017) state that the marketing of livestock is significantly impacted by a number of factors, including the illicit export trade, the absence of marketing infrastructure, competition, recurrent bans, mobility limitations, and the absence of port facilities. The availability of livestock transportation infrastructure, upgraded slaughterhouses, livestock resting places, as well as storage and quarantine facilities at appropriate sites, as stated by Togarepi, Thomas, and Bankono (2016), are necessary in order to promote efficient livestock trading. It is recommended by Thomsen et al. (2019) and Mebrate, Tewodros, and Derbie (2020) that the government's ability to control the illegal trade of live animals and products across borders will create sanity in both local and cross-border markets. This is because of the difficulties

that are associated with export and cross-border trade.

In Sub-Saharan Africa and other similar contexts throughout the world, the culture of the pastoralists has an impact on their livestock production and trade practices. These undertakings include the establishment of selling prices and the delivery of live animals to the market (Mumba et al., 2018; Shibru, 2017). Pastoralists, on the other hand, opt to sell their animals when there is a need for income (Abebe, Tadie, and Taye, 2018). This is the case in any country where traditional farming practices are utilized. The lack of adequate market infrastructure leads to high transaction costs and a variety of snags in gaining access. Even though pastoralist communities in eastern Africa and the Sahel region of western and northern Africa have a large number of livestock, they struggle to produce food and make a livelihood (Mbatha, 2021; Asante et al., 2016).

3.5 Livestock Business Environment and Risks

3.5.1 Stability of livestock business in pastoral areas

Pica-Ciamarra et al. (2015) conducted research on the topic of peace and security, and their findings revealed that the majority of clan conflicts were caused by the killing of live animals, acts of vengeance, and injuries. In pastoral and agro-pastoral regions, the majority of inter-ethnic and intra-ethnic conflicts have been caused by competition for land, a significant increase in the number of modern guns, and an increase in poverty with very limited access to education, health care, economic activities, and safe water, among other necessities (Burke, Myers, and Jayne, 2015). These factors have contributed to the rise of violence in these regions. According to Jagnani et al. (2018), Dido (2019), and Isako et al. (2019), pastoral conflicts tend to arise during dry seasons. This is because increased mobility, desperation, and the urgent need for livestock production resources both locally and over the border are all factors that contribute to the outbreak of these conflicts.

It is claimed in Yiram, Ahmed, and Mohammed (2017) that the clan conflict is not only caused by socio-economic and geo-political variables, but it is also caused by the traditions or culture of the

society. Both Pica-Ciamarra et al. (2015) and Little, Tiki, and Debsu (2015) provide evidence in support of this claim by stating that problems in livestock marketing, such as repeated raiding, revenge, counter-revenge, and intra-clan conflicts, impede the free flow of live animals and products from the location where they are manufactured to the location where they are intended to be sold. According to Yiram, Ahmed, and Mohammed (2017), ethical systems of livestock trade have the potential to make livestock production and marketing more viable, productive, market-orientated, competitive, and sustainable in a variety of farming systems, including agro-pastoral, mixed farming, urban and peri-urban farming, and specialised intensive farming systems.

Southern Africa presents a number of opportunities for livestock marketing. As a semi-arid country that is abundant in natural pastures, Namibia is an ideal location for substantial livestock ranching due to its agricultural potential. As a result of the severe environment and livestock diseases that are prevalent in the country, such as foot and mouth disease (FMD), contagious bovine pleuropneumonia (CBPP), or lung sickness, animals are required to be detained for a period of 21 days prior to being slaughtered (Togarepi, Thomas, and Bankono, 2016). There are a number of factors that make it challenging for livestock entrepreneurs to reach export thresholds, including low pricing on the market, a lack of information about the market, and farmers' failure to produce enough healthy livestock to meet market needs. Addis (2017) and Melesse and Cecchi (2017) both agree that these factors contribute to the difficulty of reaching export thresholds.

3.5.2 Risks, mitigation and management capacities

According to Clark et al. (2017), improper management of animal waste can have serious environmental consequences. These consequences include the release of animal pathogens, the release of odours, the attraction of rodents, insects, and other pests, and groundwater and surface water runoff contamination, among others. According to Bogard et al. (2017) and FAO (2020), conducting additional study on the process of decreasing waste and losses in livestock value

chains can assist developing nations in producing livestock in a manner that is more environmentally friendly while simultaneously lowering the amount of risk and uncertainty involved. According to the findings of Melesse and Cecchi's (2017) research on the use of market experience for risk aversion, pastoralist households that are located in close proximity to markets are more likely to engage in market-orientated livestock production and to make use of contemporary livestock inputs.

As a further point of interest, Jensen, Barrett, and Mude (2017) state that households that reside in regions where the weather is more uncertain are less likely to grow livestock for the purpose of selling it, are more likely that they will grow livestock for the purpose of saving money and obtaining insurance. Those households that live in areas with weather conditions that are variable and unpredictable are more likely to engage in livestock production as a precautionary measure and insurance against shocks (Pica-Ciamarra et al., 2015; Kibona and Yuejie, 2021). This is because the use of modern livestock breeds is positively related to the use of modern livestock farming technologies. Kibona and Yuejie (2021) and Sang, Nyein, and Soojung (2016) state that market involvement by market stakeholders is essential to providing improved income, food security, and sustainable livestock supply and demand in markets. This is the case since market participation is the key to assuring economic growth.

It is common knowledge that farmers in both traditional and conventional livestock markets have a low level of engagement during market events. A low volume of sales, low education levels, and inadequate access to credit and veterinary services are the primary issues that limit market involvement in Tanzania and Kenya's rural markets (Kibona and Yuejie, 2021). These variables affect the market participation of rural farmers. Age, gender, income, membership in cooperatives, access to market information, and agricultural experience are all factors that can be used to predict market involvement, as stated by Kgosikoma and Malope (2016). Stephen et al. (2018) discovered that the establishment of strategic cooperatives assists farmers in locating profitable marketplaces, which in turn can increase market performance and access (Esmael, Bekele,

and Ketema, 2016). This is due to the fact that cooperatives serve as a communication channel for farm loans, the establishment of prices, the exchange of information regarding the market, and training and education regarding commercial farming.

3.6 Broking and Management in Livestock Markets

3.6.1 Role of brokers in livestock markets

According to Manyeki, Balazs, and Kano (2021), brokers are significant market actors because they act as mediators for formal and informal transactions within and across livestock markets making it easier for commodities and services to flow. In the borderlands of Kenya and Somalia, for instance, brokers are key characters in the cross-border selling of livestock. Furthermore, the analysis of broking produces crucial insights into the informal economies that exist in the borderlands of Africa (Parry-Hanson et al., 2019; Manyeki, Balazs, and Kano, 2021). Brokering helps to legalise Somali livestock as it moves from southern Somalia, where there are few restrictions, to central and coastal Kenya, where there are more rules (Parry-Hanson et al., 2019). This is especially true in the Garissa area, which is located in the northeastern Kenyan livestock marketing region.

According to Zhou and Staatz (2016), livestock brokers facilitate business transactions that are essentially interethnic. Furthermore, within cross-border livestock trading networks, sellers and buyers are frequently separated by long distances and may be based in different trade corridors that are characterized by different institutional environments and exposures to risk. The research conducted by Holm et al. (2019) on corridors of trade and power, as well as the research conducted by Martijn and Leynseele (2018) on studying development through the lens of broking, both indicate that brokers play significant roles in livestock trade networks. This is because the long distances that exist between the source markets and the destination markets make it difficult for producers to obtain market information. Brokers are responsible for establishing pricing with other traders and ensuring the safety of producers operating within border markets that are governed by informal regulations (Golub, 2015). According to the findings of Martijn and Leynseele (2018)

and Tothmihaly (2018), brokers are responsible for providing market information regarding marketplaces that are located in faraway locations.

3.6.2 Information and market access enablers

According to the findings presented in Vrankic and Krpan (2017), information asymmetry is an issue not only in the selling of livestock but also in businesses all over the world. This creates a gap or "structural hole" that brokering in trade networks has to fill. Therefore, the role of brokers as mediators between trading partners that do not meet face-to-face should be emphasised because of the information asymmetry that exists in the livestock marketing industry. According to Willet et al. (2019), traders begin their careers as brokers and eventually transition into trading roles. As a result of this, Golub (2015) argue that traders have sufficient knowledge regarding livestock brokering. According to Wen-Chi and Sicelo (2019), market participation is a more effective method for ensuring enhanced income and food security among livestock caretakers.

Kibona and Yuejie (2021) and Esmael, Bekele, and Ketema (2016) suggest that the government should direct activities related to livestock marketing by means of regulatory frameworks, the coordination of extension services to provide producers and traders with training on commercial farming, pricing, and the organization of livestock marketing, and the diversification of livelihoods for pastoralists. Since the collapse of the central Somali state in 1991, the trade of Somali livestock has been increasingly reoriented towards terminal markets in central and coastal Kenya. This has been made possible by the more recent liberalization of trade in Kenya (Little, Tiki, and Debsu, 2015; Njiru et al., 2017). According to Evans et al. (2017), the largely informal cross-border commerce (ICBT) has been responsible for the development of local livelihoods and the generation of government revenues in Kenya. This is because informal transactions and formal regulation overlap in the supply chains of livestock that is fed by Somalia. According to Ndoro et al. (2015), the marketing protocol can be strengthened even further by investigating the connection between the changes that have occurred in the political economy of international livestock trading and the unforeseen impacts that

decentralization has had on the administration of livestock supply chains.

3.7 Pastoral Communities Empowerment

3.7.1 Pastoralists' capacity-building strategies

The incorporation of adult literacy programs in pastoral production systems, the establishment of proactive livestock development directorates, and the grounding of livestock marketing in business models and strategies are all important ways to make local and regional markets function more effectively, according to Anno and Pjero (2021), Little, Tiki, and Debsu (2015), Ameso et al. (2018), and Dido (2019). All of these authors list youth and women's participation in livestock trade as important ways to improve the functioning of these markets. Markets are characterized by the supply and demand of livestock and products. It has also been suggested by Shibu (2017) and Kelly et al. (2016) that training farmers on the appropriate breeding stock and local breed improvement, increased investment in livestock health management, dissemination of price information, and beef quality improvement are more urgent now if small-scale farmers are to move out of poverty through market access (Ameso et al., 2018).

Lubungu, Sitko, and Hichaambwa (2015) and Fornari et al. (2016) both made the recommendation that there is a need to invest in marketing centres in order to lower transaction costs across the countries and regions. This recommendation was made in order to reduce the overall cost of doing business. According to Aggrey, Kuganza, and Muwanika (2018) and Ameso et al. (2018), governments, community producer groups, and other interested parties should collaborate in order to construct infrastructure for livestock production and marketing. Additionally, they should conduct research that can assist in the formation of policy and strategies for making the most of livestock value chains in various markets. This will ensure that the supply and demand requirements of markets are substantially satisfied.

3.7.2 Management of small and medium sized livestock enterprises

According to the findings of Enahoro et al. (2019), actions within the livestock sector that are not

properly managed may result in the loss of economic resources that have been invested in the industry. These benefits are in addition to the significant direct economic effects that livestock and foods manufactured from animals have (Hatab, Cavinato, and Lagerkvist, 2019). Despite the fact that livestock is essential for ensuring food and nutrition security, equal rights for women, and gender equality, these benefits are not the only beneficial aspects of livestock. According to Enahoro et al. (2019), policymakers and investors in low- and middle-income countries are confronted with a number of complicated choices involving the policy and investment decisions that are required to accommodate the anticipated growth in demand for products derived from animal sources. According to Clark et al. (2017) and Sarkar et al. (2020), nations that already have a livestock industry ought to give some thought to the possibility of assisting small and medium-sized farmers and value chain contributors in capitalising on the numerous opportunities that livestock provides, thereby becoming more profitable and market-oriented.

3.8 Policy Environment and Enablers

3.8.1 Regulations for the livestock sector in pastoral areas

According to Kgosikoma and Malope (2016) and Cheteni and Mokhele (2019), governments and civil society organizations that invest in policy development and implementation strategies will strengthen regulations that govern livestock production, trade, and consumption of a variety of products. This is an argument that is made in order to promote the viability of livestock trade among pastoral communities. Policy and regulatory frameworks will organise and facilitate the governance of various livestock market segments, which will affect cross-border markets (Shibu, 2017). This will be accomplished by focusing on the livestock marketing agenda through its effective implementation. According to Kgosikoma and Malope (2016), this outcome demonstrates how essential it is to cultivate domestic and export markets in order to alleviate poverty, increase the amount of money that is brought in by livestock farmers and traders, and maintain the positive trend towards more market orientation activity.

According to the findings of Fornari et al. (2016) and Mousley et al. (2015), animal markets serve a socioeconomic purpose; however, the organisation and management of animal markets can be structured in a way that helps mitigate risks to animal and public health throughout the livestock supply chain. A study that was conducted by Mousley and colleagues (2015) found that the exportation of livestock from Somaliland to countries located on the Arabian Peninsula constitutes a significant portion of the economy and serves as the primary source of foreign currency for Somaliland. According to Little, Tiki, and Debsu (2015), the majority of communities in the Horn of Africa region that raise livestock rely on international commerce as their primary means of subsistence. Additionally, international trade serves as a source of financing for businesses that sell livestock as well as those that do not. Although drought does not have an effect on the number of small ruminants in fair rangeland ecosystems, it does have an effect on the quantity of livestock, and the establishment of quarantine stations has a significant impact on the number of animals that are exported (Napp et al., 2018; Handstaff, Hasler, and Rushton, 2015).

3.8.2 Markets for livestock and the direction of policy

In the nations and regions that are involved in the livestock trade, the size of the trade is influenced by a variety of factors, including institutional and policy considerations. According to Little, Tiki, and Debsu (2015) and Motta et al. (2019), market solutions are developed through the implementation of required regulatory, institutional, and policy reforms, in addition to the participation of stakeholders. In a similar vein, Mousley et al. (2015) and Molia et al. (2016) say that the international market protocol is the determining factor in defining the effectiveness of internationally traded commodities and services that are made possible by the free movement of goods and services. Extreme competition as a result of a lack of formal marketing, systemic imbalances in supply and demand, ineffective management of non-market forces, and increasing dynamics of livestock production and marketing as a result of social, economic, and political instability in the market region are all factors that

have an impact on the performance and diversity of livestock trade (Mugunieri et al., 2016; Napp et al., 2018; Kelly et al., 2016).

Togarepi, Thomas, and Bankono (2016) and Burke, Myers, and Jayne (2015) state that in order to address the effects of market development obstacles, the government must formulate policies, laws, and rules; issue quality control directives; establish quarantine stations; promote and grow both domestic and international markets; it must collect, analyse, and share market information; encourage and carry out market research; and it must support and encourage the promotion of the livestock value chain. According to Kembe and Omondi (2016) and Aggreyea, Kuganza, and Muwanika (2018), there is a need for increased stakeholder engagement and partnerships to be established and strengthened in order to assist pastoralists in comprehending the market, revitalising the private sector, lobbying for the development and implementation of livestock breeding policies, supporting the improvement of market access, strengthening research, and assisting in the standardization of livestock agenda interventions and development prospects. The importance of policy as a leading determinant of growth, development, and the accomplishment of agricultural goals has been the subject of a great number of research and publications in the agricultural sector.

3.8.3 Relational livestock production factors and market potential

Abay and Jensen's (2020) research on access to markets and inhibiting hazards reveals that the relationship between the production of animal-source foods and economic development in low- and middle-income countries is complex, works in both directions, and acts at multiple levels. This is the conclusion that can be drawn from the findings of the study. In addition, Iannotti (2018) discovers that countries with higher levels of wealth typically have a larger livestock sector. The reason for this is that livestock makes a greater contribution to the people's social and economic well-being as well as to the agricultural GDP of the country; a strategy for achieving both profitability and competitiveness. Increasing the supply of products derived from animals through more externally directed paths, such as imports,

industrialization, and alternative products, would have less influence on economic development and growth in general (Abay and Jensen, 2020).

For policy to improve, it should concentrate on lowering the obstacles that stand in the way of livestock development. Inadequate investments, insufficient recurrent spending, low investments in research, a weak infrastructure and economic environment, and a lack of competent knowledge and skills are some of the obstacles that stand in the way. According to Zhou and Staatz (2016) and Frija et al. (2020), these issues can be resolved by developing agricultural strategies that are not only efficient but also high-yielding and competitive. According to Thorat and Madheswaran (2018), when it comes to ensuring sustainable livelihoods in rural areas, it is essential to diversify both employment and income portfolios. According to Kumar et al. (2018), the livestock industry has the potential to play a significant part in the alleviation of poverty, the augmentation of income, and the reduction of risk for low-income rural communities.

Mbatha (2019), SCA (2018), and Bachewe et al. (2018) state that the willingness of the government and private sector to take the lead in making the necessary policies and helping to put them into place is a crucial factor in determining whether or not a policy can be implemented to address the issues that are associated with the export and import of live animals and meat products. These issues include supply issues, the spread of disease, traditional production systems, illegal export trade, and a lack of infrastructure. According to Manyeki, Balazs, and Kano (2021), as well as Sikamwaya and Guiyu (2020), it is possible to overcome external production and marketing challenges by implementing strong and well-applied agricultural policies. These challenges include competition, quality standards, financing, repeated bans and other types of market restrictions, inadequate livestock production and marketing facilities, and well-defined programmers and management areas.

4.0 RESULTS AND DISCUSSION

4.1 Pastoralism and Pastoral Coping Mechanisms

From the study, traditional knowledge determines livestock farming practices in most pastoral areas,

and the impact of climate change, risks and uncertainties necessitates initiatives to restore pastoral agro-ecologies, thus making them resilient and productive throughout seasons. To ensure the viability of the pastoral farming system, building farmers' and traders' adaptive capacities, relating herd sizes with land carrying capacities and expanding the scale of production activities are required. Intra-community peace and resource-sharing agreements are vital for maintaining livestock productivity, and direct support provided to individual farmers and livestock producer groups will restore pastoral livelihoods and reduce losses. A viable pastoral production system should result in an adequate supply of livestock resources for sale in different potential markets. This is possible if livestock trade is made mandatory, not voluntary as it currently is. Due to hardships associated with pastoralism, private sector-led safety nets such as livestock insurance are vital for the protection and recovery of livestock assets and investments.

4.2 Livestock Production and Productivity Enhancement

The study identifies that improved livestock production practices are essential for optimising market functionality for pastoralists, and promoting investments in non-livestock industries will diversify their livelihoods, enhancing resilience during challenging periods. Robust links between pastoral production systems and markets, the implementation of evidence-based pricing for livestock products, and a long-term strategy to overcome barriers to market access will incentivize livestock production practices in pastoral regions. Restoring rangelands to enhance their viability for increased livestock production is a strategic initiative aimed at augmenting forage availability and ensuring sustained productivity throughout the season. Furthermore, linking livestock production regions with suitable markets, managing production dynamics influenced by environmental conditions or market performance, and educating pastoralists and traders about the intrinsic value of their livestock resources should constitute an integrated strategy for livestock farming in pastoral areas. This approach aims to encourage family farmers and producer groups to adopt efficient and productive

livestock farming practices that are attuned to environmental and market demands.

4.3 Livestock Health Management

Healthy animals possess an extended economic and productive lifespan and are essential to the health and wellbeing of both individuals directly reliant on livestock and consumers of livestock goods in the marketplace. The study recognises animal production areas and market yards as sites for disease transmission. Regulating markets not to spread diseases, is intended to be fundamental to the livestock farming system. To attain this objective, it is essential to enhance awareness of animal health and production among livestock farmers and traders, while effectively managing a reservoir of infectious and prevalent diseases in pastoral regions through optimal strategies and practices. This will transform pastoral areas and markets into disease-free zones, thereby fostering market and consumer confidence in livestock resources from these regions. Furthermore, advocating for the One Health plan by incorporating health protocols into livestock production and marketing processes, as well as augmenting the presence of health personnel in livestock production catchment regions and markets, will facilitate the enforcement of health-sensitive practices in livestock endeavors.

4.4 Incentivizing Livestock Commercialization

Markets facilitate the connection between producers and traders. This outcome is maintained if the emphasis on production and marketing prioritises the development of healthy and productive livestock resources within a commercialization framework aimed at establishing sustainable markets. To safeguard livestock commercialization processes, pastoralists and development partners must enhance the value and usability of livestock products generated in pastoral regions. This is achieved through established livestock holding facilities and feedlots, secure transportation services and trade corridors, and a robust livestock off-take and trading system. The sustainability of market links is governed by a system that integrates livestock markets to facilitate the seamless movement of livestock resources from catchment areas. Safeguarding local traders from

exploitation by high-capital traders, who sell livestock in bulk to meet economic demands; implementing a standardized livestock grading system; investing in market promotion activities; and preventing illegal trading in livestock marketing will transform livestock trading into a year-round endeavor and guarantee sufficient livestock supply to target markets.

4.5 Livestock Business Environment Management

In pastoral regions marked by resource-based conflicts, peace and security are essential for the prosperity of the livestock business. Promoting peace and security necessitates the control of land competition, the alleviation of illiteracy, and the reduction of poverty. Pastoralists should be informed about the issues associated with dry seasons, including heightened mobility, to implement measures for sustaining livestock production and facilitating internal and cross-border commerce. The identification and management of socioeconomic and geopolitical factors, the enforcement of ethical livestock trade systems, and the administration of livestock supplies through effective and competitive aggregation models foster an environment conducive to both internal and cross-border trade, maximizing benefits across all market categories. Proper waste management in animal-producing areas and markets warrants consideration. This is crucial for the integration of biosafety regulations in livestock husbandry and commerce. To enhance livestock marketing in pastoral regions, it is essential for all traders to be registered in local trader associations and establish business networks, ensure that every market functions efficiently and profitably, and engage brokers in both informal and formal markets for mediation. These initiatives will realign pastoral livestock production activities towards the market, promote stability in cross-border livestock commerce, and assist in managing the political economy of international livestock trade.

4.6 Pastoral Communities Empowerment

The study highlights the significance of adult literacy programmers and the training of pastoralists in suitable livestock breeding systems and stock management methods, given that

illiteracy rates in most Horn of Africa countries exceed 70 per cent. Investing in livestock production and marketing in trading centers, which serve as hubs for farmer training and livestock commerce, is favored for linking livestock farming regions with rural and peri-urban areas. Empowering community producer groups and market associations across various market categories, while prioritizing animal nutrition, will enhance community capacities to produce commercial livestock feeds and concentrates, as well as provide training on diverse animal husbandry technologies. This approach will elevate community engagement and participation in livestock productivity, improve the performance of local markets, and enhance comparative competitiveness.

4.7 Policy Development and Application

Government and private sector entities must fund livestock development policies that take into account the prospects of the drylands livestock industry in order to enhance and maintain pastoral production and marketing systems. In order to increase the wellbeing of farmers and traders interacting in those marketplaces, the policy should also incorporate regulation of various livestock market categories. In order to structure livestock production and marketing, establish routes for foreign exchange, and establish sustainable supply and demand connections in prospective market jurisdictions, policy foundations are essential. The institutionalization of livestock production and marketing systems, the enforcement of quality control regulations, the elimination of market rivalry and the formulation of competitive strategies, the prediction of livestock business ventures' profitability and sustainability, and the support of stakeholders in managing the effects of non-market forces are all made possible by policy.

5.0 CONCLUSION

The study concludes that livestock production processes, which are the means to the end, i.e., the attainment of quality and market-accepted livestock products for sustainable consumption, are the most wanting components of livestock farming in pastoral areas. Pastoralism, which is the main mode of production, is characterized by

hardships brought about by climate change, unpredictable rains and prolonged droughts, diminishing rangelands and biodiversity, livestock farming based on sociocultural intents and practiced using traditional methods, and limited conventional and improved knowledge, skills and practices on animal husbandry among many pastoralists. The pastoralists' coping mechanisms for pastoral farming challenges are also predisposing factors to many challenges affecting livestock and pastoralists' wellbeing, such as high mobility leading to people and animal stress, migration to other places in search of better pasture and water leading to the spread of diseases and pests, insecurity and the inability of pastoralists' children to attend school.

Limited consideration of the role of markets in pastoral livestock farming makes pastoralists not interested in creating value in their livestock products for the target market and for economic gains. Lack of this concept defines the pastoralists' livestock economy as largely traditional, and opportunities to access and sustain marketing of livestock products to the delight of consumers remain oblique! The criticality of these elements defines the means towards livestock farming that is anchored on the market. Increasing the consumption of livestock products means pastoralists transforming their farming practices to facilitate the development of the required supply and demand at different market categories. To achieve this outcome, the theory and practice of livestock farming in pastoral areas should be modernized and made precise, with pastoralists themselves, both farmers and traders, taking the lead.

Changing consumer behavior towards livestock and products created from pastoral areas involves pastoralists' and development partners' commitments towards improving livestock farming practices, managing scarcity of production resources for season-long and competitive pastoral livestock farming, investments in making livestock production conventional and guided by the quality required by the market, managing health issues critical for ascertaining the safety of livestock products, and making markets in pastoral areas functional and well-coordinated.

Improving the business environment to facilitate public-private sector development partnerships, managing competition by limiting tendencies of competitive rivalries, empowering community capacities to nurture healthy and productive livestock resources and alternative livelihoods, and supporting policy implementation towards transformation of pastoral production systems and competitiveness of livestock enterprises in local and external markets can help build consumer trust. Consideration of all components that lead to better livestock and livestock products and managing consumer market needs will definitely make comprehensive livestock production processes the means, while consumer willingness to purchase products from pastoral areas will be the end goal!

6.0 RECOMMENDATIONS FOR APPLICATION

- Livestock production processes are essential for attaining high-quality, market-accepted goods in pastoral regions. Local and national governments, along with development partners, should invest in enabling every element of the livestock production value chain. This move will cultivate trust in the market and among the broader consumer base regarding the worth of items. Consequently, demand for pastoral livestock products would rise.
- Pastoralism encounters difficulties due to climate change, droughts, diminishing rangelands, and dependence on traditional agricultural practices. Enhancements in pastoralism can be achieved by implementing sustainable land use practices, managing the scarcity of livestock production resources, promoting peace and security, developing adaptive and resilient capacities among pastoralists, and regulating herd sizes; these are critical areas for ensuring the sustainability of pastoralism, the most appropriate form of livestock farming in arid regions.
- The significant mobility of pastoralists results in stress, the transmission of diseases, and interruptions in pastoralists children's schooling. Frequent mobility restricts pastoralists' participation in markets, so constraining the economic potential of their livestock resources. Implementing strategies such as systematic grazing, the establishment of ranches and

enclosures for forage production during dry periods, rangeland regeneration through diverse pasture and shrub biodiversity for livestock, and educating pastoralists about the risks associated with mobility will not only stabilize nomadic pastoralists but also enhance opportunities for organizing livestock production and developing pastoralist territories.

- Transforming livestock production techniques is crucial to satisfy market needs and consumer expectations, and the modernization of these practices should emphasise the participation of pastoralists and traders. The measures to achieve this result should prioritise pastoralists and livestock traders, ensuring that knowledge and skills are effectively utilized to foster desired positive behaviors and responses from the target groups.

- Enhancing livestock farming entails resolving health concerns, optimizing market functionality, and investing in competitive production methodologies. Livestock development partners must devise measures to eradicate or sustainably manage the widespread livestock diseases that have long rendered numerous pastoral regions as disease zones and quarantined areas. Emerging and other disease threats in pastoral areas must be addressed through strategies including bio surveillance, early warning systems, contingency planning, animal health services infrastructure within a functional One Health framework, and accessible yet decentralized human resources.

- Pastoralists necessitate a comprehensive understanding of fundamental livestock market dynamics, specifically supply and demand, and their implications within the livestock sector. Any supply of products not intended for markets is a subsistence economy, yielding low socioeconomic advantages. Enhancing pastoralists' understanding of market and customer demands would expedite supply procedures, thereby optimizing the benefits of livestock farming through both local and external markets.

7.0 AREAS FOR FUTURE RESEARCH

- Research should be conducted on the most important livestock production processes in pastoral areas. This research should include a comparative analysis of the various pastoral

settings, as well as an examination of how production processes are being used, with both achievements and challenges being recorded. The results of the research will make it easier to tailor information to particular pastoral contexts and to devise strategies for putting necessary procedures into action.

- Assess the behavior of pastoralists with regard to the management of the pastoral farming system and the processes involved in relation to the shifting development settings in terms of the requirements that consumers have for livestock products. The insights that are derived from these research findings will provide pastoralists and development partners in pastoral areas with information regarding the requirements for

improved positioning of pastoralist products in the market that is currently changing and dynamic.

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REFERENCES

1. Abay, K. A., Koru, B., Chamberlin, J., & Berhane, G. (2018). Does weather risk explain low uptake of agricultural credit? Evidence from Ethiopia. *ESSP-IFPRI Working Paper*, pp. 128.
2. Abay, K. A., Nathaniel, D., & Jensen, N. D. (2019). Access to markets, weather risk, and livestock production decisions: Evidence from Ethiopia. *The Journal of the International Association of Agricultural Economists*. 2020; 51:577–593. DOI: 10.1111/agec.12573.
3. Abebe, B. D., Tadie, M. A., & Taye, M. M. (2018). Factors affecting market outlet choice of wheat producers in North Gondar Zone, Ethiopia. *Agriculture & Food Security; London Vol. 7*. DOI: 10.1186/s40066-018-0241-x.
4. Addis, A. B. (2017). Major constraints of livestock marketing in the lowland part of Ethiopia. *International Journal of Engineering Development and Research*. Volume 5, Issue 1. 489-499. ISSN: 2321-9939.
5. Aggrey, S., Kugonza, D. R., & Muwanika, V. (2018). Commercialization of Alternative Livestock Feeds Could Save Fish Stocks in Lake Victoria. *African Journal of Tropical Hydrobiology and Fisheries*, 16(1), 48-50.
6. Amare, M., Mavrotas, G., & Edeh, H. (2018). *Farmers' crop choice decision: Trends and determinants in Nigeria and Uganda*. IFPRI Discussion Paper 01716.
7. Ameso, E., Bukachi, S., Olungah, C., Haller, T., Wandibba, S., & Nangendo, S. (2018). Pastoral Resilience among the Maasai Pastoralists of Laikipia County, Kenya. *Land*, 7(2), 78.
8. Anno, E. F., & Pjero, B. E. (2021). Impact of Traders' Competitive Rivalry on Supply and Demand Relations in Livestock Markets in the Drylands of Kenya. *International Journal of Business and Economics Research*. Vol. 10, No. 3, 2021, pp. 99-109. doi: 10.11648/j.ijber.20211003.13.
9. Asante, B. O., Villano, R. A., Patrick, I. W., & Battese, G. E. (2018). Determinants of farm diversification in integrated crop-livestock farming systems in Ghana. *Renewable Agriculture and Food Systems*; Cambridge Vol. 33(2): 131-149. DOI: 10.1017/S1742170516000545.
10. Asfaw, A. A. (2018). Prevalence and economic significance of bovine fasciolosis in Bale Rural Abattoir, Ethiopia. *Academy of Agriculture Journal* 3(9):541-550. <http://www.innovativejournal.in/index.php/aj/article/view/2286>
11. Bachewe, F., Minten, B., Tadesse, F., & Taffesse, A. S. (2018). *The evolving livestock sector in Ethiopia: growth by heads, not by*

productivity. ESSP-IFPRI Working Paper 122.

12. Berger, R. (2015). Now I see it, now I don't: Researcher's position and reflexivity in qualitative research. *Qualitative Research*, 15(2), 219–234. <https://doi.org/10.1177/1468794112468475>

13. Berihun, T. (2017). Livestock Marketing Performance Evaluation in the Afar Region, Ethiopia. *International Journal of Agricultural Marketing*, 4 (2): 152-160. Retrieved from <https://premierpublishers.org/ijam/160620177736>.

14. Blecha, J. (2016). Regulating backyard slaughter: Strategies and gaps in municipal livestock ordinances. *Journal of Agriculture, Food Systems, and Community Development*, 6(1), 33–48.

15. Bocken, N. M. P., Rana, P., & Short, S. W. (2015). Value Mapping for Sustainable Business Thinking. *Journal of Industrial and Production Engineering*, Vol. 32 No. 1, pp. 67–81.

16. Bogard, J. R., Farook, S., Marks, G. C., Waid, J., Belton, B., Ali, M., Toufique, K., Mamun, A., & Thilsted, S. H. (2017). Higher fish but lower micronutrient intakes: Temporal changes in fish consumption from capture fisheries and aquaculture in Bangladesh. *PLoS One*, 12(4), e0175098.

17. Bren d'Amour, C., Reitsma, F., Baiocchi, G., Barthel, S., et al. (2017). Future urban land expansion and implications for global croplands. *Proceedings of the National Academy of Sciences*, 114, 8939–8944.

18. Burke, W. J., Myers, R. J., & Jayne, T. S. (2015). A triple-hurdle model of production and market participation in Kenya's dairy market. *American Journal of Agricultural Economics*, 97, 1227–1246.

19. Cheteni, P., & Mokhele, X. (2019). Small-scale livestock farmers' participation in markets: evidence from the land reform beneficiaries in the central Karoo, Western Cape, South Africa. *S. Afr. J. Agric. Ext. Vol. 47 No. 1, 2019: 118-136* <http://dx.doi.org/10.17159/2413-3221/2019/v47n1a494>

20. Clark, B., Stewart, G., Panzone, L., & Kyriazakis, I. (2017). Citizens, consumers and farm animal welfare: A meta-analysis of willingness-to-pay studies. *Food Policy*, 68, 112–127.

21. CSA. (2018). Federal Democratic Republic of Ethiopia Central Statistical Agency. Agricultural Sample Survey, 2017/18 [2010 E.C.], Volume II, Report on Livestock and Livestock Characteristics (Private Peasant Holdings). Statistical Bulletin 587. April 2018.

22. Desiere, S., Hung, Y., Verbeke, W., & D'Haese, M. (2018). Assessing current and future meat and fish consumption in Sub-Saharan Africa: learnings from FAO food balance sheets and LSMS household survey data. *Global Food Security* 16:116–26. doi:10.1016/j.gfs.2017.12.004.

23. Dido, R. H. (2019). Livestock Marketing in Ethiopia: Practices, Challenges and Opportunities. *International Journal of Current Research*. Vol. 11, Issue 01, pp. 362–367, January, 2019. DOI: <https://doi.org/10.24941/ijer.33891.01.2019>.

24. Dixit, A. K., Singh, M. K., Roy, A. K., Reddy, B. S., & Singh, N. (2015). Trends and contribution of grazing resources to livestock in different states of India. *Range Management and Agro-forestry*, 36(2), 204–210.

25. Egbe, N. F., Muwonge, A., Ndip, L., Kelly, R. F., Sander, M., Tanya, V., et al. (2016). Abattoir-based estimates of mycobacterial infections in Cameroon. *Sci Rep.* 6:24–32. doi: 10.1038/srep24320

26. Eltholth, M., Fornace, K., Grace, D., Rushton, J., & Häslar, B. (2015). Characterisation of production, marketing and consumption patterns of farmed tilapia in the Nile Delta of Egypt. *Food Policy*, 51, 131–143.

27. Enahoro, D., Mason-D' Croz, D., Mul, M., Rich, K. M., Robinson, T. P., Thornton, P., & Staal, S. S. (2019). Supporting sustainable expansion of livestock production in South Asia and Sub-Saharan Africa: Scenario analysis of investment options. *Global Food Security*, 20(2019), 114–121. doi:10.1016/j.gfs.2019.01.001.

28. Eshetu, E., & Zewudu, A. (2016). Review on live animal and meat export marketing system in Ethiopia: challenges and opportunities. *Journal of Scientific and Innovative Research* 2016; 5(2): 59-64.

29. Esmael, Y., Bekele, A., & Ketema, M. (2016). Determinants of level of smallholder farmers' participation in potato sales in Kofele District, Oromia Region, Ethiopia. *J. Agric. Sci. Res.*; 3, 23-30.

30. Evans, S., Vladimirova, D., Holgado, M., van Fossen, K., Yang, M., Silva, E. A., & Barlow, C. Y. (2017). Business Model Innovation for Sustainability: Towards a Unified Perspective for Creation of Sustainable Business Models. *Business Strategy and the Environment*, 26 (5): 597–608.

31. FAO, IFAD, UNICEF, WFP & WHO. (2020). The State of Food Security and Nutrition in the World 2020. Transforming food systems for affordable healthy diets. Rome, FAO. ISBN: 978-92-5-132901-6. Retrieved from <http://www.fao.org/documents/card/en/c/ca9692en>.

32. Fornari, G. B., Menegassi, S. R. O., Pereira, G. R., de Oliveira, T. E., Barcellos, J. O. J., Fornari, G. B., et al. (2016). Factors affecting the selling prices of calves in auctions in Santa Catarina State, Brazil. *Rev Brasileira Zootecnia*. 45:632–8. doi: 10.1590/S1806-92902016001000009

33. Frija, A., Chebil, A., Abdul Mottaleb, K., Mason-D'Croz, D., & Dhehibi, B. (2020). Agricultural growth and sex-disaggregated employment in Africa: future perspectives under different investment scenarios. *Global Food Security* 24:100353. doi:10.1016/j.gfs.2020.100353.

34. Gebremedhin, B., Shiferaw, K., Tegegne, A., Gizaw, S., & Hoekstra, D. (2017). An analysis of milk production, butter marketing and household use of inputs in rural Ethiopia. LIVES Working Paper 26. International Livestock Research Institute (ILRI).

35. Golub, S. (2015). Informal Cross-Border Trade and Smuggling in Africa. In *Handbook on Trade and Development*, edited by Oliver Morrissey, Ricardo Lopez, and Kishor Sharma, 179–209. Northampton, MA: Edward Elgar Publishing.

36. Hardstaff, J. L., Häslar, B., & Rushton, J. R. (2015). Livestock trade networks for guiding animal health surveillance. *BMC vet Res.* (2015) 11:82. doi: 10.1186/s12917-015-0354-4

37. Hatab, A. A., & Cavinato, M. E. R., & Lagerkvist, C. J. (2019). Urbanisation, livestock systems and food security in developing countries: A systematic review of the literature. *Food Security* (2019) 11:279–299 <https://doi.org/10.1007/s12571-019-00906-1>.

38. Holm, A., Bidmon, C. M., Henike, T., Bosbach, K. E., & Baden-Fuller, C. (2019). Teaching business models: Introduction to the special issue, *Journal of Business Models*, Vol. 7, No. 3, pp. 1-11.

39. Iannotti, L. L. (2018). The benefits of animal products for child nutrition in developing countries. *Revue scientifique et technique (International Office of Epizootics)* 37(1):37–46. doi:10.20506/rst.37.1.2738.

40. Isako, T., Kimindu, V., Amboga, S., & Tuke, G. (2019). Pastoral Livestock Marketing: A Case Study of Marsabit County, Kenya. *Journal of Natural Sciences Research*, Vol. 9(6): 51-57. DOI: 10.7176/JNSR.

41. Islam, M. M., Anjum, S., Modi, R. J., & Wadhwan, K. N. (2016). A scenario of livestock and poultry in India and their contribution to the national economy. *International Journal of Science, Environment and Technology*, Vol. 5(3): 956-65.

42. Jagnani, M., Barrett, C. B., Liu, Y., & You, L. (2018). *Within-season producer response to warmer temperatures: defensive investments by Kenyan farmers*. Working Paper, Cornell University.

43. Jensen, N., Barrett, C., & Mude, A. (2017). Cash transfers and index insurance: A comparative impact analysis from northern Kenya. *Journal of Development Economics*, 129, 14–28.

44. Kelly, R. F., Hamman, S. M., Morgan, K. L., Nkongho, E. F., Ngwa, V. N., Tanya, V, et al. (2016). Knowledge of bovine tuberculosis, livestock husbandry and dairy practices amongst pastoralists and small-scale dairy

farmers in Cameroon. *PLoS ONE* 11:e0146538. doi: 10.1371/journal.pone.0146538

45. Kembe, M. A., & Omundi, C. O. (2016). The Infrastructural Development and Commercialisation of Smallholder Dairy Farming in Uasin Gishu County, Kenya. *Urban and Regional Planning*, 1(4), 77.

46. Kibona, C. A., & Yuejie, Z. (2021). Factors that influence market participation among traditional beef livestock farmers in the Meatu District of the Simiyu Region, Tanzania. *PLoS ONE* 16(4): e0248576. <https://doi.org/10.1371/journal.pone.0248576>

47. Kgosikoma, K., & Malope, P. (2016). Determinants of market participation and the institutional constraints: a case study of Kweneng West, Botswana. *Journal of Agricultural Extension and Rural Development*. Vol. 8 (9), pp. 178-186, September 2016. DOI: 10.5897/JAERD2016.0780. Article Number: D80D19F60007. ISSN 2141-2170.

48. Knight-Jones, T. J. D., Gubbins, S., Bulut, A. N., Stärk, K. D. C., Pfeiffer, D. U., Sumption, K. J., et al. (2016). Mass vaccination, immunity and coverage: modelling population protection against foot-and-mouth disease in Turkish livestock. *Sci Rep.* (2016) 6:22121. doi: 10.1038/srep22121

49. Kumar, A., Mishra, A. K., Parappurathu, S., & Jha, G. K. (2018). Farmers' choice of milk-marketing channels in India. *Economic & Political Weekly*, LIII(51), 58–67.

50. Little, P. D., Tiki, W., & Debsu, D. N. (2015). Formal or informal, legal or illegal: the ambiguous nature of cross-border livestock trade in the Horn of Africa. *Journal of Borderlands Studies* 30 (3): 405–421.

51. Lubungu, M., Sitko, N. J., & Hichaambwa, M. (2015). Analysis of the beef value chain in Zambia: Challenges and opportunities of linking smallholders to markets. *Indaba Agricultural Policy Research Institute (IAPRI)*. 103:1–40. <http://www.iapri.org.zm/>

52. Lubungu, M. (2016). Factors Influencing Livestock Marketing Dynamics in Zambia. *Livestock Research for Rural Development*. Volume 28, Article #58. Retrieved July 4, 2016, from <http://www.lrrd.org/lrrd28/4/lubu28058.html>

53. Manyeki, J. K., Balázs, K., & Kanó, I. S. (2021). Unconditional factor demands and supply response for livestock products: A farm-level analysis of the Southern Rangelands of Kenya. *African Journal of Agricultural and Resource Economics*, Volume 16, Number 3, pages 253-263.

54. Martijn, K., & van Leynseele, Y. (2018). Brokers as Assemblers: Studying Development Through the Lens of Broking. *Ethnos* 83, no. 5 (2018): 803–813. doi:10.1080/00141844.2017.1362451.

55. Mbatha, C. N. (2019). Diversification in Production and Marketing Strategies for Higher Returns on Farmlands Located in a Coastal and Tourist District of Kenya: Lessons for South Africa's Land Reform Projects in Similar Locations. *African Journal for Tourism and Leisure (AJHTL)* 9(1): 1-19

56. Mbatha, C.N. (2021). Livestock production and marketing for small emerging farmers in South Africa and Kenya: comparative lessons. *S. Afr. J. Agric. Ext.* Vol. 49 No. 1, 2021: 141-161 <http://dx.doi.org/10.17159/2413-3221/2021/v49n1a10783>

57. Mebrate, G., Tewodros, A., & Derbie, Z. (2020). Current Status of Marketing and Transportation of Beef Livestock in Ethiopia. *International Journal of Animal Science, Husbandry and Livestock Production (IJASHLP)* (2141-5191), Vol. 6(6), pp. 328-333.

58. Melesse, M. B., & Cecchi, F. (2017). Does market experience attenuate risk aversion? Evidence from landed farm households in Ethiopia. *World Development*, 98, 447–466.

59. Mmbengwa, V. M., Nyhondo, B., Lindikaya, M., Ngethu, X. & Van Schalkwyk, H. (2015). Communal livestock farming in SA. Does this farming system create jobs for poverty-stricken rural areas? *SYLWAN*, 159 (10):176-192

60. Molia, S., Boly, I. A., Duboz, R., Coulibaly, B., Guitian, J., Grosbois, V., et al. (2016). Live bird market characterisation and trading network analysis in Mali: Implications for the surveillance and control of avian influenza

and Newcastle disease. *Acta Trop.* 155:77–88. doi: 10.1016/j.actatropica.2015.12.003

61. Molotsi, A., Dube, B., Oosting, S., Marandure, T., & Mapiye, C., et al. (2017). Genetic Traits of Relevance to the Sustainability of Smallholder Sheep Farming Systems in South Africa. *Sustainability* Basel Vol. 9(8): 1225. DOI: 10.3390/su9081225.

62. Motta, P., Handel, I. G., Rydevik, G., Hamman, S. M., Ngwa, V. N., Tanya, V. N., et al. (2018). Drivers of live livestock prices in the livestock trading system of central Cameroon. *Front Vet Sci.* (2018) 4:244. doi: 10.3389/fvets.2017.00244/full

63. Mumba, C., Häslер, B., Muma, J. B., Munyeme, M., Sitali, D. C., Skjerve, E., & Rich, K. M. (2018). Practices of traditional beef farmers in their production and marketing of livestock in Zambia. *Tropical Animal Health and Production.* 50(1):49–62. Available: <https://doi.org/10.1007/s11250-017-1399-0>

64. Mousley, P., Ndiaye, J., Wimpey, J., Amin, M., Votava, C., Nicoli, M., & Phillips, D. (2015). Somaliland's private sector at a crossroads: political economy and policy choices for prosperity and job creation. World Bank Publications, Washington, DC. Available at <https://doi.org/10.1596/978-1-4648-0491-5>

65. Mugunieri, G. L., Mtmet, N., Enock, K., Costagli, R., & Gulaid, I. (2016). Saudi Arabia's end-market requirements and the implications for Somaliland livestock exports. ILRI Research Report 40. Nairobi: International Livestock Research Institute (ILRI).

66. Murendo, C., Kairezi, G., & Mazvimavi, K. (2020). Resilience capacities and household nutrition in the presence of shocks. Evidence from Malawi. *World Development Perspectives* 20: 100241. <https://doi.org/10.1016/j.wdp.2020.100241>

67. Mwangi, M. N., Ngigi, M., & Mulinge, W. (2015). Gender and age analysis of factors influencing output market access by smallholder farmers in Machakos County, Kenya. *Afr. J. Agric. Res.* 10(40):3840-3850.

68. Napp, S., Chevalier, V., Busquets, N., Calistri, P., Casal, J., Attia, M., et al. (2018). Understanding the legal trade of livestock and camels and the derived risk of Rift Valley Fever introduction into and transmission within Egypt. *PLoS Neglect Trop Dis.* 12:e0006143. doi: 10.1371/journal.pntd.0006143.

69. Ndoro, J. T., Mudhara, M., & Chimonyo, M. (2015). Farmers' choice of livestock marketing channels under transaction cost in rural SA: a multinomial logit model. *African Journal of Range & Forage Science,* 32(4):243-252.

70. Njiru, N., Mtmet, N., Wanyoike, F., Kutu, A., Songolo, A., Dahir, I., & Jillo, G. (2017). Assessment of livestock marketing associations in arid and semi-arid lands in northern Kenya. International Livestock Research Institute (ILRI) and USAID – Feed the Future Programme.

71. Parry-Hanson, K. A., Aboagye, E. F., Colecraft, E. K., Otoo, G. E., Adjei, M. Y. B., Acquaah, E., Afrifa-Anane, E., & Amissah, G. J. N. (2019). Low Consumption of Indigenous Fresh Dairy Products in Ghana Attributed to Poor Hygienic Quality. *Journal of Food Protection* 82(2):276-286.

72. Pica-Ciamarra, U., Tasciotti, L., Otte, J., & Zezza, A. (2015). Livestock in the household economy: cross-country evidence from microeconomic data. *Development Policy Review,* 33, 61–81.

73. Roba, G. M., Lelea, M. A., Hensel, O., & Kaufmann, B. (2019). Elusive Profits: Understanding the economic performance of local traders in the pastoral small ruminant value chain in northern Kenya Nomadic Peoples; Isle of Harris Vol. 23 (1): 78-105. DOI: 10.3197/np.2019.230105.

74. Ryschawy, J., Disenhaus, C., Bertrand, S., et al. (2017). Assessing multiple goods and services derived from livestock farming on a nationwide gradient. *Animal* 2017; 11: 1861–72.

75. Sang, H. L., Nyein, N. K., & Soojung, A. (2018). Analysis of the Factors Influencing Market Participation among Smallholder Rice Farmers in the Magway Region, Central Dry

Zone of Myanmar. Sustainability. 10, 4441; <https://doi.org/10.3390/su10124441>

76. Sarkar, A. (2020). Role of Livestock Farming in Meeting Livelihood Challenges of SC Cultivators in India. Indian Journal of Human Development 14(1): 23–41, 2020. DOI: 10.1177/0973703020923863

77. Seleka, T. B. & Kebakile, P. G. (2017). Export competitiveness of Botswana's beef industry. *The International Trade Journal*, 31(1):76-101

78. Shabana, A. H., & Matanda, J. W. (2019). Determinants of livestock commercialization in pastoral communities in Isiolo County, Kenya. *The Strategic Journal of Business & Change Management*, 6 (2), 2413–2429.

79. Shibru, S. (2017). A Review of Challenges and Opportunities of Livestock Marketing in the Southern Part of Ethiopia. Journal of Marketing and Consumer Research. ISSN 2422-8451 An International Peer-reviewed Journal. Vol. 34, 2017.

80. Sikamwaya, R. M., & Guiyu, Z. (2020). An Analysis of the Beef Production Industry and Marketing in Zambia. *South Asian Journal of Social Studies and Economics*. 8(3): 46-62, 2020; Article no. SAJSSE.62484. DOI: 10.9734/SAJSSE/2020/v8i330214.

81. Staal, S. J., Wanyoike, F. N., & Ballantyne, P. G. (2019). Why livestock matter – Examples and evidence showing positive outcomes and impact of specific livestock-related interventions and investments in Africa and Asia. Nairobi: ILRI. <https://hdl.handle.net/10568/107015>

82. Stephen, G. M., Kimpei, M., Mathew, K. K., & Juma, M. M. (2018). The Factors That Influence Beef Livestock Marketing Efficiency and The Behavior of Pastoralists: A Case Study in Kenya-Review. World Journal of Research and Review (WJRR). P51–58.

83. Thomsen, P., Sort, J. C., & Brøndum, K. (2019). Booster cards: A practical tool for unlocking business model innovation, Journal of Business Models, Vol. 7, No. 3, pp. 131-142.

84. Thorat, S., & Madheswaran, S. (2018). Graded caste inequality and poverty: Evidence on the role of economic discrimination. *Journal of Social Inclusion Studies*, 4(1), 3–29.

85. Togarepi, C., Thomas, B., & Kankono, M. (2016). Livestock marketing constraints and opportunities in north-central communal areas of Namibia, Ohangwena Region. *Livestock Research for Rural Development* 28 (7) 2016. 1-9. www.lrrd.org/lrrd28/7/toga28132.html

86. Tothmihaly, A. (2018). How low is the price elasticity in the global cocoa market? *African Journal of Agricultural and Resource Economics* 13(3): 209–23.

87. Vrankić, I., & Krpan, M. (2017). Short-run profit maximization in a convex analysis framework. *Interdisciplinary Description of Complex Systems* 15(1): 1–15.

88. Wen-Chi, H., & Sicelo, I. D. (2019). A Double Hurdle Estimation of Sales Decisions by Smallholder Beef Livestock Farmers in Eswatini. *Sustainability*. 11, 5185; <https://doi.org/10.3390/su11195185>

89. Willet, W., Rockström, J., Loken, B., Springmann, M., Lang, T., Vermeulen, S., Garnett, T., Tilman, D., DeClerck, F., Wood, A., et al. (2019). Food in the Anthropocene: the EAT-Lancet Commission on healthy diets from sustainable food systems. *Lancet* 393(10170):447–492. doi:10.1016/S0140-6736(18)31788-4.

90. Yiram, H., Ahmed, M., & Mohamed, S. (2017). Livestock Marketing: Local beliefs and clan conflicts in focus. *African Journal of Marketing Management*. Vol. 9, No. 1, pp. 1-7. DOI: 10.5897/AJMM2015.0452.

91. Zhou, Y., & Staatz, J. (2016). Projected demand and supply for various foods in West Africa: implications for investments and food policy. *Food Policy* 61:198–212. doi:10.1016/j.foodpol.2016.04.002.
