

Organizing Livestock Markets in Kenya's Drylands: Evolution, Institutional Arrangements, Business Models and a Framework for Sustainable Market Coordination

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Abstract: Livestock production is central to the livelihoods and economies of pastoral and agro-pastoral communities in Kenya's drylands, yet its commercial potential is constrained by fragmented production and marketing systems, weak institutional coordination, inadequate infrastructure, information asymmetries, insecurity, climatic shocks and unequal bargaining power. This study examined the evolution, institutional arrangements and business models underpinning livestock-market organization in Kenya's drylands and developed a framework for sustainable market coordination. A qualitative-dominant multiple-case study design was employed, focusing on four models: the Organized Livestock Marketing Model, Livestock Marketing Associations (LMAs) and Co-management Model, Meat and Livestock Assembly Model, and Livestock Market-Yard Management Model. Turkana County constituted the principal empirical case, supplemented by evidence from Marsabit, Isiolo, Samburu, Baringo and Tana River. Data were collected through 45 semi-structured key-informant interviews, 10 focus group discussions, documentary review and direct market observation, and analyzed using thematic, historical, within-case and cross-case approaches. Findings show that the four models represent complementary dimensions of livestock-market development. The Organized Livestock Marketing Model provides market architecture by coordinating actors, information, livestock flows and market linkages. The LMA and Co-management Model strengthens collective action, representation and shared governance, although uneven implementation limits its effectiveness. The Meat and Livestock Assembly Model enhances aggregation, specialization, downstream linkages and value addition, while the Market-Yard Management Model institutionalizes infrastructure management, regulation, service delivery and commercial operations. The study concludes that sustainable livestock commercialization requires integration of these functions rather than isolated interventions. It proposes a Sustainable Livestock-Market Coordination Framework linking production, aggregation, market linkages, value addition and governance to improve connectivity, efficiency, competitiveness, commercial viability, resilience and institutional sustainability in Kenya's drylands.

Keywords: Livestock markets, Market coordination, Livestock commercialization, Institutional arrangements, Business models, Kenya's drylands.

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Introduction

Livestock production is central to the economies, livelihoods and food systems of pastoral and agro-pastoral communities in Kenya's drylands, providing food, income, employment, savings and insurance. However, its commercial potential is constrained by fragmented production and marketing systems, weak coordination and information flows, inadequate infrastructure, insecurity, climatic and animal-health risks, weak institutions and unequal bargaining power. These challenges are compounded by dispersed and mobile production, seasonal supply and recurrent drought, making effective market organization and governance essential for transforming livestock assets into reliable and sustainable commercial opportunities.

Well-functioning livestock markets can improve coordination among producers, traders, aggregators, processors and consumers; reduce transaction costs; strengthen price discovery

and bargaining power; facilitate aggregation and value addition; and create more predictable market linkages. However, market organization in drylands must respond to pastoral realities, including mobility, dispersed production, seasonality, weak infrastructure and the coexistence of formal and informal trading arrangements. This requires institutional and business models that combine commercial efficiency, collective action, effective governance and locally appropriate market services.

Against this background, four interrelated livestock-market models illustrate the evolution of market organization in Kenya's drylands. The Organized Livestock Marketing Model provides the foundation by organizing producers, traders, livestock flows and transactions to improve market coordination and access. The Livestock Marketing Associations (LMAs) and Co-management Model strengthens collective action, representation and shared governance among producers, traders, local authorities and other

market actors. The Meat and Livestock Assembly Model advances aggregation and commercialization by coordinating supply and demand, increasing marketable volumes, reducing transaction costs and strengthening linkages with slaughterhouses, processors, wholesalers and institutional buyers. The Livestock Market-Yard Management Model further institutionalizes market governance by integrating physical infrastructure with management, regulation, service delivery and revenue-generation mechanisms, thereby treating the livestock market as a managed commercial system rather than merely a place of exchange.

Together, these models represent complementary dimensions of an increasingly organized, coordinated and commercially oriented livestock-market system. Their evolution reflects a progression from organizing market actors and livestock flows, through collective governance and aggregation, towards commercialization and institutionalized management of market infrastructure and services. The models are not necessarily linear or mutually exclusive; rather, their effectiveness depends on how institutions, incentives, infrastructure and business functions are aligned with pastoral realities. Collectively, they provide a framework for understanding how livestock markets can become more efficient, inclusive, locally owned, financially viable and sustainable in Kenya's drylands.

Accordingly, the study examines the four models through the following objectives:

- i. To examine the Organized Livestock Marketing Model and its contribution to livestock-market organization and commercialization in Kenya's drylands.
- ii. To assess the LMA and Co-management Model and its contribution to collective action, market governance and institutional sustainability.
- iii. To examine the Meat and Livestock Assembly Model and its contribution to aggregation, market linkages, value addition and commercialization.
- iv. To evaluate the Livestock Market-Yard Management Model and its contribution to infrastructure management, regulation, service delivery and sustainable market operations.

Literature Review

Organization and Performance of Livestock Markets in Kenya's Drylands

Livestock markets and commercialization in Kenya's drylands

Livestock production is central to livelihoods and local economies in Kenya's arid and semi-arid lands (ASALs), providing pastoral and agro-pastoral households with income, food security, savings and productive assets. However, fragmented markets, inadequate infrastructure, information asymmetries, weak institutions, insecurity, climatic shocks and limited bargaining power constrain the conversion of livestock assets into reliable commercial returns. Consequently, livestock-market development increasingly requires not only higher production but also stronger market organization, integration and governance, linking producers, traders, processors, service providers and consumers across market levels.

Physical and institutional connectivity is particularly important for livestock-market performance. Using high-frequency livestock-price data from northern Kenya, [Chelanga et al. \(2022\)](#) found price transmission and convergence across pastoral markets, with larger markets influencing smaller ones and connected trading routes showing short- and long-run relationships. Improvements in roads, market infrastructure and telecommunications also strengthened market integration. These findings indicate that livestock markets function as interconnected networks rather than isolated physical marketplaces, supporting the importance of market categories, product flows and linkages examined in the present study.

Despite, market integration does not necessarily ensure equitable participation. Although connectivity can improve price transmission, proximity to production areas may still be associated with lower prices, indicating that structural and institutional factors influence how market benefits are distributed ([Chelanga et al., 2022](#); [Fisher et al., 2017](#)). Infrastructure improvements therefore need to be complemented by stronger institutions, information systems, competition and collective organization.

Collective organization, market institutions and bargaining power

The literature increasingly emphasizes collective action and institutional organization as mechanisms for addressing the disadvantages of dispersed pastoral producers and small-scale traders. The Livestock Marketing Association (LMA) and co-management approach examined in this study reflects this perspective by organizing market participants, improving information sharing, facilitating collective representation and strengthening engagement with government and market-support institutions.

Evidence from Turkana highlights the importance of these institutional dimensions. [Anno, Eipa and Emase \(2023\)](#) found that competition and market-access constraints significantly affected secondary livestock-market performance, with limited regulatory frameworks, informal marketing systems, insecurity, limited capital, unequal production capacity and competitive rivalry among key constraints. This suggests that market organization must address market structure, competition, regulation and actor capabilities, alongside physical market access. [Anno, Emase, and Etapar \(2023\)](#) also found that pricing strategies and consumer behaviour influence market performance, while weak price discovery and price-setting challenges can reduce market efficiency and consumer satisfaction. These findings underscore the need for transparent pricing, improved market information and stronger commercial relationships, indicating that organized markets require coordination of information, supply, demand and market relationships beyond physical trading spaces.

Recent research on quality-based livestock payments further supports this institutional perspective. In Kenya's conflict-prone Kerio Valley, buyers' adoption of quality-based payment mechanisms was influenced by value-chain organization and financing, market-system development, livestock quality and perceptions of value, while seasonal conditions and security affected implementation feasibility ([Sala et al., 2020](#)). Effective market organization can therefore support both market access and the shift from undifferentiated pricing toward systems that reward

quality and better align producer incentives with downstream demand.

Aggregation, value addition and market integration

A further development in the literature is the recognition that pastoral livestock commercialization requires aggregation and vertical market integration. Because pastoral production is dispersed and seasonal, larger buyers require predictable volumes, quality and delivery schedules. The Meat and Livestock Assembly Model addresses this by linking farmers, traders, cooperatives, order buyers, brokers, auctions, terminal markets, processors and exporters. [Dabasso et al. \(2021\)](#) found that pastoralists in Kenya were adapting production and marketing practices to meet the requirements of cattle-fattening enterprises. This creates pathways for sourcing lean animals from pastoral areas and transferring them to better production environments for finishing, demonstrating how specialization and vertical coordination can generate additional value.

Value addition is particularly important in Turkana, where livestock markets, abattoirs and meat enterprises connect producers to consumers. [Anno \(2025\)](#) found that these enterprises were constrained by inadequate financing, conflict, regulatory challenges, long distances, and political, economic, technological and environmental factors. The study calls for stronger market orientation, capitalization, diversification and institutional arrangements, supporting the extension of livestock-market organization beyond live-animal transactions to slaughter, processing, packaging and distribution.

Market information, climate shocks and resilience

Market organization in drylands must account for the interaction between market participation and climatic shocks. [Sala et al. \(2020\)](#), studying commercial fodder markets in Isiolo, found that participation was influenced by access to credit, weather and market information, exposure to shocks, off-farm income and proximity to towns, highlighting how institutional and information constraints affect integration into wider markets. Evidence from the severe 2021-2023 drought further underscores these relationships. [Ndiritu and Gichuki \(2025\)](#), using data from 1,053 pastoral households in Kenya's ASALs, found that drought and conflict significantly influenced livestock-market participation and channel choice. Informal sources, including neighbours, family members and local traders, remained important sources of market information, while formal channels had less influence. They recommend strengthening localized market-information systems and supporting marketing cooperatives and common-interest groups to improve coordination and bargaining power.

These findings imply that dryland livestock markets must be flexible enough to withstand drought, insecurity, disease, transport disruptions and price volatility. The research study therefore proposes integrating risk information, alternative market outlets and contingency mechanisms into livestock-market development, supporting a shift towards resilient market systems that sustain commercial relationships during and after shocks.

Business-Model Design and Institutional Coordination

The rationale is grounded in business-model literature, which emphasizes the identification of relevant actors, definition of clear value propositions, coordination of resources and activities, and establishment of mechanisms for creating, delivering and

capturing value. These elements provide a useful basis for understanding how market institutions can be organized to improve coordination and commercial performance ([Bocken, Rana, & Short, 2015](#); [Müller, Poandl, & Glinik, 2019](#); [Nyariki, 2009](#)).

Business-model frameworks also provide mechanisms for developing and refining organizational strategies. [Ebel, Bretschneider, and Leimeister \(2016\)](#) demonstrate their usefulness in supporting business-model development, while [Bitetti \(2019\)](#) emphasizes the importance of learning and adaptation as business models evolve. Similarly, [Sort and Nielsen \(2018\)](#) and [Wirtz et al. \(2016\)](#) show that business models can facilitate the coordination of resources, activities and relationships while supporting investment and organizational development.

A further contribution of the literature concerns market access and value creation across interconnected activities. [Evans et al. \(2017\)](#) emphasize that effective business models can improve market access by aligning products and services with customer requirements, while value-mapping approaches help identify how value is created, delivered and captured across different actors and activities. [Wirtz and Daier \(2017\)](#) therefore advocate integrative approaches to business-model design that connect multiple organizational and market dimensions. [Kuratko, Bloodgood, and Hornsby \(2017\)](#) further highlight the importance of institutional legitimacy in entrepreneurial systems, suggesting that commercially viable business models also depend on credible institutional arrangements and relationships among market actors.

Overall, the literature suggests that business models should be understood not merely as firm-level commercial tools, but as mechanisms for coordinating actors, resources, relationships and value flows within wider market systems. This provides a strong conceptual basis for examining institutional arrangements and business models in livestock markets.

Synthesis and research gap

Recent literature increasingly views livestock marketing not simply as animal exchange but as a coordinated market system involving infrastructure, information, institutions, collective organization, competition, aggregation, value addition and risk management. Evidence from northern Kenya highlights market integration and infrastructure; Turkana studies emphasize competition, pricing and market access; Isiolo research identifies institutional determinants of market participation; and drought-period studies stress information and flexible marketing channels. However, the literature largely examines these elements separately rather than explaining how they can be integrated into a coherent institutional and business-model architecture. This study addresses the gap by combining four complementary approaches: the Organized Livestock Marketing Model, LMA and Co-management Model, Meat and Livestock Assembly Model, and Livestock Market-Yard Management Model.

The evidence supports an integrated framework linking production with aggregation, market linkages, value addition and governance. This is particularly relevant to Turkana and other dryland counties, where market performance depends on interactions among actors, infrastructure, information, institutions, competition and downstream demand. The study therefore shifts the focus from isolated interventions towards demand-driven, commercially viable and institutionally sustainable livestock-market systems.

Methodology

Study Design, Cases and Sampling

The study used a qualitative-dominant multiple-case study design, focusing on four analytical cases: the Organized Livestock Marketing Model, Livestock Marketing Associations and Co-management Model, Meat and Livestock Assembly Model, and Livestock Market-Yard Management Model. Turkana County was the main empirical case, supplemented by evidence from Marsabit, Isiolo, Samburu, Baringo and Tana River. Units of analysis included market systems, institutions, businesses and key market actors. Purposive, criterion-based and snowball sampling were used to select cases and participants. Data comprised 45 semi-structured key-informant interviews and 10 focus group discussions.

Data Sources and Data Collection

Data were drawn from documentary, historical and primary sources, including policies, plans, reports, market records, bylaws, business plans, feasibility studies and academic literature. Primary

data comprised key-informant interviews, focus group discussions and direct market observation. The study examined model evolution, governance, stakeholder roles, commercial incentives, business models, market linkages, resilience and sustainability. Market-system mapping and observation captured key livestock, information, financial and institutional flows. Documentary evidence, stakeholder perspectives and observed practices were triangulated to strengthen validity.

Data Analysis, Synthesis and Trustworthiness

Data were analyzed using thematic, historical, within-case and cross-case analysis. A common analytical matrix assessed market evolution, actors, governance, infrastructure, information, aggregation, commercial viability, linkages, regulation, inclusion, resilience and sustainability. Findings informed a Sustainable Livestock-Market Coordination Framework centred on connectivity, institutional coordination, commercial viability, efficiency, inclusiveness, resilience and sustainability. Trustworthiness was strengthened through triangulation, member checking, audit trails and documentation of contradictory cases. Informed consent and confidentiality were maintained throughout

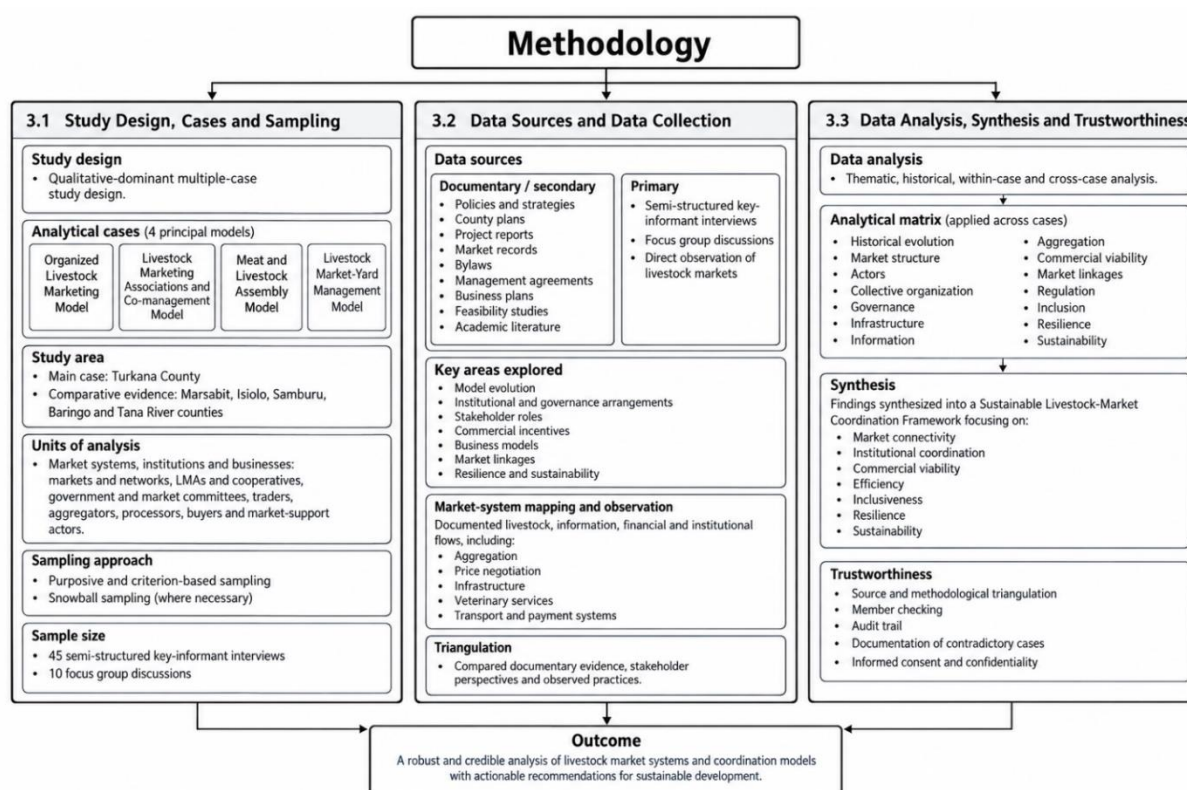


Figure 1: Study methodology framework. Source: Researcher made.

Results

The Organized Livestock Marketing Model Framework

Origin, Evolution and Rationale of the Model

The organized livestock marketing approach in Kenya's pastoral areas can be traced to the Drought Response Programme of the Arid Lands Resource Management Project (ALRMP), conceptualized in the late 1990s to strengthen the economies of livestock-dependent communities through market-oriented livestock production and market development. Its underlying premise was that pastoral livestock production could generate

greater economic returns when livestock and livestock products were systematically linked across the value chain, from producers and primary traders to secondary and terminal markets and ultimately to consumers. The model emerged in response to fragmented livestock marketing systems in which weak coordination, limited market information, poor infrastructure and unequal bargaining relationships constrained commercialization.

The central rationale of the model is that livestock commercialization requires more than increasing production; it requires coordination between production, marketing, value addition and final demand. Without such coordination, producers may sell animals without adequate information on prevailing prices

or downstream demand, while traders and processors may face unreliable supply, inconsistent quality and high transaction costs. Organizing the market system can therefore improve information flows, clarify market roles, strengthen linkages between market levels and reduce avoidable inefficiencies.

Structure and Key Dimensions of the Organized Marketing Model

The Organized Livestock Marketing Model conceptualizes livestock marketing as an interconnected system rather than a series of isolated transactions. It comprises six principal dimensions: stakeholders, market categories, livestock production, value-addition points, product flows, and competitive relationships. Stakeholders include producers, primary and secondary traders, transporters, service providers, processors and consumers. Market categories distinguish the different levels and functions through which livestock and livestock products move, while production provides the initial supply base. Value-addition points identify stages at which livestock or livestock products can be upgraded, processed or differentiated to meet market requirements. Product flows illustrate the movement of animals and products through successive market levels, while competitive relationships capture the interactions, bargaining processes and power relations among market participants.

These dimensions provide an analytical framework for understanding how livestock move from production areas to differentiated markets and how value is created and distributed along the chain. The model therefore links production decisions to market demand, allowing market requirements such as volume,

quality, timing and price to inform production and marketing decisions. In this sense, the model provides a framework for organizing both the physical movement of livestock and the relationships, information and transactions that support that movement.

Institutional Coordination, Competition and Market Performance

The Organized Livestock Marketing Model can consequently be understood as both a marketing framework and an institutional coordination mechanism. Its principal objective is to establish clearer and more functional relationships among producers, traders, service providers, processors and consumers while connecting production areas with appropriate market categories. This is particularly important in pastoral systems where weak market institutions can result in information asymmetries, unequal bargaining power, restricted access to buyers and dysfunctional competitive practices.

In contexts such as Turkana, these conditions can undermine transparent price formation and constrain the participation of smaller producers and traders. Organized marketing can address these challenges by clarifying stakeholder roles, strengthening communication and information sharing, improving coordination across market levels and reducing avoidable conflicts. The ultimate purpose is therefore not simply to increase the volume of livestock traded, but to create a more coordinated, transparent, competitive and demand-responsive livestock market system in which different actors can participate and capture greater value.

The Organized Livestock Marketing Model for Drylands

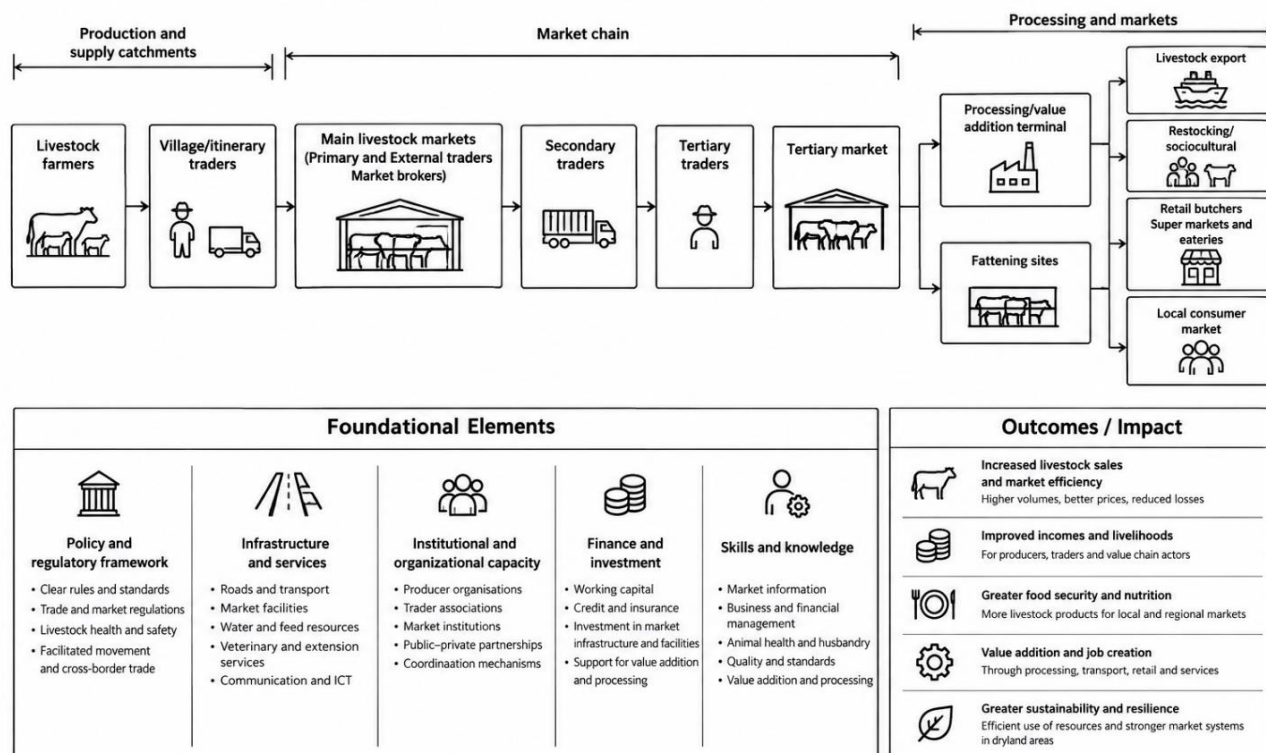


Figure 2: Drylands Organized Marketing System. Source: Researcher made.

The model provides the foundation for subsequent institutional innovations because organization at the system level creates the conditions for collective action, aggregation,

governance and value addition. However, organization alone does not necessarily resolve problems associated with market governance, collective representation or infrastructure

management. These limitations provide the rationale for the development of livestock marketing associations and co-management arrangements.

Livestock Marketing Associations and Co-management Model

Collective Organization of Livestock Marketing

Collective organization represents a second dimension of livestock-market development in Kenya's drylands. Livestock Marketing Associations (LMAs) emerged as an institutional mechanism for organizing market participants and strengthening their capacity to participate collectively in livestock commerce. The approach is particularly relevant to pastoral markets, where individual producers and traders often operate with limited bargaining power, inadequate market information and weak access to formal business institutions. By clustering market participants into organized associations, the LMA model provides platforms for information sharing, collective representation, negotiation, market governance and engagement with government and other market-support institutions.

The model therefore addresses four broad market-system functions: capacity development, market governance, market functionality and competitive market development. Capacity development strengthens the knowledge and skills of traders and other market participants; governance promotes transparent decision-making and accountability; market functionality focuses on the availability and effective use of market infrastructure and services; while competitive market development seeks to reduce practices that distort competition. Mentoring and coaching can further strengthen the knowledge, skills and attitudes required for effective participation in market governance and commercial decision-making.

Integrated Market Architecture and Coordination

The LMA model extends beyond the organization of individual traders by linking different categories of livestock markets into a coordinated system. Its principal components include the transformation and mapping of livestock production areas; identification of primary markets and their links with production zones; organization of secondary markets and their supply relationships with primary markets; identification of tertiary, terminal and export markets; and alignment of market activities with the requirements of each market category.

This architecture recognizes that livestock markets are not isolated points of exchange but interconnected networks through which animals, information, finance and services move. Strengthening linkages among production areas and primary, secondary, tertiary, terminal and export markets can improve

supply reliability, facilitate aggregation and create opportunities for economies of scale. In Turkana, stronger LMAs and their integration into larger cooperative structures could potentially increase collective bargaining power, improve access to market information, facilitate livestock aggregation and strengthen relationships with processors and terminal-market buyers.

The coordination function is particularly important because collective organization alone does not automatically resolve market-system constraints. Effective LMAs require linkages with government agencies, producer organizations, market committees, traders, financial institutions, processors and buyers. Such relationships can improve access to services, information, finance and markets while creating a more coherent institutional structure for livestock commercialization.

Co-management, Governance and Institutional Sustainability

An important feature of the model is co-management, through which public institutions, market committees, traders, producer organizations and other stakeholders share responsibilities for market operations, infrastructure, governance and problem-solving. Co-management can strengthen accountability and ownership while creating incentives for market users to contribute to the maintenance and improvement of market facilities. It also provides a platform for addressing conflicts, coordinating market activities and strengthening transparency in market decision-making.

Stakeholder consultations and assessments indicate that implementation has remained uneven. The reported finding that approximately 48% of livestock markets fully implemented the model suggests that institutional adoption alone does not guarantee effective market governance. Weak coordination, inadequate partnerships, poor governance and competitive rivalry can undermine the intended benefits of collective organization. The model therefore needs to move beyond association formation towards a broader institutional architecture incorporating coordination, accountability, partnerships, market information, conflict management and commercial incentives.

The implication is that sustainable LMA development requires both strong member organizations and effective co-management arrangements. The emphasis should consequently shift from simply establishing associations towards building capable, accountable and commercially oriented institutions that can coordinate market actors, manage shared infrastructure, negotiate collectively, resolve conflicts and sustain relationships with higher-value markets. This provides the basis for the enhanced LMA and Co-management Model.

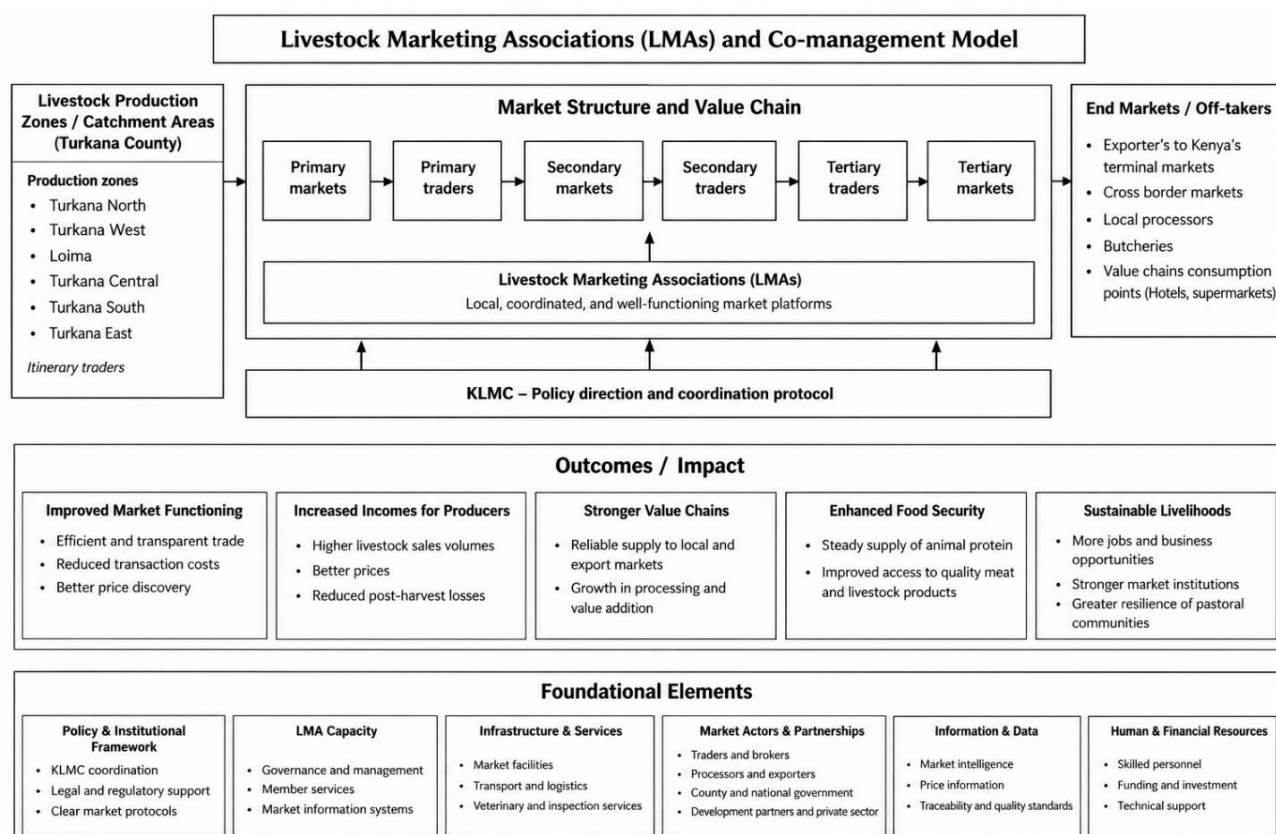


Figure 3: LMAs and Co-Management Model. Source: Researcher made.

The LMA model consequently represents an important transition from individual participation in livestock markets towards collective market governance. Nevertheless, collective organization must be accompanied by mechanisms for aggregating livestock and linking production to larger and more diversified markets. This provides the rationale for the Meat and Livestock Assembly Model.

The Meat and Livestock Assembly Model

Evolution, Purpose and Commercial Aggregation

The Meat and Livestock Assembly Model represents a further evolution of livestock-market development towards commercial aggregation and value-chain integration. The concept was introduced into Kenya through government benchmarking initiatives drawing on experiences from Indonesia and was subsequently considered for application in pastoral areas. Its central premise is that livestock commercialization can be strengthened by establishing organized mechanisms for aggregating animals from dispersed production areas and connecting them to primary, secondary, tertiary, terminal and export markets.

The model is particularly relevant to pastoral systems, where livestock production is geographically dispersed and animals are often marketed individually or in small consignments. Organized aggregation can reduce transaction costs, generate economies of scale and improve the capacity of producers and traders to meet the volume, quality and timing requirements of larger buyers. Importantly, the model goes beyond the physical assembly of animals by linking live-animal markets with downstream meat value chains, thereby creating opportunities for value addition beyond the sale of livestock.

Market Actors, Roles and Value-Chain Specialization

The model establishes a network of market actors with differentiated and complementary roles. Livestock farmers constitute the production base; rural traders aggregate animals from producers; cooperatives facilitate collective mobilization and marketing; order buyers and brokers connect supply with identified demand; auctioneers facilitate organized exchange; terminal public markets provide larger-scale aggregation and redistribution; while meat processors, packers and exporters connect livestock and meat products to domestic and international consumers.

The model also promotes specialization and business diversification across the livestock value chain. Farmer-to-farmer transactions can support differentiated production functions such as breeding and fattening, while rural traders specialize in aggregation and market intermediation. Cooperatives can coordinate collective marketing and negotiate with processors and other large buyers, whereas order buyers can procure livestock according to slaughterhouse and processor specifications. Other actors can participate in transport, brokerage, slaughter, meat processing, packaging and distribution. Such specialization creates opportunities for actors to capture value at different stages rather than relying exclusively on live-animal sales.

Auctions, Market Coordination and Enabling Conditions

Auctions constitute an important mechanism within the assembly model because they can bring different categories of buyers and sellers together in an organized market environment. Different auction formats can serve breeders, livestock finishers, traders, butchers, meat processors and other commercial buyers. Transparent auction arrangements can improve price discovery and competition. However, their effectiveness depends on credible

governance, reliable market information, adequate infrastructure, effective enforcement and participation by a sufficiently diverse range of buyers.

The model therefore requires more than the physical assembly of livestock. It requires the coordinated assembly of information, buyers, finance, logistics, standards and supporting services. Physical aggregation without effective demand coordination may simply transfer transaction costs from one level

of the market to another. The Meat and Livestock Assembly Model can consequently be conceptualized as a commercial integration mechanism linking dispersed pastoral production with increasingly sophisticated downstream markets. Its effectiveness depends on the capacity of cooperatives, traders, brokers, auctioneers, processors and public institutions to coordinate supply and demand and to facilitate efficient movement of livestock and meat products through the value chain.

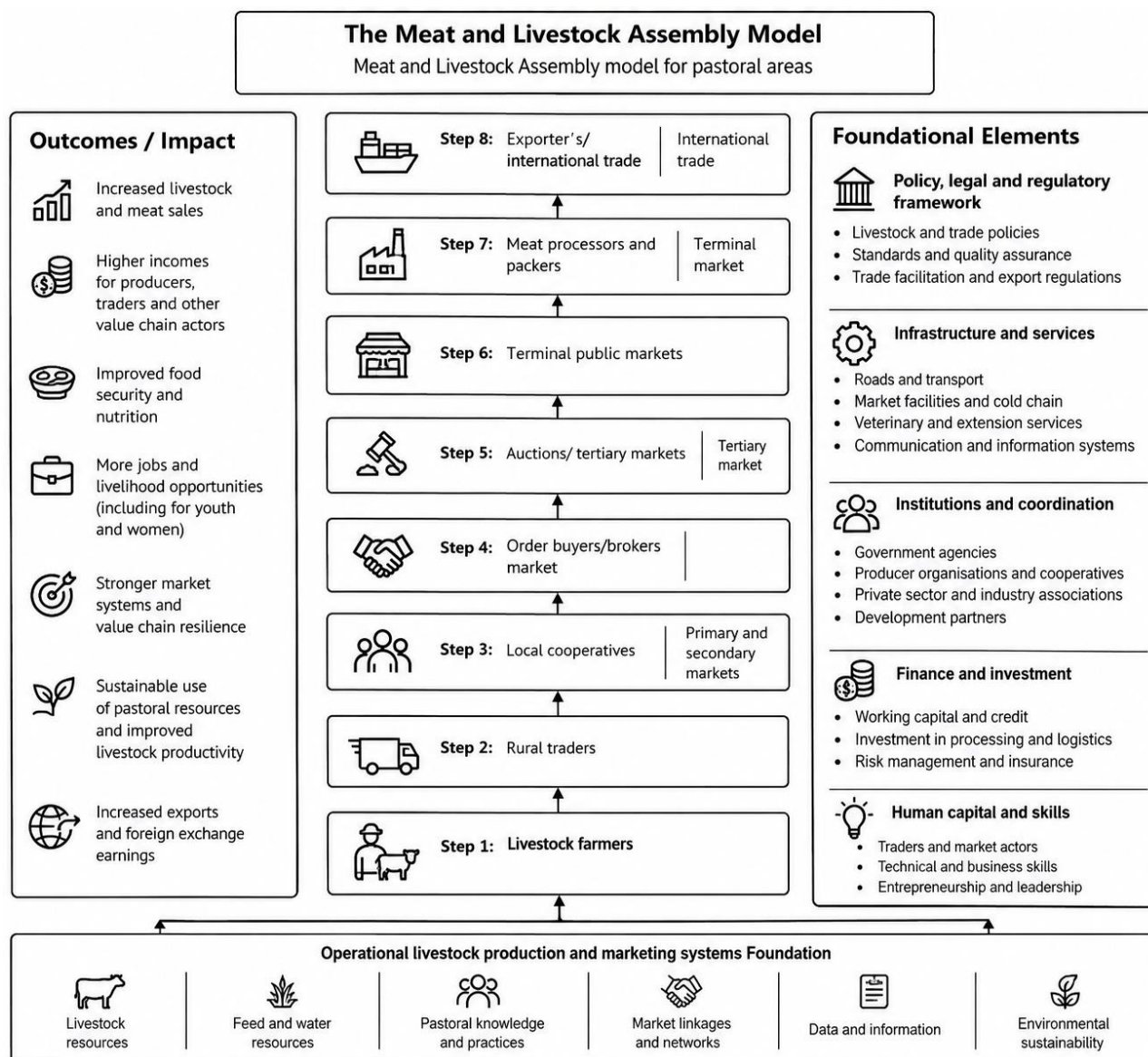


Figure 4: Pastoral Economy Meat and Livestock Assembly model. Source: Researcher made.

The model establishes a progressive market pathway in which livestock farmers supply rural traders and local cooperatives, who in turn connect producers to order buyers and brokers. Livestock then moves through tertiary and auction markets to terminal public markets, followed by meat processors and packers, and ultimately reaches export and international markets. This pathway provides a framework for strengthening market linkages while creating opportunities for value addition and specialization. It also creates a basis for integrating business-model learning and adaptation into livestock-market development, particularly as market opportunities, consumer preferences and commercial requirements change.

The Livestock Market-Yard Management Model

Market Administration, Governance and Institutional Arrangements

The Livestock Market-Yard Management Model addresses an institutional dimension that is often overlooked in livestock-market development: the management and regulation of the physical spaces in which livestock transactions occur. In Turkana, livestock marketing is increasingly shifting from traditional exchange and barter arrangements towards more conventional commercial systems involving designated market actors, sale yards, auction facilities and supporting infrastructure. This transition creates a need for formal governance arrangements

capable of managing market infrastructure, regulating transactions and protecting the interests of market participants.

The model therefore establishes clear responsibilities for market administration, infrastructure management, conflict resolution, market monitoring and coordination of market operations. Livestock Marketing Associations (LMAs), operating under appropriate institutional oversight, would assume responsibility for day-to-day market management, particularly on market and auction days. Market management committees would provide oversight, while mechanisms for resolving disputes and protecting market land would strengthen accountability and continuity of operations.

Market Infrastructure, Trading Operations and Support Services

The model links market-yard management with the provision and maintenance of the physical and technical services required for efficient livestock trading. LMA functions would include maintenance of market infrastructure, provision of water and sanitation services, protection of market facilities and coordination of market-day activities. The framework also incorporates trading systems and trader-support functions to facilitate orderly and transparent transactions.

Because livestock markets involve more than commercial exchange, the model incorporates specialized services such as veterinary personnel, meat inspectors, market monitors and animal-welfare functions. These services address animal health, public

health, food safety, animal welfare and consumer protection while supporting efficient market operations. Stakeholder capacity development is also included to strengthen the ability of market managers, traders and other actors to comply with market procedures and effectively participate in commercial livestock markets.

Legal, Regulatory, Compliance and Commercial Sustainability

The Livestock Market-Yard Management Model integrates business-model development with a legal and regulatory framework. This recognizes that business models operate within institutional environments that determine what market actors can do, how transactions are governed and how accountability is established. The proposed framework consequently recognizes that commercial livestock markets require both economic incentives and institutional rules. Infrastructure without governance may be vulnerable to misuse, exclusion and deterioration, while regulation without viable commercial incentives may impose compliance costs without improving market performance. Effective market-yard management therefore requires alignment between infrastructure, governance, commercial incentives and enforcement. The six core areas of the framework administration and governance; infrastructure and logistics; livestock welfare and veterinary services; trading systems; stakeholder capacity development; and policy, regulation and compliance collectively provide the institutional and commercial foundation for sustainable livestock market-yard management.

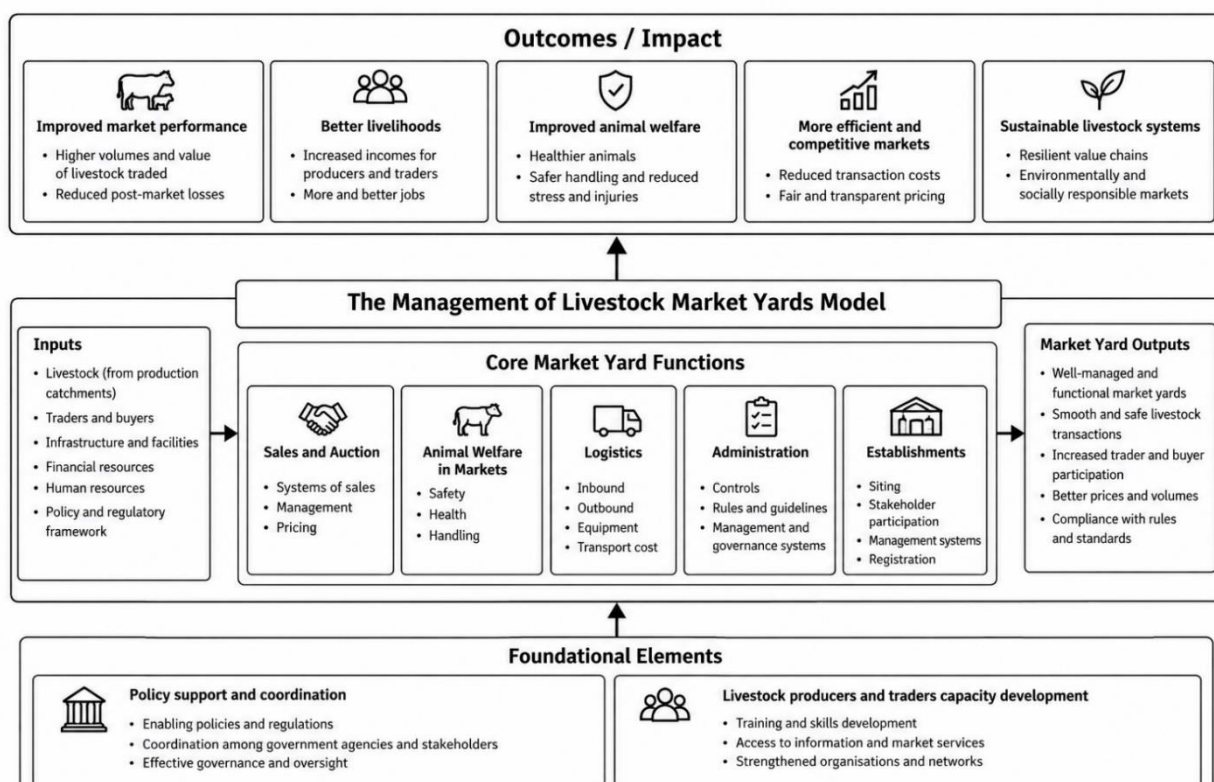


Figure 5: Livestock Markets-Yard Management. Source: Researcher made.

The model represents the institutionalization of livestock-market management. Whereas the Organized Livestock Marketing Model focuses primarily on organizing market relationships and flows, the LMA and Co-management Model emphasizes collective organization, the Meat and Livestock Assembly Model focuses on

aggregation and commercialization, and the Market-Yard Management Model provides the governance and regulatory architecture required to sustain these arrangements.

Integrating the Four Models into a Dryland Livestock-Market Framework

The four models should not be interpreted as independent interventions but as complementary dimensions of a broader livestock-market system. The Organized Livestock Marketing Model establishes the basic architecture of the market system by identifying actors, market categories, production areas, value-addition points and product flows. The Livestock Marketing Associations (LMA) and Co-management Model strengthens collective organization, participation and shared governance among market actors. The Meat and Livestock Assembly Model enhances aggregation, specialization and vertical linkages between different levels of the market, while the Livestock Market-Yard Management Model provides the physical infrastructure, regulatory arrangements and institutional mechanisms required to facilitate and sustain market transactions.

Taken together, the models suggest a five-layer institutional architecture comprising the production layer, where livestock producers and production systems generate marketable animals; the aggregation and coordination layer, where traders, cooperatives, LMAs and brokers organize supply and facilitate transactions; the market-linkage layer, which connects producers and aggregators to primary, secondary, tertiary and terminal markets and differentiated sources of demand; the value-addition layer, involving slaughterhouses, processors, packers and other enterprises that transform livestock into higher-value products; and the governance and enabling-environment layer, where government institutions, market committees, regulations, market-information systems and support organizations create the conditions for effective and inclusive market functioning.

This integrated perspective therefore shifts attention from isolated market interventions towards the performance of the entire livestock-market system. The effectiveness of one layer depends partly on the functionality of the others. Improved livestock production, for instance, may generate limited benefits where reliable aggregation and market access are absent; functional markets may encourage rent-seeking, exclusion or conflict where governance and transparency are weak; and stronger aggregation may fail to capture substantial economic opportunities where downstream processing and value addition remain underdeveloped. The four models are consequently best understood as interconnected institutional mechanisms that collectively strengthen production, coordination, market access, value creation and governance across the livestock value chain.

Summary of Study Results

The study identified four complementary models reflecting the evolution of livestock-market organization in Kenya's drylands. The Organized Livestock Marketing Model established the foundational market architecture by linking producers, traders, service providers, processors and consumers. Its main contribution was coordinating production, market flows, information, value addition and stakeholder relationships around demand. The findings show that commercialization requires coordination beyond production, particularly where fragmented markets, weak information, poor infrastructure and unequal bargaining constrain performance.

The Livestock Marketing Associations (LMA) and Co-management Model highlighted the importance of collective

organization, participation and shared governance. LMAs facilitate information sharing, collective negotiation and participation in market governance, while co-management supports shared responsibility for operations, infrastructure and conflict resolution. However, only about 48% of livestock markets had fully implemented the model, showing that associations alone are insufficient. Effective implementation requires stronger coordination, accountability, partnerships, information, conflict management and commercial incentives.

The Meat and Livestock Assembly Model extended market organization through commercial aggregation, specialization and vertical integration. The findings show that dispersed pastoral production requires mechanisms linking producers and traders to larger markets through rural traders, cooperatives, order buyers, brokers, auctioneers, terminal markets, processors, packers and exporters. The model supports economies of scale, price discovery, market linkages and value addition, but its effectiveness also depends on coordinated demand, information, finance, logistics, standards, infrastructure and governance.

The Livestock Market-Yard Management Model provided the institutional, infrastructural and regulatory foundation for sustained market operations. It integrates governance, infrastructure, logistics, veterinary and welfare services, trading systems, stakeholder capacity, regulation and compliance. Overall, the four models are interdependent rather than standalone interventions: organized marketing provides market architecture; LMAs and co-management provide collective governance; the assembly model supports aggregation and commercial linkages; and market-yard management provides the institutional and physical environment for transactions. Together, they form an integrated dryland livestock-market framework linking production, aggregation, market coordination, market linkages, value addition and governance to strengthen connectivity, commercial viability, efficiency, transparency and sustainable participation.

Implications for Livestock Market Development in Turkana

System-Based Market Organization and Commercial Collective Action

- a. **Market organization as a system-level intervention.** Livestock-market development should be treated as a system-level intervention rather than as a single infrastructure or institutional activity. Effective market development requires simultaneous attention to production, aggregation, market linkages, value addition, governance and enabling institutions.
- b. **Commercially oriented collective organization.** Livestock Marketing Associations (LMAs) and cooperatives should not be established solely as administrative structures. Their sustainability should depend on their ability to provide tangible economic benefits to members, including aggregation, market information, collective bargaining, access to buyers, business services and reduced transaction costs.
- c. **Integration of aggregation and value addition.** Aggregation and value addition should be developed together. Aggregating animals without reliable downstream demand may not generate sustainable commercial returns, while processors and large buyers

require consistent supplies in terms of volume, quality and timing. Stronger contractual and relational linkages among producer organizations, traders, processors and terminal buyers can therefore improve market reliability.

Competitive, Informed and Connected Livestock Markets

- a. **Governance that promotes competition.** Market governance should promote competition rather than merely regulate market participation. Excessive concentration of buying power, information asymmetries and exclusionary practices can weaken price discovery and reduce the benefits of commercialization. Transparent rules, accessible information, diverse buyers and effective dispute-resolution mechanisms are therefore essential for competitive livestock markets.
- b. **Integration of market information and digital technologies.** Market information and digital technologies should be integrated into market organization. Information on prices, demand, livestock quality, market days, transport opportunities and disease risks can reduce information asymmetries and strengthen commercial decision-making. Digital platforms should complement rather than replace physical market institutions.
- c. **Cross-border and regional market linkages.** Cross-border and regional market linkages deserve greater attention. Turkana's geographical position creates opportunities for domestic, regional and cross-border livestock trade. Strengthening formal trade corridors, harmonizing standards and improving market information could expand the range of markets accessible to pastoral producers and traders.

Risk-Resilient and Sustainable Market Systems

- a. **Integration of climate and market risks.** Climate and market risks should be incorporated into livestock-market models. Drought, disease outbreaks, insecurity, transport disruptions and price volatility can rapidly alter livestock supply and market demand.
- b. **Risk-management mechanisms.** Resilient market systems should therefore incorporate risk information, livestock insurance, contingency planning, flexible market linkages and alternative outlets. These mechanisms can help producers, traders and other market actors respond to shocks while maintaining market participation.
- c. **Implication for Turkana and other dryland counties.** Taken together, the four models indicate that sustainable livestock-market development requires an integrated system that combines market organization, collective commercial action, competitive governance, aggregation and value addition, information and digital connectivity, regional market linkages, and climate-risk management. This provides a stronger foundation for improving pastoral incomes, market efficiency and resilience in Turkana and comparable dryland counties.

Discussion

The findings show that livestock-market development in Kenya's drylands has evolved from facilitating transactions towards a broader institutional and commercial approach to market-system coordination. The four models the Organized Livestock Marketing Model, LMA and Co-management Model, Meat and Livestock Assembly Model, and Livestock Market-Yard Management Model represent complementary responses to interconnected market constraints. While infrastructure, transport and telecommunications improve connectivity, effective markets also require actor organization, information exchange, collective decision-making, aggregation, infrastructure management and accountable governance. The models should therefore be viewed as complementary institutional arrangements rather than successive stages.

Collective organization is particularly important for addressing dispersed production, weak bargaining power and coordination challenges. The LMA and Co-management Model facilitates information sharing, negotiation, governance and infrastructure management, but its uneven implementation only about 48% of markets reportedly fully implement the model shows that institutional formation alone does not ensure effective collective action. LMAs and cooperatives should therefore be assessed by the economic and governance services they provide, including aggregation, bargaining, buyer linkages, conflict resolution and transaction-cost reduction. Similarly, the Meat and Livestock Assembly Model addresses dispersed and seasonal supply through aggregation and larger-buyer linkages, while the Market-Yard Management Model shows that infrastructure creates commercial value only when supported by effective administration, maintenance, veterinary and inspection services, transparent trading, regulation and sustainable revenue mechanisms.

Overall, the study advances an integrated market-system perspective in which performance depends on the interaction of production, aggregation and coordination, market linkages, value addition, and governance and the enabling environment. This architecture is especially relevant to drylands, where drought, disease, insecurity, climate variability and market volatility can disrupt individual components and the wider system. Sustainable development therefore requires a shift from project-based investments in infrastructure and institutions towards demand-driven systems characterized by functional organizations, demand-responsive aggregation, professionally managed infrastructure, reliable market information, fair competition and risk management. Success should be measured through market participation, price transparency, transaction efficiency, trading volumes, profitability, value addition, competitive access and resilience, rather than infrastructure constructed, associations formed or stakeholders trained.

Conclusion

This study demonstrates that livestock-market development in Kenya's drylands has evolved from fragmented, transactional systems towards more organized, collective, commercially oriented and institutionally governed market systems. The four models examined the Organized Livestock Marketing Model, LMA and Co-management Model, Meat and Livestock Assembly Model, and Livestock Market-Yard Management Model represent complementary functions in this evolution: market organization,

collective coordination, aggregation and value addition, and infrastructure and governance. Collectively, they show that effective livestock markets are not merely physical trading spaces but institutional and commercial systems that coordinate livestock, information, finance, services and value.

The study concludes that no single model can address the structural and contextual constraints to livestock commercialization in drylands. Sustainable market development requires alignment of collective action, aggregation, market information and linkages, infrastructure, value addition, finance, governance, regulation and risk management. LMAs and cooperatives must therefore develop commercially relevant functions such as collective marketing, price information, bargaining and buyer linkages, while aggregation and infrastructure must be supported by predictable demand, logistics, finance, quality assurance, veterinary services, transparent management and sustainable revenue mechanisms. Market performance ultimately depends on the interaction of institutions, incentives, infrastructure, actors and commercial relationships.

The study contributes an integrated Sustainable Livestock-Market Coordination Framework for transitioning from fragmented, project-based interventions to demand-driven, commercially viable and resilient market systems. The framework links market organization, collective coordination, commercial aggregation and value addition, and institutionalized governance within a supportive enabling environment. For Turkana and other dryland counties, success should be measured not by markets constructed or stakeholders trained, but by improved market participation, price discovery, transaction efficiency, volumes, profitability, value addition, competition, repeat commercial relationships and resilience. This approach can reposition livestock from primarily a subsistence and asset-security resource to a stronger foundation for enterprise, income generation, value creation and regional economic integration.

Recommendations

The livestock market development stakeholders should undertake the following:

1. Adopt an integrated livestock-market system approach.
2. Strengthen LMAs and cooperatives as commercially oriented organizations.
3. Establish transparent and accessible livestock-market information systems.
4. Develop structured aggregation and reliable market linkages.
5. Promote value addition and downstream livestock enterprises.
6. Institutionalize professional management of livestock market yards.
7. Strengthen competition, price discovery and market governance.
8. Integrate climate, disease, insecurity and market risks into market planning.
9. Strengthen domestic, cross-border and regional livestock-market linkages.
10. Establish a performance-based framework for sustainable market coordination.

Overall, these recommendations imply that the priority for Turkana and other dryland counties should be to build a functioning market system not simply more markets. The emphasis should be on connecting organized producers and traders to reliable demand, strengthening commercially viable institutions, improving information and competition, adding value, professionally managing infrastructure and embedding resilience and risk management throughout the system.

Areas for Future Research

Future research should move from documenting constraints to testing institutional, technological, commercial and resilience mechanisms that improve market performance over time.

Priority areas are comparative model evaluation, digital information, climate resilience, commercial viability and institutional sustainability using longitudinal and mixed-methods research.

Disclaimer

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Interest Conflicts

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