

From Pastoral Production to Competitive Markets: Navigating Livestock Production and Trade Challenges in Turkana County, Kenya

Ekiru Francis Anno*

Selinus University of Sciences and Literature (SUSL), Ragusa, Italy

Corresponding Author: Ekiru Francis Anno

Selinus University of Sciences and Literature (SUSL), Ragusa, Italy

Article History

Received: 19 / 07 / 2026

Accepted: 26 / 08 / 2026

Published: 13 / 09 / 2026

Abstract: Livestock trade is central to the economies and livelihoods of pastoral communities in Africa's drylands, yet its potential is constrained by climate variability, weak market infrastructure, limited market information, inadequate capital, insecurity, animal diseases, informal marketing arrangements, and unequal competitive conditions among traders. This study examined the challenges affecting livestock trade in Turkana County, Kenya, with particular attention to livestock production and market access, trader competitive rivalry, and the implications of market organization for pastoral livelihoods. A case-study approach was applied to three livestock markets in Lodwar, Lokichoggio, and Kainuk towns. Primary data were obtained from 168 livestock-market respondents, with 56 respondents selected from each market. The analysis employed descriptive statistics, chi-square tests, Kruskal–Wallis tests, post-hoc comparisons, one-way analysis of variance, reliability analysis, and simple linear regression. Results indicate substantial constraints in livestock production and market access. The overall market-access scale had a mean score of 2.51 (SD = 0.61), with significant differences among Lodwar (M = 2.89), Kainuk (M = 2.54), and Lokichoggio (M = 2.09) markets. Competitive rivalry was also significant, with an overall mean of 3.12 (SD = 0.63); Lodwar recorded the highest mean (M = 3.62), compared with Lokichoggio (M = 2.79) and Kainuk (M = 2.94). Regression analysis showed that trader competitive rivalry significantly predicted livestock production and market access, $\beta = 0.381$, $t = 5.536$, $p < .001$, explaining 15.1% of the adjusted variation. The findings demonstrate that competition in dryland livestock markets is not inherently beneficial when it operates through unequal access to capital, information, market networks, and institutional influence. Sustainable livestock trade therefore requires a systems-oriented approach combining market infrastructure, animal health, climate resilience, transparent pricing, market information, trader finance, producer organization, inclusive governance, and strengthened cross-border trade arrangements. The study concludes that transforming dryland livestock trade from predominantly informal and subsistence-oriented transactions into transparent, market-oriented and resilient value chains is essential for improving pastoral incomes, food security and regional economic development.

Keywords: livestock trade, drylands, pastoralism, market access, competitive rivalry, livestock markets, Turkana County, pastoral livelihoods, Kenya.

How to Cite in APA format: Anno, E. F. (2026). From Pastoral Production to Competitive Markets: Navigating Livestock Production and Trade Challenges in Turkana County, Kenya. *IRASS Journal of Economics and Business Management*. 3(9), 20-30.

1. Introduction

Livestock production is central to rural economies in dryland Africa, providing pastoral households with food, income, savings, employment, social security and a key asset during economic shocks. Livestock markets therefore play an important role in linking producers to consumers, urban demand, processing enterprises and regional trade. In eastern Africa, pastoral systems have traditionally relied on mobility, herd diversification and flexible rangeland use, but climate change, recurrent drought, disease, insecurity, population growth, changing land use and mobility restrictions increasingly affect both production and marketing.

In Turkana, livestock marketing continues to be constrained by weak infrastructure, high transport costs, inadequate market information and credit, insecurity, low and unstable producer prices, disease, inadequate pasture and water, and restricted mobility. These constraints limit market participation and reduce incentives to invest in livestock productivity. At the same time,

differences in traders' capital, information, market networks and bargaining power can create unequal competition, price discrimination and weak market organization.

Cross-border trade further complicates market governance because formal and informal trading arrangements coexist across Kenya, Ethiopia and Somalia. This study therefore examines livestock production and trade challenges from an integrated market perspective, focusing on production and market access, competitive rivalry among traders, and the institutional, infrastructural and socioeconomic factors influencing the functionality of dryland livestock markets.

1.1 Problem statement

Turkana County possesses substantial livestock resources and a long-established pastoral economy, yet livestock trade has not fully translated these resources into sustained commercial and livelihood benefits. Long distances to markets, inadequate

infrastructure, drought, animal disease, insecurity, weak market information, limited capital, and informal marketing arrangements increase transaction costs and weaken bargaining power. These challenges are compounded by unequal competition, whereby better-capitalized traders with stronger market networks can purchase livestock from producers and smaller traders and gain greater control over access to larger markets, limiting local aggregation and value retention within pastoral communities.

While existing research has documented individual constraints such as drought, transport costs, disease, and weak infrastructure, there is a need to examine how these factors interact with competitive rivalry and market organization. The key issue is therefore not merely the existence of livestock markets, but whether they function efficiently and equitably to enable producers, traders, and consumers to participate effectively and share the benefits of livestock commercialization.

1.2 General objective

The study examined the challenges affecting livestock production and trade in dryland pastoral markets, using Turkana County, Kenya, as a case study.

1.3 Specific objectives

The study sought to:

1. characterize livestock production and market access in selected pastoral livestock markets;
2. assess the level and nature of competitive rivalry among livestock traders;
3. determine whether competitive rivalry significantly affects livestock production and market access; and
4. identify institutional, infrastructural and socioeconomic strategies for improving livestock trade in dryland areas.

1.4 Research hypothesis

The study tested the null hypothesis:

- **H₀:** Trader competitive rivalry has no significant effect on livestock production and market access in pastoral livestock markets.

1.5 Significance of the study

The study contributes to understanding how dryland livestock markets can be transformed into more efficient and inclusive economic institutions. Its findings are relevant to county and national governments, livestock marketing associations, producer organizations, development agencies, traders, pastoral households and investors seeking to strengthen livestock value chains.

2. Literature Review

2.1 Livestock Production, Pastoral Livelihoods and Dryland Vulnerability

2.1.1 Livestock production and socioeconomic importance

Livestock production is a cornerstone of livelihoods and local economies in Kenya's arid and semi-arid lands (ASALs), which support over 70% of the country's livestock and about 46.3% of national beef production. Predominantly pastoral systems rely on variable rangeland resources and provide households with

milk, meat, income, savings, wealth accumulation, and insurance against shocks ([Odhong et al., 2025](#)). In Turkana and similar dryland areas, livestock are particularly important for meeting household needs such as food, education, health care, veterinary services, debt repayment, and investment. However, livestock ownership alone does not guarantee improved welfare; the benefits depend on households' ability to maintain productive herds and access profitable markets, with production conditions, market access, prices, transaction costs, and institutional arrangements determining the extent to which livestock assets translate into sustainable income and resilience.

2.1.2 Production constraints, climate variability and pastoral vulnerability

Livestock productivity in Kenya's drylands is highly dependent on the availability of pasture, browse and water, with drought and climate variability reducing feed and water resources, weakening animal condition, increasing disease and mortality, and lowering milk production, livestock quality and market value. These challenges interact with disease, land-use pressures, conflict, biodiversity loss and weak resource-governance institutions, thereby reducing marketable livestock surplus and increasing households' reliance on livestock sales ([Odhong et al., 2025](#)).

Evidence from Turkana shows that favorable rainfall can improve pasture, browse, livestock body condition, milk production and livestock prices, although disease and food insecurity may persist despite environmental recovery ([NDMA, 2024](#)). Beyond climatic shocks, environmental degradation, changing land use, food insecurity and limited access to productive resources further constrain pastoral livelihoods, highlighting the need for integrated livestock interventions that address interconnected environmental, production and socioeconomic challenges rather than isolated constraints ([Siedenburg, 2021](#)).

2.2 Livestock Marketing Systems and Household Livelihoods

2.2.1 Livestock markets as pathways from production to income

Livestock marketing is the principal mechanism through which pastoral households convert livestock assets into cash and involves producers, traders, brokers, transporters, market institutions, infrastructure, information systems, financial services, and consumers. An efficient marketing system performs functions such as assembling, transporting, grading, financing, negotiating, processing, and distributing livestock and livestock products, thereby creating time, place, and form utility. Market participation is important for pastoral livelihoods because livestock sales provide cash for household needs and function as savings and insurance, although participation is influenced by household and herd characteristics, production conditions, and market access ([Lutta et al., 2021](#); [Abate et al., 2021](#)).

However, marketing outcomes should be assessed not only by the volume of livestock sold but also by their contribution to household welfare and the preservation of productive assets, since strategic sales can support herd management while distress sales during drought and other crises can accelerate asset depletion. Consequently, livestock market development should be integrated with measures that strengthen production, risk management, and household resilience.

2.2.2 Commercialization and market participation

Commercialization in livestock systems depends not only on physical access to markets but also on adequate herd size and quality, reliable market information, transport, finance, animal-health services, extension support, grazing and feed availability, and producers' bargaining capacity. Factors such as education, livestock prices and distance to markets also influence market participation and its intensity ([Abate et al., 2021](#); [Lutta et al., 2021](#)). Livestock commercialization can improve household welfare by increasing income and reducing poverty, as demonstrated among drought-prone pastoral households in Ethiopia, although high transaction costs can discourage participation ([Yitayew et al., 2023](#)). Therefore, strengthening commercialization requires reducing the financial, logistical and market risks associated with livestock sales rather than simply encouraging households to sell more animals.

2.3 Market Access, Infrastructure and Transaction Costs

2.3.1 Physical infrastructure and market connectivity

Infrastructure is a critical determinant of livestock-market performance in pastoral areas because roads, markets, holding grounds, watering points, loading facilities, slaughterhouses, quarantine facilities and transport systems influence transaction costs, market access and the efficiency of livestock movement. Poor infrastructure increases costs, reduces competition and limits producers' access to distant, higher-value markets. Empirical evidence shows that improved market infrastructure can increase market participation and farmers' earnings, while distance to markets remains a significant constraint in pastoral areas ([Zelege et al., 2021](#); [Lutta et al., 2021](#)). In Turkana, limited infrastructure, insecurity, inadequate capital, informal marketing arrangements and regulatory weaknesses further constrain secondary livestock-market performance ([Anno et al., 2023](#)). Therefore, infrastructure investments should be integrated with improvements in market information, finance, animal-health services and market organization to achieve sustainable improvements in livestock marketing.

2.3.2 Transport and livestock movement

Transport and market connectivity are critical to pastoral economies because livestock production areas are often far from major consumption centres. High transport costs and long-distance trekking can reduce livestock weight and quality, increase disease exposure and mortality, and lower producers' returns, particularly disadvantaging small traders. However, infrastructure development must be compatible with pastoral mobility and communal grazing systems. Roads, livestock corridors, markets and watering points should therefore be planned alongside rangeland governance to improve market access without restricting access to grazing resources or undermining pastoral livelihoods ([Akall, 2021](#)).

2.4 Market Information, Pricing, Brokers and Collective Action

2.4.1 Market information and bargaining power

Information is critical to livestock-market participation because timely access to prices, demand, quality requirements, buyers, weather and disease information strengthens producers' bargaining power and reduces dependence on intermediaries. Evidence shows that market access, livestock prices, education, grazing resources and feed availability influence

commercialization, while informal networks such as neighbours, family and community members remain important sources of market information, particularly during droughts ([Abate et al., 2021](#); [Ndiritu & Gichuki, 2025](#)). Although mobile phones and digital platforms can improve access to market information, electronic payments, buyer identification and early warnings, their effectiveness depends on network coverage, affordability, literacy, trust and institutional support. Therefore, effective livestock information systems should combine digital technologies with trusted, locally embedded communication and extension networks.

2.4.2 Brokers and intermediaries

Brokers and other intermediaries play important roles in livestock markets by connecting dispersed producers and buyers, reducing search and transaction costs, sharing market information, negotiating prices and facilitating transport. However, reliance on intermediaries can weaken producers' bargaining power when they lack reliable price information or alternative buyers. Therefore, policy should focus on improving market transparency and competition rather than eliminating brokers, through transparent weighing and grading, accessible price information, stronger producer organizations and direct links between producers and larger buyers.

2.4.3 Producer organizations and collective marketing

Collective action through cooperatives, producer groups and livestock marketing associations can overcome multiple market constraints by aggregating livestock, lowering transport costs, strengthening bargaining power, improving access to finance and market information, and linking small producers with larger buyers. Evidence from northern Kenya's camel-milk sector, particularly Isiolo, shows that flexible, socially embedded networks involving producers, transporters, collectors, sellers and cooperatives help coordinate production, transportation, collection and sales while adapting to uncertainty. Thus, collective organization can promote commercialization and improve market access while complementing rather than replacing locally embedded pastoral institutions.

2.5 Competition, Market Structure and Market Performance in Turkana

2.5.1 Competition and competitive rivalry

Competition can improve livestock-market efficiency by promoting price discovery, innovation, better services and responsiveness to demand, but its benefits are not automatically equitable. Evidence from Turkana shows that competition and market access significantly affect secondary livestock-market performance, while limited capital, insecurity, climate change, informal marketing systems, weak regulation and unequal trader capacities can restrict these benefits ([Anno et al., 2023](#)). [Anno et al. \(2024\)](#) further demonstrate that unequal financial and commercial capacities among traders can result in uneven outcomes, highlighting the need for appropriate institutional regulation to ensure that competition supports productive, fair and organized livestock-market development rather than exploitation.

2.5.2 Strengthening local competitiveness

Improving market performance requires more than increasing the number of traders; it involves strengthening the capabilities of local traders and producers, expanding access to finance and market information, improving infrastructure,

strengthening market institutions, and establishing transparent participation rules. In Turkana, building local and regional trading capacity can help retain more livestock value within pastoral economies. [Anno \(2026\)](#) further highlights the importance of information, market access, trader capabilities, and competitive conditions in shaping rivalry and competitiveness in secondary livestock markets. Overall, competition should therefore be understood not simply by the number of market participants, but by who competes, the resources and opportunities available to them, the rules governing participation, and the resulting effects on producers and market performance.

2.6 Livestock Value Addition, Gender and Inclusive Commercialization

2.6.1 Value addition and diversification

Pastoral commercialization should move beyond live-animal sales by promoting value addition through aggregation, grading, fattening, milk and meat processing, hides and skins, improved handling, packaging and specialized transport. Evidence from northern Kenya's camel-milk sector shows that developed collection, cooling, transport, financial and urban distribution networks can create income and employment while enabling pastoralists to respond to changing markets ([Nori, 2023](#)). Similarly, abattoirs and meat enterprises in Turkana offer opportunities to retain more value locally, although their success depends on adequate infrastructure, finance, market organization, regulation and security ([Anno, 2025](#)). Overall, value addition is most effective when production, aggregation, transport, processing and marketing are strengthened as an integrated value chain.

2.6.2 Gender and inclusive market participation

Market participation is socially differentiated, with women and youth often facing barriers to livestock assets, finance, information, mobility, training and decision-making. Evidence from Ethiopia shows that gender influences participation in small-ruminant value chains, marketing decisions and control over income, meaning that participation alone does not guarantee women's economic empowerment ([Kinati et al., 2023](#)). Inclusive livestock-market development should therefore promote not only participation but also ownership, agency, decision-making and control over income, while recognizing women and youth as producers, traders, processors, transporters, service providers and entrepreneurs. Collective marketing, targeted finance, entrepreneurship training, digital market information and value addition can help expand their opportunities and ensure more equitable distribution of livestock-market benefits.

2.7 Climate Risk, Animal Health, Rangeland Governance and Market Resilience

2.7.1 Drought, market participation and distress sales

Climate variability, particularly drought, affects the entire livestock value chain by reducing pasture and water availability, weakening livestock condition, increasing mortality, lowering marketable surplus and forcing households to sell animals to meet urgent cash needs. Evidence from drought-prone Ethiopia shows that livestock-market participation can increase household income and reduce poverty, although high transaction costs may limit participation ([Yitayew et al., 2023](#)).

Importantly, livestock sales may reflect either strategic commercialization, where households sell under favorable

conditions while maintaining productive assets, or distress asset liquidation, where animals are sold because of drought, hunger, disease or insecurity. Therefore, resilient livestock marketing requires integration with early-warning systems, feed markets, veterinary services, livestock insurance, savings, credit and social protection to reduce pressure on households to sell productive assets at unfavorable prices.

2.7.2 Rangeland management and pastoral mobility

Livestock markets depend on healthy rangelands and pastoral mobility, which enable households to access variable pasture and water and maintain livestock productivity and marketable surpluses. Evidence from Kenya shows that combining community-based rangeland management with livestock-marketing interventions can improve animal nutrition, health, fertility, adaptive capacity, and food and nutrition security, while effective governance requires coherent institutional and legal frameworks. Therefore, livestock-market development should protect the ecological resource base by ensuring that roads, settlements, irrigation, markets, and other investments maintain access to grazing areas, water points, and livestock corridors.

2.7.3 Animal health and market access

Animal health is essential to livestock productivity, quality, market value and access to high-value markets, as diseases can reduce growth, fertility, milk production and survival while restricting animal movement and trade. At the same time, livestock markets and corridors can facilitate disease transmission when animals from different areas are concentrated. Evidence from Turkana shows that even where pasture availability and animal body condition improve, high disease prevalence can persist, demonstrating that feed security alone is insufficient for producing market-ready livestock. Therefore, veterinary services, vaccination, disease surveillance, quarantine, certification and traceability should be integrated into livestock market systems, with predictable and risk-based disease-control measures that protect animal and public health without unnecessarily restricting pastoral mobility and legitimate trade ([NDMA, 2024](#)).

2.8 Domestic, Cross-Border Trade and Policy Institutions

2.8.1 Regional and cross-border livestock trade

Livestock markets in northern Kenya are closely connected to regional markets in Ethiopia, Uganda, South Sudan, Somalia and the wider Horn of Africa, with cross-border trade expanding market opportunities and generating income and employment across the livestock value chain. However, such trade is affected by border regulations, animal-health requirements, taxation, insecurity, infrastructure and political relations, leading traders and pastoralists to combine formal and informal channels in response to institutional costs and opportunities ([Little et al., 2015](#)). In Turkana, strengthening cross-border livestock trade therefore requires improved roads and border markets, stronger animal-health and quarantine systems, reliable market information, enhanced security and predictable regulations, alongside regional harmonization of health standards, documentation and border procedures to reduce transaction costs and promote legitimate trade.

2.8.2 Policy and institutional environment

Livestock marketing is strongly influenced by policies and institutions governing animal health, rangelands, infrastructure,

taxation, finance, trade, food safety, security and social inclusion. Poorly coordinated policies can create unnecessary movement restrictions, market closures, high transaction costs and weak investment incentives, while predictable regulations and effective institutions can reduce uncertainty and promote commercialization. Policy should also recognize the important role of informal institutions such as brokers, traders, customary systems and producer networks in pastoral economies; therefore, formalization should focus on improving incentives, services, transparency and coordination rather than eliminating existing informal arrangements.

2.9 Integrated Pathways to Livestock Market Performance and Pastoral Resilience

The reviewed literature shows that livestock production and marketing in drylands are closely interconnected systems in which production resources determine livestock productivity and marketable surplus, while market access, information, finance, organization, competition and infrastructure influence transaction costs, bargaining power and market performance, ultimately

affecting household income, food security and resilience. These processes are shaped by cross-cutting factors such as drought and climate variability, animal disease, rangeland governance, insecurity, gender and institutional arrangements, which can either constrain or strengthen participation in livestock markets. The evidence therefore supports integrated livestock-development approaches that combine production, rangeland management, market infrastructure, information, finance and institutional support rather than isolated interventions, as demonstrated by [Odhong et al. \(2025\)](#) and evidence from Turkana showing the importance of market infrastructure, trader competitiveness, organization and access for improved livestock-market performance ([Anno et al., 2023, 2024](#)).

2.10 Conceptual framework

The study conceptualizes dryland livestock trade as a system in which production capacity, market access, competitive conditions, institutional governance and climatic and security risks jointly influence market performance as presented in the figure below:

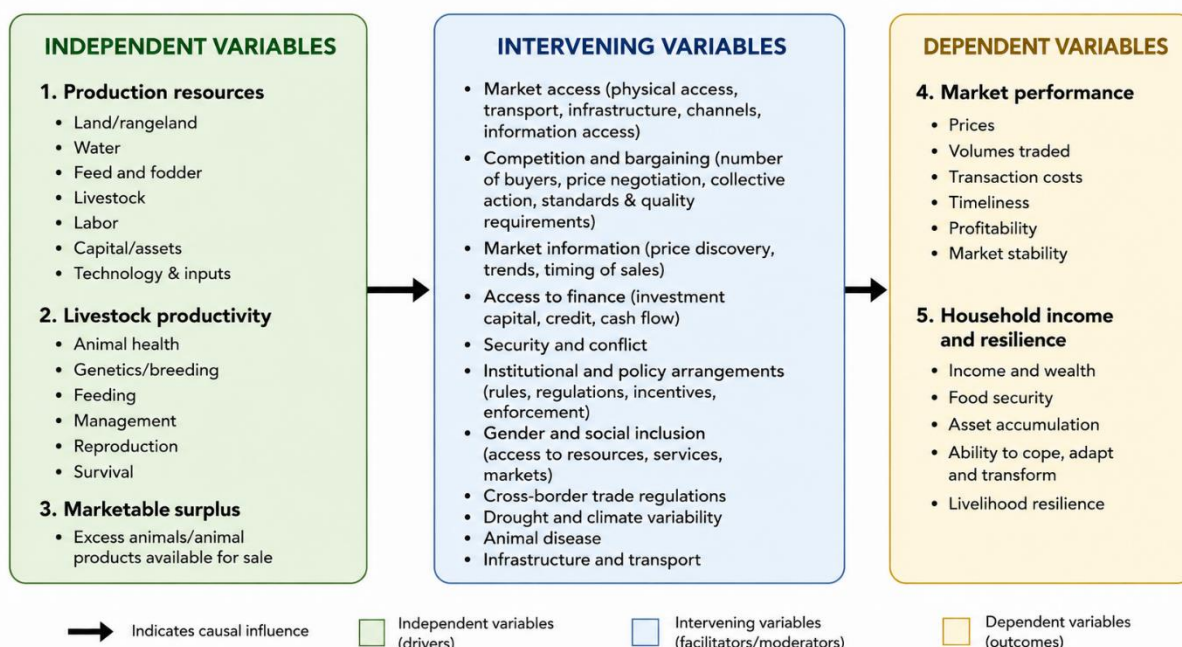


Figure 1: Study Conceptual Framework

The framework implies that improving livestock trade requires simultaneous interventions at production, market, institutional and policy levels.

3. Methodology

3.1 Research design

The study used a case-study design focusing on livestock markets in Turkana County. The approach combined quantitative analysis of livestock-market respondents with contextual evidence concerning livestock production, marketing institutions and market governance.

The study's empirical setting comprised three secondary livestock markets: Lodwar, Lokichoggio and Kainuk. The three markets provided a basis for comparing market conditions within different pastoral production and trading environments.

3.2 Study population and sampling

The primary study population comprised livestock traders operating in the selected markets. The study sampled 168 primary respondents, with 56 respondents from each of the three markets. The respondent distribution was therefore balanced across markets. The broader study also involved government and civil-society actors as secondary respondents. These stakeholders were relevant to understanding livestock policy, market administration, development programming, peace and security and community development.

3.3 Data collection

The primary instrument was a structured/semi-structured questionnaire addressing livestock production and market access, trader competition and rivalry, and related market conditions. The

broader study also incorporated stakeholder and contextual information. The questionnaire contained Likert-scale statements measuring the principal constructs. The market-access construct retained seven statements, while trader competitive rivalry was measured using nine statements.

3.4 Data analysis

Descriptive statistics were used to summarize numerical and categorical variables. Means and standard deviations were calculated for numerical variables, while frequencies and percentages were used for categorical variables. Chi-square tests were applied to categorical comparisons. Because some numerical variables did not satisfy assumptions of normality and homogeneity of variance, the Kruskal–Wallis test was used for comparisons among the three markets, with post-hoc comparisons where appropriate.

One-way analysis of variance was used to compare mean scores across market groups. Reliability analysis was undertaken using Cronbach's alpha before scale construction. The source study retained items meeting the specified reliability criterion. Simple linear regression was used to estimate the effect of trader competitive rivalry on livestock production and market access.

The regression model was specified as:

$$[Y = \beta_0 + \beta_1 X + \epsilon]$$

where:

- (Y) = livestock production and market access;
- (X) = trader competitive rivalry;
- (β_0) = constant;
- (β_1) = regression coefficient; and
- (ϵ) = error term.

Statistical significance was evaluated at the 5% level.

4. Results

4.1 Respondent characteristics

The study involved 168 respondents distributed equally across the three markets. The mean respondent age was 37.10 years (SD = 8.96), ranging from 19 to 70 years. Male respondents constituted 85.1% of the sample, while females represented 14.9%. Approximately 75% of respondents were classified as non-literate in the source dataset, while 4.8% had certificate-level education. Respondents had an average of 12.59 years of livestock-production/marketing experience (SD = 6.16). Approximately 95.2% identified livestock keeping as their main occupation.

The high proportion of male respondents demonstrates the gendered structure of livestock commerce in the study area and supports the need for interventions that expand women's participation in livestock enterprises.

4.2 Livestock production and market access

The overall livestock production and market-access scale produced a mean of 2.51 (SD = 0.61), indicating an overall position close to neutral on the five-point scale. Market-level differences were substantial. Lodwar recorded the highest mean score at 2.89 (SD = 0.50), followed by Kainuk at 2.54 (SD = 0.54), while Lokichoggio recorded the lowest score at 2.09 (SD = 0.50). The differences were statistically significant, $F(2, 165) = 34.253$, $p < .001$. Post-hoc tests showed significant differences among all three market pairs.

Several individual indicators reveal the structural weakness of the market system. Only 3.0% of respondents agreed that value addition for livestock productivity was being considered, while 75.6% strongly disagreed. Similarly, 35.1% strongly disagreed that livestock marketing systems were efficient, competitive and sustainable, and 46.4% strongly disagreed that research and market surveys were regularly conducted. These results indicate that the principal problem is not the absence of livestock markets but their limited functionality, weak value addition and inadequate market intelligence.

Table 1. Selected indicators of livestock production and market access

Indicator	Mean	SD
Livestock production is real and progressive	2.88	1.20
Availability of pasture and water	2.35	1.12
Livestock marketing is large in scope and size	3.05	1.27
Producers, traders and consumers benefit	3.52	1.32
Value addition is considered	1.43	0.82
Marketing systems are efficient and sustainable	2.36	1.25
Research and market surveys are regularized	1.95	1.07
Overall scale	2.51	0.61

Source: Study survey data.

The particularly low score for value addition indicates that livestock trade remains concentrated on the sale of live animals rather than processing, grading, branding, meat processing, hides and skins, breeding services and other higher-value activities.

4.3 Competitive rivalry among traders

The competitive-rivalry scale recorded an overall mean of 3.12 (SD = 0.63). Lodwar had the highest mean score (3.62), followed by Kainuk (2.94) and Lokichoggio (2.79). The difference was statistically significant, $F(2, 165) = 39.966$, $p < .001$.

Vol-3, Iss-9 (September-2026)

Respondents generally acknowledged that producers and traders relate with one another, with 29.2% agreeing and 19.6% strongly agreeing that producers and traders relate well. Similarly, 34.5% agreed and 23.2% strongly agreed that traders relate well among themselves.

However, the findings become more problematic when respondents assessed the effects of competition. About 35.7%

strongly disagreed that competition was beneficial to individuals and the subsector. At the same time, 24.4% strongly agreed and 23.8% agreed that competitive rivalry was evident in livestock markets. Most importantly, 38.7% strongly agreed and 25.0% agreed that competitive rivalry was instigated by traders for their own benefit. Meanwhile, 34.5% strongly disagreed that a system existed to regulate competition in the markets.

Table 2. Selected competitive-rivalry indicators

Indicator	Mean	SD
Producers and traders relate well	3.41	1.16
Traders relate well among themselves	3.60	1.11
Competition is beneficial	2.48	1.34
Competitive rivalry is evident	3.24	1.42
Competitive rivalry affects market performance	3.57	1.42
Rivalry is instigated for traders' own benefit	3.84	1.19
A system regulates competition	2.42	1.32
Competition strengthens markets	2.77	1.41
Competition reduces livestock prices	2.74	1.46
Overall	3.12	0.63

Source: Study survey data.

The findings demonstrate that competition exists but is not consistently perceived as healthy or market-enhancing.

4.4 Effect of competitive rivalry on livestock production and market access

Simple linear regression demonstrated a statistically significant relationship between trader competitive rivalry and livestock production and market access.

The model was statistically significant:

$$F(1, 166) = 30.642, p < .001.$$

The coefficient for competitive rivalry was 0.381 (SE = 0.069), with $t = 5.536$ and $p < .001$. The model produced an R^2 of .156 and adjusted R^2 of .151. Thus, competitive rivalry accounted for approximately 15.1% of the adjusted variation in livestock production and market access.

Table 3. Regression of competitive rivalry on livestock production and market access

Variable	B	SE	t	p
Constant	1.319	0.219	6.028	< .001
Competitive rivalry	0.381	0.069	5.536	< .001

Model statistics: $F(1, 166) = 30.642, p < .001; R^2 = .156; \text{adjusted } R^2 = .151$.

The null hypothesis was rejected.

The result should, however, be interpreted carefully. The positive coefficient indicates that higher measured competitive-rivalry scores are statistically associated with higher scores on the production and market-access measure in the estimated model. It does not mean that all forms of rivalry are beneficial. The descriptive findings show that respondents simultaneously perceived rivalry as self-interested, poorly regulated and insufficiently beneficial to the broader subsector.

This distinction is important for policy: the objective should be to convert unmanaged rivalry into transparent and productive competition.

5. Discussion

5.1 Market access remains the central constraint

The study confirms that the existence of livestock markets does not automatically translate into effective market access. Lodwar's higher market-access score relative to Lokichoggio and Kainuk demonstrates substantial spatial variation in market functionality. The results are consistent with earlier Turkana evidence showing that weak infrastructure, high transaction costs, insecurity, poor producer prices, limited cash and inadequate market information constrain livestock commercialization ([Watson & van Binsbergen, 2008](#)).

The findings also align with more recent research showing that distance to markets, weak prices and conflict continue to influence livestock-market participation among Kenyan pastoralists ([Siedenburg, 2021](#)).

5.2 Drought and livestock productivity

Drought operates through several pathways. It reduces pasture and water availability, lowers animal body condition, increases disease susceptibility and mortality, and forces households to sell animals when market conditions may be unfavorable. The result is a double vulnerability: households lose livestock assets while receiving lower prices for animals whose condition has deteriorated.

Consequently, livestock-market policy cannot be separated from feed and water security. Investments in fodder reserves, water infrastructure, animal health, drought early warning and strategic destocking can improve not only livestock survival but also the quality and timing of animals entering markets.

5.3 Competitive rivalry versus healthy competition

One of the most important contributions of this study is the distinction between competition and rivalry. Competition can stimulate innovation and efficiency when participants operate under relatively equal rules and access to information. Rivalry becomes harmful when competition is characterized by unequal capital, information asymmetry, exclusion, price discrimination or manipulation of market structures.

The study found that respondents perceived competitive rivalry as evident and frequently motivated by individual trader interests. The absence of adequate mechanisms for regulating competition further increases the risk that powerful market participants will dominate transactions. This finding is consistent with the broader evidence that pastoral livestock markets can contain both formal and informal institutional arrangements. In the Horn of Africa, formal regulation often interacts with informal trade practices, producing hybrid market systems rather than purely formal or informal markets ([Little et al., 2015](#)).

5.4 Capital constraints and unequal bargaining power

Low-capital traders face a structural disadvantage because livestock aggregation requires working capital, transport and the ability to hold animals until favorable markets become available. The study reports that tertiary off-takers may purchase livestock from low-capital traders at low prices, while insufficient access to capital prevents local traders from establishing stronger market linkages. Financial inclusion is therefore a central element of livestock-market development. However, finance alone is insufficient. Credit must be accompanied by market information, business training, livestock-quality improvement and mechanisms that reduce the risks associated with livestock price volatility.

5.5 Value addition as an underdeveloped opportunity

The extremely low score for value addition is significant because, despite substantial livestock production, most value is generated through the sale of live animals rather than through processing and product differentiation. Potential value-addition opportunities include meat processing, hygienic slaughter facilities, hides and skins, leather production, milk processing, animal breeding, livestock fattening, feed production, veterinary services, livestock transport, market information services, and branding of

dryland livestock products. [Anno \(2023\)](#) similarly emphasize the need for market-based and hybrid business models that integrate traditional pastoral production with modern commercial mechanisms to enhance value creation, income and market competitiveness.

5.6 Brokers as market intermediaries

Brokers should not automatically be regarded as market distorters. In geographically dispersed pastoral systems, they can provide important information and connect producers with buyers. The problem arises when producers have no alternative channels through which to obtain market information or compare prices. In such circumstances, brokers may acquire excessive bargaining power. A better approach is therefore to improve market transparency through regular price reporting, digital communication, trader registration and producer organizations while maintaining legitimate brokerage functions.

5.7 Cross-border trade and regional integration

Turkana's geographic position provides opportunities for regional livestock trade. However, border insecurity, disease-control requirements, regulatory differences, informal taxation and weak infrastructure can limit these opportunities. The evidence from the Horn of Africa demonstrates that formalization strategies must recognize the realities of borderland trade rather than simply criminalize informal transactions ([Little et al., 2015](#)). Regional livestock-trade policies should therefore prioritize harmonized animal-health protocols, mutually recognized certification, coordinated quarantine, trade-corridor infrastructure and predictable taxation.

5.8 Gender and youth inclusion

The strong male dominance observed in the study indicates an underutilized economic opportunity. Women's participation should extend beyond small-scale processing or household activities to include livestock trading, transport, aggregation, brokerage, input supply and enterprise ownership. Youth can also be positioned as technology-enabled market actors. Mobile phones and digital platforms can support price information, livestock identification, payment systems, transport coordination and buyer–seller matching.

6. Policy and Practical Implications

The findings suggest that improving dryland livestock trade requires coordinated interventions rather than isolated projects. Strengthening livestock marketing in dryland areas requires an integrated approach combining infrastructure, productivity, market information, finance, institutions, governance, and value addition. Priorities should include improved roads, livestock markets, water and veterinary facilities, and processing infrastructure; drought-resilient breeds, animal health, feed, pasture, and extension services; reliable market and price information; livestock-specific financial products; and stronger, commercially oriented Livestock Marketing Associations or cooperatives.

Transparent market rules, fair competition, standardized weighing and grading, and effective dispute-resolution mechanisms should improve market governance, while investment in meat, dairy, hides and skins, breeding, and livestock fattening can increase value addition, reduce reliance on live-animal sales, and enable pastoral producers to capture greater returns.

7. Limitations of the Study

Several limitations should be recognized.

1. Limited geographical coverage: The study was conducted in only three selected secondary livestock markets in Turkana County, limiting the generalizability of the findings to all pastoral livestock markets in Kenya.
2. Reliance on perception-based data: The empirical analysis relied substantially on respondents' perceptions measured using Likert-scale statements, which may not fully reflect objective indicators such as actual livestock volumes, prices, trader margins, transport costs, and household incomes.
3. Low explanatory power of the regression model: The regression model explained only 15.1% of the adjusted variation, suggesting that competitive rivalry is only one of several factors influencing livestock production and market access.
4. Seasonality of livestock markets: Livestock markets in drought-prone areas are highly seasonal. The study's data may therefore not adequately capture changes in prices, livestock volumes, and trader behavior across different seasons.
5. Limited evidence on causality: The study did not establish clear causal relationships among all the identified constraints affecting livestock production and market access.
6. Need for additional data sources: Future studies should strengthen the evidence base by combining survey data with market-price series, transaction-level data, longitudinal data, and qualitative institutional analysis.

8. Recommendations

Based on the findings, the study recommends that:

1. Government and development partners invest in strategic livestock-market infrastructure, particularly roads, market yards, slaughter facilities, quarantine facilities and livestock holding grounds.
2. Animal-health systems be strengthened through disease surveillance, vaccination, veterinary extension and development of disease-controlled production and trade zones.
3. Pasture and water investments be integrated into livestock-market development, because livestock quality and market supply depend directly on the availability of feed and water.
4. A transparent livestock market-information system be established to provide producers and traders with reliable information on prices, demand, transport and market requirements.
5. Livestock-specific financial services be expanded to improve the working capital of local traders and producer organizations.
6. Livestock Marketing Associations be strengthened and assessed for transformation into cooperatives, enabling members to aggregate livestock, negotiate collectively and access finance.

7. Competition-management systems be introduced to reduce exploitative rivalry, conflicts of interest, price discrimination and market exclusion.
8. Value addition be prioritized to increase returns from meat, milk, hides and skins, breeding, fattening and related livestock enterprises.
9. Women and youth be deliberately integrated into livestock business strategies, including entrepreneurship, digital market information, finance and training.
10. Adult literacy and business education be strengthened to enable pastoralists and traders to participate more effectively in increasingly commercial and technology-enabled livestock markets.
11. Cross-border livestock-trade protocols be harmonized across neighboring countries to reduce unnecessary transaction costs while maintaining animal-health safeguards.
12. Market research be institutionalized, including periodic assessments of livestock supply, demand, prices, trader margins, consumer preferences and emerging trade opportunities.

9. Areas for Further Research

Future research should:

1. Quantify livestock supply and demand across Turkana's production zones and major markets;
2. Establish livestock price and trader-margin databases;
3. Evaluate the economic contribution of value addition;
4. Investigate the drivers and consequences of cross-border livestock trade;
5. Assess the viability of transforming LMAs into cooperatives;
6. Examine the causes and consequences of the closure of livestock-processing facilities such as Lomidat;
7. Investigate livestock diseases with significant economic effects on trade;
8. Evaluate women's and youth participation in livestock value chains;
9. Examine the effectiveness of livestock insurance and climate-risk financing;
10. Test digital livestock-market information systems; and
11. Develop longitudinal studies that follow livestock prices, supply, demand and market participation across drought and non-drought periods.

10. Conclusion

Livestock trade in dryland areas represents a major but underutilized pathway for pastoral economic development. The challenge is not simply that pastoral communities lack livestock or markets. Rather, the problem lies in the interaction between low productivity, climate shocks, weak infrastructure, inadequate information, restricted finance, animal disease, insecurity, informal institutions and unequal competitive conditions.

Evidence from Lodwar, Lokichoggio and Kainuk demonstrates substantial differences in market access and significant levels of trader competitive rivalry. The overall market-

Vol-3, Iss-9 (September-2026)

access score was relatively weak, while respondents expressed strong concerns about value addition, market efficiency and the regularity of market research. Competitive rivalry was significant across the three markets, and regression analysis confirmed a statistically significant relationship between rivalry and livestock production and market access.

The findings point to an important policy distinction: dryland livestock markets require healthy competition, not unmanaged rivalry. Competition becomes developmental when it is supported by transparent rules, equal access to information, finance, infrastructure and market opportunities.

A resilient dryland livestock economy therefore requires an integrated strategy connecting rangeland and livestock productivity with market infrastructure, animal health, finance, information, value addition, inclusive institutions and regional trade. Such a transformation would enable pastoral communities to move beyond distress sales and subsistence-oriented livestock keeping toward more predictable, competitive and profitable livestock enterprises.

Ultimately, the future of livestock trade in drylands depends on treating the livestock market not as an isolated trading point but as a complete production–market–institution–livelihood system. This systems perspective provides a stronger basis for building competitive livestock value chains, improving pastoral incomes, strengthening food security and enhancing resilience to climate and economic shocks.

Disclaimer

- The views stated in this article are those of the author and do not necessarily represent those of any of the entities mentioned.

Interest Conflicts

- The author declares no conflict of interest whatsoever in this publication.

Funding Statement

- This research study was conducted in its entirety without any form of funding from external sources. Fieldwork and publication costs were covered by the author.

References

1. [Abate, D., & Addis, Y. \(2021\). Factors affecting the intensity of market participation of smallholder sheep producers in northern Ethiopia: Poisson regression approach. *Cogent Food & Agriculture*, 7\(1\), 1874154. <https://doi.org/10.1080/23311932.2021.1874154>](#)
2. [Akall, G. \(2021\). Effects of development interventions on pastoral livelihoods in Turkana County, Kenya. *Pastoralism: Research, Policy and Practice*, 11, 23. <https://doi.org/10.1186/s13570-021-00197-2>](#)
3. [Anno, E. F., Eipa, J. S., & Emase, J. N. \(2023\). Impact of competition and market access factors on the performance of secondary livestock markets in Turkana, Kenya. *International Journal of Business and Economics Research*, 12\(3\), 87–98. <https://doi.org/10.11648/j.ijber.20231203.12>](#)
4. [Anno, E. F., Ekuwom, A. J., Etpar, S. E., & Dida, E. N. \(2024\). Setting competition within the necessary limits in livestock markets: Intervention in Turkana, Kenya, to manage competitive rivalry among traders. *International Research Journal of Economics and Management Studies*, 3\(3\), 263–272. <https://doi.org/10.56472/25835238/IRJEMS-V3I3P134>](#)
5. [Anno, E. F. \(2025\). Marketing livestock and meat products from drylands: A case study of abattoirs and meat eateries in Turkana, Kenya. *Global Research in Environment and Sustainability*. <https://doi.org/10.63002/gres.301.780>](#)
6. [Anno, E. F. \(2026\). An analysis of competition, competitiveness, and determinants of competitive rivalry in secondary livestock markets in Northwestern Kenya: A review study in Turkana County. *IRASS Journal of Multidisciplinary Studies*, 8–21. <https://doi.org/10.5281/zenodo.20566647>](#)
7. [Kinati, W., Temple, E. C., Baker, A. D., & Najjar, D. \(2023\). Small ruminant value chain and empowerment: A gendered baseline study from Ethiopia. *Frontiers in Sustainable Food Systems*, 7, 1165792. <https://doi.org/10.3389/fsufs.2023.1165792>](#)
8. [Little, P. D., Tiki, W., & Debsu, D. N. \(2015\). Formal or informal, legal or illegal: The ambiguous nature of cross-border livestock trade in the Horn of Africa. *Journal of Borderlands Studies*, 30\(3\), 405–421. <https://doi.org/10.1080/08865655.2015.1068206>](#)
9. [Lutta, A. I., Wasonga, O. V., Robinson, L. W., Nyangito, M. M., & Sircely, J. \(2021\). Determinants of livestock market participation among pastoral communities of Tana River County, Kenya. *Environment, Development and Sustainability*, 23, 7500–7521. <https://doi.org/10.1007/s10668-020-00922-8>](#)
10. [National Drought Management Authority. \(2024\). Turkana County long rains assessment 2024. Government of Kenya.](#)
11. [Ndiritu, S. W., & Gichuki, C. N. \(2025\). Pastoralist decisions to participate in livestock marketing systems during drought seasons: Evidence from Kenyan arid and semi-arid regions. *Pastoralism: Research, Policy and Practice*, 15. <https://doi.org/10.3389/past.2025.14333>](#)
12. [Nori, M. \(2023\). High quality, high reliability: The dynamics of camel milk marketing in northern Kenya. *Pastoralism: Research, Policy and Practice*, 13, 9. <https://doi.org/10.1186/s13570-022-00265-1>](#)
13. [Odhong, C., Van Dijk, S., Wahome, R., Chepkorir, V., Kihara, F., Kamadi, V., & Radeny, M. A. O. \(2025\). Impact of community-based rangeland management \(CBRM\) and livestock marketing interventions on adaptive capacity, food and nutrition security, and greenhouse gas emissions in extensive livestock systems in Kenya. *International Livestock Research Institute*.](#)
14. [Siedenburg, J. \(2021\). Perils facing Kenyan pastoralists, livelihood innovations and wider impacts: Learning from project experience. *Development Studies Research*, 8\(1\), 218–235. <https://doi.org/10.1080/21665095.2021.1961595>](#)

15. [Yitayew, A., et al. \(2023\). Market participation and pastoral welfare in drought-prone areas: A dose-response analysis. Economic Analysis and Policy, 80, 1415–1429. https://doi.org/10.1016/j.eap.2023.10.030](#)
16. [Zelege, F., Kassie, G. T., Haji, J., & Legesse, B. \(2021\). Would market sheds improve market participation and earnings of small ruminant keepers? Evidence from Ethiopia. Journal of Agricultural Economics, 72\(2\), 470–485. https://doi.org/10.1111/1477-9552.12411](#)
17. [Watson, D. J., & van Binsbergen, J. \(2008\). Livestock market access and opportunities in Turkana, Kenya. ILRI Research Report No. 3. Nairobi, Kenya: International Livestock Research Institute \(ILRI\). 106 pp. ISBN 92-9146-208-X.](#)