

CONFIGURING LIVESTOCK PRODUCTION AND MARKETING IN THE DRYLANDS OF KENYA USING HYBRID BUSINESS MODELS AND MARKETING SYSTEMS: A CASE OF TURKANA COUNTY

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ABSTRACT

The performance of livestock markets is dependent on the applied marketing systems, which not only structure the marketing activity and management of markets, but also regulate stakeholder engagements in trading, coordinate communications, and support market programming based on consumer behavior and the satisfaction of needs. The study to organize livestock production and marketing in Kenya's drylands, using Turkana County as a case study, was an opportunity to reconsider livestock trading, which has for a long time been based on bartering. The shifting corporate environment necessitates the usage of market-based trade mechanisms, which coexist with the growing prevalence of technology and a cash-based economy. "What are the livestock market pillars and opportunities that warrant the adoption of business models and trading systems vital to structuring and increasing the performance of livestock marketing in drylands?" was the overriding question that guided the investigations. Case study and exploratory research designs were utilized, as well as a mixed-methods approach, in this study. The study selected 13 livestock marketplaces in Turkana, and 130 participants took part in the research. The study determined that livestock markets in Turkana require business models and strategies to organize the markets and marketing activities, such as the organization of livestock marketing associations (LMAs) into corporate units, i.e. cooperatives, the assembly of livestock and meat products for various markets, and sale yard management systems. In addition, the study establishes that the use of defined, value-added business models and trading systems necessitate a professional approach and investments in resources in the delivery of marketing management. The paper suggests improved knowledge capture through market research, regularized monitoring and evaluation, and comparative application to strengthen knowledge, lessons learned, and good practices to structure and coordinate livestock marketing systems. The most important implication of the study's findings is that they will assist in the configuration of crucial aspects of livestock production, marketing, stakeholder engagements, competitiveness, profitability, and sustained functionality of numerous markets in Turkana and other similar dryland contexts in Kenya.

Keywords: Business Models, Competition, Livestock Production, Marketing, Marketing Systems, and Theory.

INTRODUCTION

The vast rural areas and drylands of Sub-Saharan Africa are the primary livestock-producing regions. The majority of households in these regions rely on livestock as their primary source of income and wealth. The increased demand for animal-source foods is creating tremendous opportunities for the livestock business worldwide. Consequently, regions that produce livestock contribute to rural and urban food systems through access to local and regional markets and the

diversification of business and trade operations. Nonetheless, food, income, and nutrition insecurity continue to pose significant obstacles to the well-being of livestock keepers and entrepreneurs, and as a result of the slow commercialization of livestock production, dryland development remains sluggish and populations are undergoing a slow transformation and survival difficulties. In pastoral settings, decisions about the utilization of livestock resources and the environment are still determined by culture, social norms, and opinion leaders. The production and marketing of livestock continue to rely on traditional ways, with markets used only when money is needed for basics like healthcare, education, and clothes. In the rapidly changing context of customer needs and preferences, public health standards, the quality of livestock and livestock products, and a cash-based economy, traditional pastoral livestock farming remains inefficient, unable to meet market demands, and unable to improve the living conditions of pastoralists.

The formula to support the effective configuration of livestock production and marketing interventions and practices in pastoral areas should be based on a hybridized model and trading systems that integrate the touch points of livestock producers, different trader categories, market standards, and diversity of consumer clients into the contents and processes of livestock production and marketing initiatives. The comprehensiveness of hybrid business models must encompass the elements of value propositions, value delivery, and value capture, the principal elements of which are the identification of customers and products to offer, business organization and delivery of the proposition, and alignment of the proposition and delivery to create value for the livestock business, respectively. Consequently, the programming of the components of livestock production and marketing across various components of the livestock development value chain can deliver a systematized approach that combines both conventional and local systems and can marshal the necessary stakeholders, production, and trade capabilities for improved livestock resource economics and socioeconomic development for all involved.

LITERATURE REVIEW

A. Bartering and special considerations in trade

Bartering is a trading practice that dates back to 6000 B.C. and was utilized by the Phoenicians to barter wood for some precious metals and jewelry used for trade inside their own territory (Campbell, 2009). This was by far the largest and most significant trade relationship for the Phoenicians; having a client as large as the Egyptians ensured riches for the Byblos citizens. According to the study by Ganesan and Seshadri (2005) on the price of barter trade, local communities utilized bartering systems to exchange commodities and services they need for their daily living and for business. The prevalence of bartering is growing worldwide, yet it lacks the flexibility of a money system. Findings depicted in Lopez et al (2004) on multi-agent trading systems, the advancements in technology and transportation allow modern society to engage in global commerce. However, the limits of trading led to the development of currency systems in which cash serves as a medium of trade, thereby resolving the mismatched demands of the barter system. In early civilizations according to the study by Campbell (2009) on the financial flexibility of today's economies, individuals exchanged animal skins or salt for commodities and services using common, agreed-upon products, and in a monetary currency system, most nations employ fiat money, i.e., a government-issued currency that is not backed by a tangible commodity, such as gold or silver, but rather by the government that created it.

Currency systems were established to minimize the inconvenience of barter trading. As per Abraham et al (2007) study on barter exchange in markets, in ancient cultures, common products served as currency. The most valuable coins were made of gold and were utilized for significant purchases, military payments, and state activities. The value of a certain type of coin determined the accounting units. Alternative currencies may be employed in addition to or instead of the current monetary system. Digital currencies are safe and inflation-hedging, preventing theft and devaluation. Digital currencies are growing in popularity due to cheaper transaction fees and more accessibility (Frikken and Opyrchal, 2008). The money system is gradually replacing the barter system, allowing parties to exchange goods and services in a more convenient and secure manner using technologically backed, globally efficient, and accepted transaction methods. It is also pinpointed in Haddawy et al (2004) study on the balanced matching of buyers and sellers in barter trade, the barter system generates imbalanced trade and lacks a standard unit of measurement, diminishing its appeal. In money systems, exchange rates and inflation increase prices, diminishing the purchasing power of a currency. Other beneficiaries of barter trading in the contemporary world are Thailand and Iran which require each other's goods transacted using the barter system (Campbell, 2009).

B. Role of Theories and Models in Business Development

Theories and models serve as the basis for any commercial venture, whether it is a business, a non-profit, or a government initiative. The interrelationships between reality, business focus, and organizational competency components are the theoretical success factors. In a competitive market context, an effective business delivery system seeks to produce results. According to Szopinski et al. (2019), market research should inform the development of competitive, robust, and efficient business models in the present and future demanding business contexts. In order for certain business models and trade systems to have a substantial impact on the dryland economy, stakeholders and markets in livestock development must engage in strategic theoretical and practical business planning.

Wirtz and Daiser (2017) also demonstrated that an integrated business model conceptual framework strengthens a company's foundation, allowing it to capitalize on its goals despite fierce competition. This material should be based on Lubungu's (2016) explanation of what a business model is and is not, and underline the necessity for effective business ideas and efforts. According to Szopinski et al. (2019), evaluating the dynamism of selected business models for long-term value creation and sustainable company investment is smart. According to Dido (2019), the capacity of corporate business models and theories to support the structuring of livestock production and marketing operations can organize entrepreneurs and their corporate business strategies. Even in highly competitive business contexts, the development of future research views for business models and the creation of business plans based on theories and models will increase the objectivity and viability of business ventures.

C. Livestock Development Modeling

Nyariki and Amwata (2019) discovered that realistic business model management in existing and new company ventures will increase the efficacy and sustainability of business designs as well as eliminate disputes in model implementation modalities. The study contends that local capacity for market competitive and comparative advantages, providing distinct value to consumer markets across regions, and limiting competition will all contribute to a workable universal strategy for the

integration and application of business models and theory in various business contexts. According to Dido (2019), the ultimate purpose of conceptualization, development, application, and remaking of business theories and models is investigating entrepreneurial prospects for firms employing technology and business education for sustainable development. This will also guarantee the effectiveness and influence of the business models in organizing markets and making them competitive, profitable, and sustainable (Lubungu, 2016).

Nations and economic sectors have capitalized on livestock production and sales in varied ways, depending on their investments. It is claimed that managing competition and acquiring a market share and a niche is attainable if the reasons and activities that influence market access are theoretically based. Collective decision-making in entrepreneurial business modeling, as well as the teaching of business models through theoretical and practical learning, supports the development of competitive business strategies and the positioning of firms with comparative advantages. According to Nyariki and Amwata (2019), theory and practice are intertwined in the livestock industry to enhance breeding, nutrition, yields, farmer resilience, livestock productivity, and the ability of livestock and livestock products to meet market demands.

D. Role of Competition in Structuring Livestock Marketing

The current competitiveness of the animal market requires both theoretical and practical solutions. Successful business models, according to Isako et al. (2019), can also improve corporate investment procedures. This is efficiently achieved by merging strategic foresight approaches into business modeling and by conducting business model research and ongoing market research studies. Extreme levels of competition affect the livestock industry in many parts of the world. This is due to a number of variables, including the varying capacities of livestock-producing regions to provide the market with sufficient quantities of high-quality, safe livestock and livestock products (Shabana and Matanda, 2019). In order to comprehend the causes of global, regional, and local rivalry in the livestock industry, strong evidence is essential. However, the use of technology for business modeling and research, the definition of the role of business model innovations in business competitiveness and sustainability, and the emphasis on the need to create and capture value will create essential niches for livestock businesses (Abraham et al., 2007; Abay et al., 2019).

E. Management of Competitive Rivalry

Variations in human and capital resources, supply and demand, and consumer preferences also contribute to market competition. Frikken and Opyrchal (2008) suggest that business model development and delivery should be phased to allow for the development of each stage of a business and that entrepreneurial education should be improved to strengthen understanding of business environments and seasonal dynamics in order to reduce the variance effects of such parameters on markets and business competitiveness. According to Anno & Pjero (2021), intense competition in marketplaces results in rivalry, a market competition malpractice that tends to direct market benefit to those who can control market operations. Market creation will be guided by theory and business models based on elements that can lead to market saturation and low market growth. Managing high market expenses and differentiating items will assist in regulating competition. Affordable switching costs, boosting corporate diversity, facilitating equilibrium between supply and demand, and strategic planning further regulate the effects of competition on the performance of markets.

In the current livestock marketing context in Turkana, competitive rivalry is the primary source of stakeholder conflict exercised through gaps that exist in the market organization framework. It is also affirmed by Haddawy et al. (2004) that the organization of market approaches reinforces the mapping of market stakeholders and defines their roles and interests and that during the delivery of such models, stakeholder conflicts will be highly minimized. Szopinski et al. (2019) argue that the model for the organization of livestock marketing activity is an innovation that makes it easier for goods, services, and entrepreneurs to move from one market to another in a way that is ethical, synergistic, and sustainable.

RESEARCH METHODOLOGY

A. Research design and approaches

The research study combined Case study and Exploratory research designs to investigate the problem of the lack of conventional and efficient livestock marketing models in Turkana to configure and organize livestock trading locally and across various livestock market categories. The case study design facilitated learning from other livestock development jurisdictions of the world and the strategies used to configure livestock production and marketing. Exploratory research design underscored the need to investigate the livestock marketing systems in the drylands of Kenya because such research undertakings have not been extensively conducted. The research design led to an understanding of the livestock production and marketing context in the drylands and it helped solidify the submissions regarding the proposed business models and marketing systems for Turkana and similar dryland contexts.

B. Sampling and data collection

The research was done in 13 livestock markets in Turkana, and 130 respondents were sampled specifically to help investigate the local livestock marketing systems in order to develop the hybrid system. A study questionnaire and a schedule containing strategic questions on the research were administered to the study respondents. On the basis of knowledge regarding livestock production and marketing in Turkana and comparable pastoral area contexts in Kenya, the theoretical foundations for potential strategies to support the production, assembly, supply, and consumption of livestock and livestock products in Kenya's drylands were established. The formulated business strategies and models were validated by representatives from the government's livestock production and commerce departments, livestock merchants, and individuals and institutions working for livestock and livestock-keeping communities and entrepreneurs. The livestock development stakeholders in Turkana County and other arid regions of Kenya have validated and approved the proposed business models, including their use in livestock marketing operations.

C. Data analysis and presentation techniques

The numeric data collected on the study participants' demographics were analyzed statistically using descriptive and inferential methods. The respondents' views individually and in focus groups were mobilized and analyzed using qualitative techniques. These included Content analysis which facilitated the evaluation of data patterns and frequencies which led to deeper interpretation of the data generated. Narrative analysis aided in presentations on livestock marketing historical scenarios, events, and past experiences, Discourse analysis focused on social-cultural issues and the perceptions of livestock market stakeholders, and Grounded theory helped in fulfilling the intentions to create business models. The respondents' submissions on livestock business models in the drylands were finally clustered according to marketing pillars at every market level. The

crafted models were subjected to validation through stakeholder forums composed of livestock keepers, government and civil society organizations, and policy organizations.

RESULTS AND DISCUSSION

A. Demography characteristics of respondents

In the ten primary livestock markets, the average age of respondents was 38 years, while in the three secondary livestock markets, the average age was 39.24 years, with standard deviations of 8.62 and 8.86 years respectively, and a range of 18 to 71 years. The majority of respondents (84.3 percent) were male. Overall, 73.0 percent of respondents were illiterate, with only 5.2% holding a high school diploma or equivalent. The mean number of years respondents had worked in animal production was 11.49, with a standard deviation of 7.24 years. The Kruskal-Wallis test found that the average number of years spent producing livestock varied significantly amongst the three markets. Lodwar livestock market respondents had the most experience in livestock marketing (15.41 years), while Kalemunyang livestock market dealers had the least (7.36 years). At the 5 percent significance level, the difference in mean years for cattle marketing was statistically significant. The majority (94 percent) of responders in each market were livestock keepers.

Table 1: Descriptive Statistics for Demographics

Market	Overall	Remarks
Demographic characteristics	n=130	33% of total active traders in the selected markets
Age	38(8.74)	The middle age set for most traders is 35-45 years
Male (%)	84.3%	Livestock marketing is for long remained a male-dominated venture
Female (%)	15.7%	Although the percentage looks small, it is progressively increasing
Certificate	5.2%	Still low but expected to increase as more educated people take part in the livestock trade
Non-literate	73.0%	This figure is reduced. A decade ago, the illiteracy of livestock traders in Turkana was at 84%
Years in livestock marketing	11.49(7.24)	Substantial. Have sustained people's livelihood for a while
Business	5.7	This is expected to increase as entrepreneurs start diversifying into livestock marketing
Livestock keeping	94.0%	Almost all livestock traders are livestock keepers

Note: Figures in the parentheses are the standard deviations associated with the means for the variables indicated.

B. Livestock Marketing Models and Trade Systems

(I) The Organized Livestock Marketing Model for Drylands

The study found that the Office of the President of the Republic of Kenya's Drought Response Programme of the Arid Lands Resource Management (ALRMP II) was responsible for introducing organized livestock trade in Kenya's pastoral areas. The business framework was created in 1997 with the objective of supporting livestock-dependent communities' economies through market-oriented livestock production and market expansion. It was hoped that the business concept would account for the primary levels of livestock production and marketing that livestock producers, traders, vendors, and consumers in the value chain require to ensure that livestock resources and products efficiently move from production zones to consumers and terminal markets. The business concept, however, lacked a solid theoretical and practical foundation that would have allowed it

to have a positive impact on the organization of livestock production and marketing components in the pastoral economy, transforming it into an organized livestock marketing model for drylands. Participants in the study provided critical pillars for a well-organized livestock development strategy. These pillars consist of stakeholders, market categories, livestock production, points for adding value, the flow of products, and a balanced approach to reducing competition that may arise as a result of the implementation of the business model.

Comparing the objective of the business model with other similar concepts offered in the literature revealed that the organization of livestock marketing activity is advantageous and necessary for market access and coordination. Given the new livestock business opportunities presented piloted in pastoral areas, a well-organized, systematic, and pragmatic business system will strengthen the business ideas of start-ups and established enterprises, create and capture value for business diversity, and strengthen stakeholder relationships, the synergy of roles, and effective business deals and transactions in an environment of healthy competition. The business model emphasizes livestock producers and production zones as the determinants of livestock and livestock products traded in primary, secondary, and tertiary markets. Every market group includes outlets that generate opportunities for the consumption of dryland-produced animals and livestock products. The following diagram illustrates the framework of the business model.

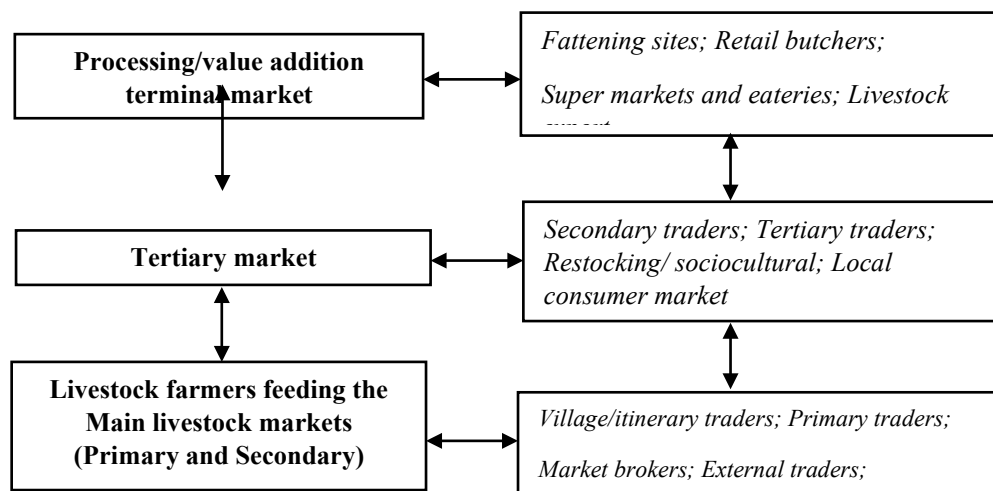


Figure 1: Organized Livestock Marketing Model for drylands

(II) Livestock Marketing Associations (LMAs) and Co-management Model

Intensive pastoralism is the dominant land use and production system in Kenya's drylands, according to studies. ASALs are home to 60% of all livestock in Kenya or roughly 60 million animals. For many years, bartering was the main way to market livestock. In 1996, the Kenya Livestock Marketing Council (CLMC) set up the Livestock Marketing Associations (LMA) as a way to organize, standardize, and commercialize the livestock trade in Kenya's drylands. The business intent is premised on the fact that regardless of any production system, business models are developed through phases and stages, and the conceptualization of innovative business models using market opportunities will reinforce the clustering of livestock traders into associations. This will not only make them more responsible for the marketing of livestock, but it will also make it easier for them to talk to each other, hence less competitive but highly productive.

The value added to the business strategy idea and co-management model is more robust and impactful in the organization of livestock trading activity in Turkana. It includes the transformation of livestock production areas; the mapping of primary markets and linking them to production zones; structuring livestock marketing activities in secondary markets and linking them strongly with primary markets as a source of supply; the mapping of tertiary, terminal, and export markets; and directing livestock business initiatives towards addressing the needs of every market category. The business model capitalizes on linkages among market stakeholders through well-designed coordination frameworks that guarantee communication and the sharing of ideas. The sustainability of livestock market projects is at the heart of the business model, in which the government and the people in charge of the livestock market work together to make money and make decisions on an equal footing.

The business model aims to address critical market gaps such as livestock traders' capacity development in various market categories, market governance, and management through the capacity strengthening of management committees, market functionality support, and performance in various markets, as well as the challenges that inhibit healthy competition. Taking into account the facts about the possible tools for developing a business model framework through the activation of learning on business models will strengthen the conceptualization and application of LMA and co-management model theoretical foundations for organization and better management of livestock markets in Turkana, including the creation and linking of several trader associations into cooperatives.

Through the business model, mentoring and coaching market stakeholders may strengthen their knowledge, abilities, and attitudes to impact the market's business agenda and the method of livestock business delivery. A good business model can serve as a canvas for improving business investments and procedures, which is consistent with the LMA's business objective. Business models can be improved, recreated, and made more profitable through research. Focusing on structuring livestock markets by creating and empowering livestock marketing organizations (LMAs) fosters leadership, shared responsibility, and harmony in the management and utilization of markets, which is a formula for commercial success. Through stakeholder consultative forums, the Livestock Marketing Association (LMA) and Co-Management Models were exposed to rigorous reviews and audits for the validation and perfection of the business models. During the evaluation of the business model, as it was conducted by County Livestock Marketing Council (CLMC), it was determined that around 50 percent of livestock markets in Turkana had successfully adopted the LMA strategy.

Concerning LMA systems, it was possible to engage in cartels, competitive rivalry, and poor market management and governance since the business model lacked substantial coordination, partnerships, relationships, and governance concerns, which have been added to the revised version. Stakeholders in the livestock industry in Turkana think that the business model will help structure and coordinate market activities and restore healthy competition to various market segments in a secure manner. The diagram of the revised LMA and Co-management model is shown below.

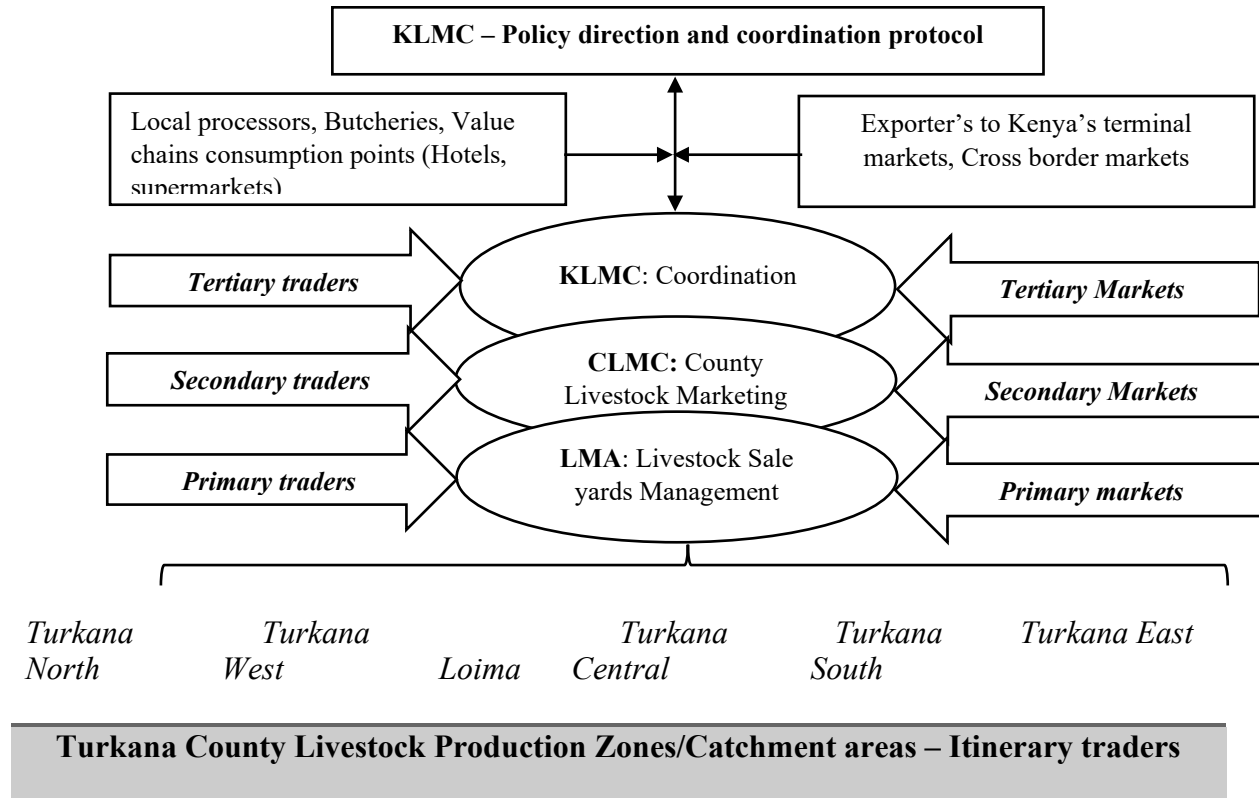


Figure 2: LMA and co-management Model

(III) The Meat and Livestock Assembly Model

Indonesia's Meat and Livestock Assembly Model concept was adopted by Kenyan in 2017 through government official benchmarking initiatives. It is a novel concept in the pastoral regions of Kenya. The objective is to establish livestock business corporations and a system for collecting livestock from production zones and distributing it via primary and secondary markets to fulfill the needs of tertiary, consumer, and export markets. Additionally, the business concept links the value chains of meat products, from slaughterhouses to consumption places. The model's strengths include the assembling of live animals for the market and the marketing of meat products to a variety of domestic and international consumer markets. The adaptability of this business model's structure allows for the modification and expansion of livestock company concepts. Good business modeling facilitates access to markets with reliable and competitive products.

To expedite the assembly of live animals, the model promotes farmer-to-farmer trading with specialties in areas such as breeding and fattening, resulting in a high level of economic relationships between farmers. The model also includes rural entrepreneurs who are self-employed and have strong business skills and experience, as well as a solid grasp of how to connect with potential markets. The majority of these dealers are wealthy and resourceful, allowing them to purchase livestock from farmers and transport them to market yards and slaughterhouses. Empowering cooperatives requires gathering livestock and meat value chains from farmers and butchers and transporting them to terminal markets at a fair cost. Business model research and value mapping will be used to strengthen the application of the model to farmer-to-farmer and trader relationships and to ensure a steady supply of livestock and livestock products in the defined markets.

The commissioning agents will facilitate livestock transactions between business partners with commission rights within the marketing system. Strengthening business relationships and utilizing a pragmatic approach to define business strategic areas will accelerate business cooperatives and mergers in the mobilization and communication of the supply of livestock and livestock products to various markets, as illustrated by the Meat and Livestock Assembly model. The auctioneers in the business model sell animals and/or deadweight meat to the highest bidders at public auctions. Animals that will be fattened, bred, or slaughtered will be purchased at an auction where traders, rather than the general public, constitute the vast majority of attendees. In market areas, many types of auctions may be placed, with some auctions catering to breeders and those seeking animals for fattening. Other auctions attract, among others, retail butchers, meat packers, and traders. Incorporated within the business concept for the livestock market are public markets.

In order to raise revenue from livestock sales and slaughters in the new facilities, the government will build auction markets and link them with commercial business organizations as part of the business model. Committees comprised of members from umbrella organizations will supervise the public markets. In addition, the business model assumes that certain meatpackers have their own purchasers for livestock and are located near ports or auction markets. This would imply that meat and livestock would be assembled in the same location. Activating model learning and identifying areas for strategy remaking and unlocking business innovation through the capitalization of existing and emerging business opportunities will enhance business model performance, especially in tertiary, terminal, and export markets.

Meat and Livestock Assembly Model for pastoral areas		
Step 8	Exporter's/ international trade	<i>International trade</i>
Step 7	Meat processors and packers	
Step 6	Terminal public and private markets	<i>Terminal market</i>
Step 5	Auctions/ tertiary markets	
Step 4	Order buyers/brokers	<i>Tertiary market</i>
Step 3	Local cooperatives	
Step 2	Rural traders	<i>Primary and secondary markets</i>
Step 1	Livestock farmers	
Operational livestock production and marketing systems		<i>Foundation</i>

Figure 3: Meat and Livestock Assembly Model

(IV) The Management of Livestock Market Yards Model

The selling of livestock in Turkana is efficiently shifting from barter to conventional marketing techniques, which involve the engagement of particular market parties, the creation of market facilities such as arenas and infrastructural amenities, and the segmentation of markets. However, the legal framework for the selling of livestock in Turkana is not yet in place, while stakeholders are consolidating their efforts on livestock marketing legislation. The management model for Turkana County Livestock Sale Yards is drafted in the form of a bill that outlines the structure and operations of livestock marketing in Turkana. The objective is to use the law to organize, structure, and prevent illegal activity in livestock markets.

The legal framework stipulates that the LMAs, under the supervision of the CLMC, are responsible for managing the sale yards on a daily basis (with a focus on market days and auction days), ensuring the repair and maintenance of market infrastructure, providing water and sanitary facilities, and safeguarding and protecting the market land of all market categories. In addition, the

law acknowledges the necessity for traders' trainers, overall sale yard management committees, and dispute resolution committees, as well as sale yard monitors, meat inspectors, and veterinary staff to provide clinical and public health services. Sale Yards Bill's business model and the legal framework include establishments, administration, logistics, animal welfare standards, trading systems, stakeholder capacity support, and the use of policy and regulations to foster compliance, ethics, and guidance in the development of livestock markets in Turkana. The integrative business model conceptual framework makes it simpler to incorporate existing knowledge and livestock market management into the theoretical and practical design of business management frameworks. The business entity ideas must be legitimized inside an entrepreneurial system; hence, it makes sense to incorporate the legal realm into livestock marketing business models. This business model's primary objectives are to ensure that all aspects of a livestock market are well-managed, to enhance governance, and to prevent individuals from exploiting weak leadership and poor administrative procedures. The diagram below displays the Sale Yards Management Model's components.

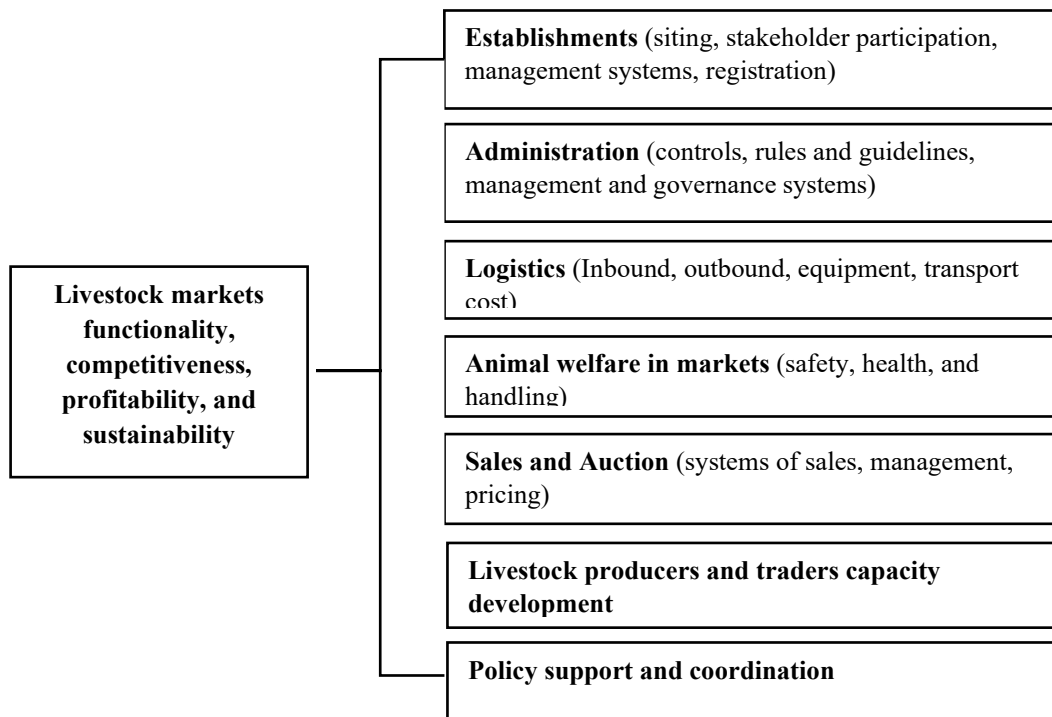


Figure 4: Market Yards and Management Model

IMPLICATIONS

The formulated recommendations for the improvement of livestock production and marketing through the application of crafted business models and marketing systems will establish a solid foundation that identifies and integrates the efforts of all livestock development stakeholders, thereby facilitating the synergistic and collaborative delivery of their respective roles. Through the incorporation of market intent into production and value addition activities, the business models will have a favorable effect on livestock producers, livestock production systems, and practices. For a very long time, livestock husbandry has been guided by traditional goals and techniques with less emphasis on the market. It is anticipated that livestock producers would comprehend the

market economy and connect their production goals with the market requirements and economic opportunities presented by multiple market categories and a larger consumer base.

The marketing of livestock and access to various markets will be guided by market research conducted on a regular basis as a means of monitoring and evaluating the performance of the newly implemented business models. As a result, livestock keepers, traders, and policymakers will be brought up to date on the structure of the livestock marketing system, and the resulting knowledge will be used to influence the critical pillars of markets and enhance the anticipated benefits of market engagements for market stakeholders. Through high-yielding business models and trading platforms, the Turkana government would structure livestock trade activities by promoting regularization and increasing investments in diverse dryland economies.

Researchers will develop insights that will aid in the creation and modification of business models as they are implemented in various dryland ecosystems. Positive outcomes from the adoption of the livestock business models will encourage additional research into integrating production into marketing, an aspect that is lacking in the existing livestock marketing system. The outcome of this research will facilitate the incorporation of poultry farming into the county livestock marketing framework. As Turkana is a pastoral region, local consumers favor meat from large stock. The results of the study will popularize poultry farming and the production of micro livestock e.g., insect farming and in order to meet the growing market demands, particularly those of the hospitality industry and the growing number of refugees in the country who are familiar with poultry and insect farming from their home countries.

RECOMMENDATIONS FOR APPLICATION

It is prudent to suggest that the government and development partners include livestock producers and traders in programs to combat illiteracy. This transformative project should also include programs to empower adolescents and women in order to integrate their efforts and investments into livestock production and marketing activities. To improve this outcome, the government and civil society develop and implement policies that encourage community development in which youth, women, and other minority groups actively participate in addressing issues pertaining to their well-being, utilizing opportunities presented by the livestock subsector and alternative livelihoods. The enactment of the Livestock production and Livestock sale yards and marketing statute for Turkana in 2023 will facilitate the institutionalization of the livestock business models and trading systems outlined in this study. The livestock marketing policy should be aligned with the governing laws of the country.

Government and civil society must shape markets by determining how each component of a market category must perform to provide economic returns that stakeholders who rely on it can be pleased with. This will increase the visibility of the livestock trade, tempting future entrepreneurs to invest in it. The joint efforts of livestock development players in creating the economy of pastoralists in dry lands should pool the resources necessary to establish livestock production and sale as a viable source of income. The lessons learned from the implementation of livestock business models should be applied to the redesign of the frameworks that will make them more competitive and productive. The coordination of livestock industry procedures is crucial. This will assist in enhancing the structure and performance of market operations. The management committees of the primary and secondary livestock markets in Turkana must collaborate closely with the county

directorates of livestock production, the trade department, and other government agencies involved in ensuring efficient and effective livestock trading.

CONCLUSION

The study emphasizes the significance of livestock for the socioeconomic development of livestock-dependent populations in dryland areas, as a vital source of income and investment capital. The majority of the people of Turkana rely on livestock not just as a source of food, but also as a significant source of money and nutrition. The only way to improve the livestock economy in drylands is to structure livestock production and marketing systems through the integration of technologies that result in healthy and productive resources and viable livestock business initiatives that are competitive and sustainable across all markets of interest.

The configuration of livestock production and marketing depends on the development, funding, and implementation of business ventures that can modify the economy of livestock-keeping populations and merchants and increase the satisfaction of different product customers. The county government of Turkana can sustain livestock development efforts by conducting research vital for knowledge mobilization and adaptation, allocating resources to support the realization of livestock development pillars, and continuously enhancing policies and regulations essential for livestock sector management.

SCOPE FOR FUTURE RESEARCH

The study of livestock production and marketing in arid regions is still in its infancy. There is insufficient information to justify the development of meaningful recommendations to lead actions and investments to transform pastoral economies. Multi-level studies are required to comprehensively address the production and sale of livestock, not just for large animals, but also for poultry and micro-livestock, which are crucial to food security and revenue. Coordination of stakeholders and management of consumer behavior are crucial study fields whose outcomes will improve business engagements based on solid stakeholder connections.

The supply and demand market factors and the influence of nonmarket variables such as law and business rules, taxation, and market security must be researched in greater depth to guide the implementation of livestock marketing systems. The importance of alternative livelihoods in the development of the livestock economy and the livelihoods of households is a key research area. This will yield insights that may be used to enhance livestock production, trade, and alternative livelihood maximization in displacement contexts that form part of the livestock market in Turkana.

Interest Conflicts

All authors declare that they have no conflicts of interest whatsoever in this publication.

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