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Original Article

The Influence of Pricing Strategies and Consumer Behavior on the Performance of the Livestock Markets in Turkana, Kenya

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Abstract: *The goal of investigating the influence of pricing strategies and consumer behaviour on the performance of livestock markets in Turkana, Kenya, is to examine how strategies for discovering, setting, and imposing prices in livestock markets affect consumer behaviour and market performance. The pricing of agricultural goods in Turkana marketplaces is difficult and must be strategically determined and managed. The study objectives encompassed matters of the role of livestock resources in the socioeconomic development of livestock-dependent populations, the livestock marketing systems used in the trading of livestock resources, the pricing strategies used in livestock marketing, and the impact of pricing strategies on consumer behaviour and market performance. Studied were three secondary livestock markets in Turkana, i.e., Kerio, Lorugum, and Lokori, with 56 study participants sampled per market as primary respondents. Also, 16 government and civil society employees (purposefully selected) were secondary study participants. The study employed exploratory and descriptive research designs and a mixed-methods approach. A questionnaire and study schedule with good validity and reliability results were administered to study participants. Interviews with respondents, actual visits to selected marketplaces, and secondary sources were used to collect data for the study. Various datasets were analysed using data computing tools like SPSS and related parametric and non-parametric approaches. The study identified pricing effects on livestock markets that were statistically significant at the 5% level. Disparities in traders' experience, capital resources, and competitiveness favour the high-capital traders who dominate the majority of domestic markets. The study suggests market-driven livestock production and marketing strategies and the transformation of livestock marketing associations into cooperatives. The move will structure and organize market operations, strengthen stakeholder coordination, balance market forces, manage non-market forces, and improve the ability to manage risks. Policy and market research are mentioned as means of enhancing the knowledge base and expertise necessary for more effective programming.*

Keywords: *Pricing strategies, Livestock production, Market performance, Supply, Demand, Competition.*

I. INTRODUCTION

Livestock farming is essential to the economic growth of Eastern African countries, as well as those of many other nations in the world that embrace it (Tilahun et al., 2017; Mumba et al., 2018). However, the reluctance of many states, corporations, and livestock-keeping communities to increase the production of livestock resources for the purpose of penetrating industrial and consumer markets continues to be a major barrier to livestock development, commercialization, and the competitiveness and sustainability of livestock-based enterprises (Aggrey, Kuganza, and Muwanika, 2018). Model countries in sub-Saharan Africa use agribusiness capabilities to increase livestock, build rural-urban commercial relations, generate employment opportunities, and offer raw materials for industries and agritourism. Smallholder farmers in Sub-Saharan Africa employ agricultural economic gains to meet their subsistence and market intentions despite the fact that overdependence on animal husbandry and social, economic, and political issues limit the agricultural outcomes desired (FAO et al., 2020; Ryschawy et al., 2017). The escalating consequences of climate change continue to decimate agricultural factors of production and the economic returns accruable from markets.

Establishing agricultural marketplaces and supporting improved transaction processes and performance management will greatly improve the performance of agricultural firms, especially in dryland areas (Abraham et al., 2018). Livestock marketing protocols seek to build, harmonize, and coordinate effective, profitable, and season-long marketing processes for livestock farmers, vendors, consumers, and policyholders (Roba et al., 2019; Abdalla et al., 2018). Good agricultural commodity pricing and market management are vital for livestock trading in Kenya's over 16 million-person dryland region (ASAL Counties), which is dependent on livestock production and trade. Variations in livestock marketing initiatives have a negative impact on the profitability, competitiveness, and sustainability of livestock initiatives, particularly in pastoral regions.

The significance of this study's output resides in the well-defined links between pricing strategies of livestock-based commodities and the behavior of both customers and consumers, which accelerate the performance of livestock markets so that sellers and buyers receive the value of their investments. For prices to influence better the performance of markets, structuring market organization and operations, improving quantity and quality of agricultural commodities, increasing the amount of knowledge among market and policy stakeholders, and maintaining efficient stakeholder coordination mechanisms are parameters identified to reinforce the contribution of livestock production and marketing to the economy of pastoral areas.

II. LITERATURE REVIEW

A) Role of Agriculture in Development

Many of the sources studied portray agriculture as the foundation of many global economies and a crucial determinant for food, income, and nutrition security (FAO et al., 2020; Ameso et al., 2018). Continentally, agriculture is one of the primary contributions to national GDPs and per capita incomes for states and regions, with farming advantages strengthening livelihoods and fostering socioeconomic transformation (Ryschawy et al., 2017). According to Kembe and Omondi (2016), agriculture and livestock farming activities significantly impact the performance of other sectors of the economy and the development of infrastructure. In Africa, the subsector of animal husbandry is the sole provider, particularly for the majority of livestock-dependent populations (Ojango et al., 2017; Asfaw, 2018).

While agriculture is thriving, particularly in Africa, where production factors and natural resource endowments are enormous (Berihun, 2017; Anno & Pjero, 2021; Lubungu, 2016), low levels of investments by states and corporations, and a lack of robust and strategic production and marketing systems and projects threaten efforts to maximize opportunities provided by agriculture sub-sectors (Abebe, Tadie, and Taye, 2018; Shibru, 2017). Diverse scholarly sources link such a scenario to the weak traditional livestock production economy, the diminishing functionality of most markets, ineffective and non-pragmatic agricultural policies, and the low value of livestock-based commodities. Poor commoditization, pricing, and valuation of livestock resources result from misplaced livestock production and marketing priorities (Aggrey, Kuganza, and Muwanika, 2018; Dido, 2019).

B) Livestock Commercialization Intents

Critical to transforming livestock production and businesses in Kenya's pastoral regions is the reinforcement of commercialization techniques that result in the capitalization of markets and the monetization of current and future consumers of various product value chains (Wanyoike et al., 2018; Kassa, Anshiso, and Fantahun, 2017). Additionally, literature supports the significance of livestock marketing projects and trade systems. Business offers and marketing materials; joint business ventures, partnerships, and referral systems; and periodic evaluation of market and marketing project performance to inform investments and trade changes are the critical pillars of the livestock marketing strategy that have a significant impact on livestock-based projects (Roba et al., 2019; Abay et al., 2019).

Internal and external market pressures that are crucial to the development of livestock-based interventions are also described in the literature. The most notable are supply and demand and their roles in controlling output, competition, and market access (Shabana and Matanda, 2019; Wambui et al., 2016). Political, social, economic, legal, technological, environmental, and ethical considerations with links to various market categories, stakeholder groups, and project performance are among the many facets of appraisal and integration into marketing strategy (Simonet and Carabine, 2021; Devaux et al., 2018). The marketing mix theory, which relates products, pricing, place, and promotion, influences the livestock industry's orientation, business modeling, the reinforcement of competitive positioning in markets, and the management of the inherent dynamics of livestock trading (Isako et al., 2019; Anno & Pjero, 2021). It is believed that the pricing of livestock and livestock products on the market is significant because it affects sales, customer satisfaction, the extent of competition, market malpractices, and creates balanced trade-offs between business sustainability and profitability of projects for the socioeconomic empowerment of states and livestock-dependent populations, as depicted in the Eastern Africa Livestock Marketing Strategy of 2012 (Clark et al., 2017; Shibia, 2018; Anno, 2022).

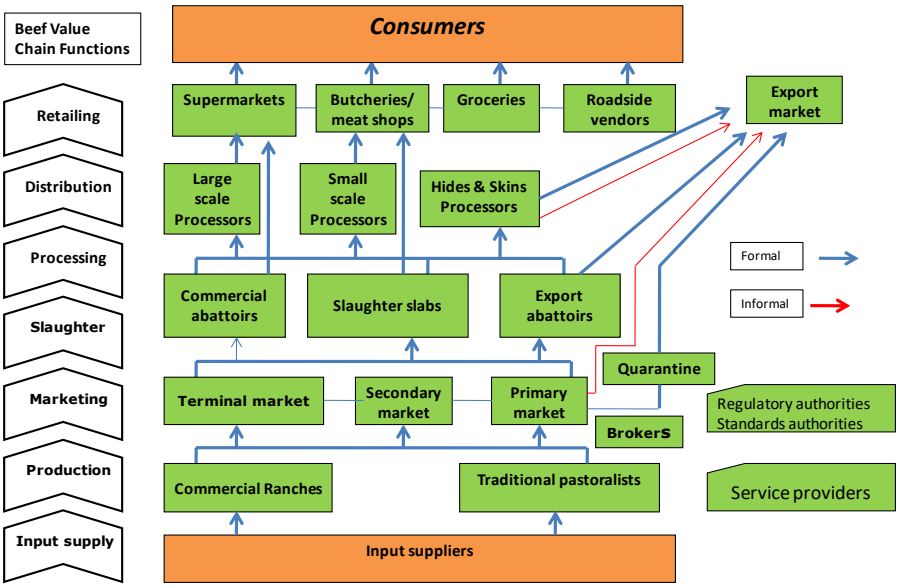

Figure 1: Eastern Africa Livestock Marketing Strategy Map, 2012

Source: Anno, E. F. (2022). Doctoral thesis (Published – ISBN [eBook] 9783346871572)

C) Price discoveries and setting

Literature reveals that evidence-based pricing of agricultural commodities justifies price discoveries and the dynamics involved in managing such pricing systems based on the intensity of market and non-market factors (Nyariki & Amwata, 2019; Pereira, 2019). The pricing of agricultural goods and services should play a significant role in a company's marketing strategy to ensure that the value created by the business can be passed on to existing and future consumers at an affordable price and that they continue to be satisfied with the items on offer (Tilahun et al., 2017; Banhazi, 2015). The ineffectiveness of pricing in livestock markets in Turkana is identified as a significant obstacle to market performance, along with a limited cash economy and capital resources to give each livestock trader and corporation a competitive edge and the capacity to realize substantial economic returns from markets (Anno & Pjero, 2021).

D) Turkana Livelihood Zones

According to Anno & Pjero (2021), the percentage distribution of livelihoods shows that pure pastoralism depended on 62% of the population. Combined with agro-pastoral livelihoods, about 80% of the population depends on livestock keeping and opportunistic crop farming. Fishing is the least relied on livelihood by about 8% of the population, mainly fishermen living along the shores of Lake Turkana. Historically, fishermen in Turkana were less than 2 percent. The number increased following resettlement decisions taken to protect the Turkana vulnerable population from the effects of the severe droughts ever experienced in Turkana, i.e., in 1969 (Namotor), 1975 (Ata anayonae), and 1980 (Lokchuu). The significance of food security in Turkana is depicted in Anno (2022), where limited access to food has remained a historical scenario where humanity in Turkana, especially the poor, suffered the worst cases of malnutrition and death. The figure below shows the distribution of the populations' dependency on livelihood options (Anno, 2022).

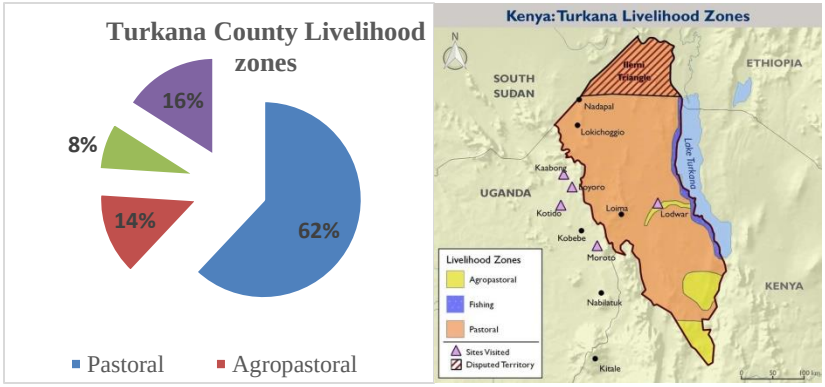

Figure 2: Turkana County livelihood zones (Anno, 2022)

III. METHODOLOGY

A) Research Design and Approaches

The study employed exploratory and descriptive research designs to investigate the relationship between pricing strategies and the performance of livestock markets with a focus on factors leading to pricing dynamics and changing supply, demand and consumer behaviour in markets. These factors included variables such as price, product, place, promotion, people (stakeholders), physical markets (market arenas), supply, demand, business capital, and policy regulations (independent variables), and changes in sales, change in demand, change in supply, size of transactions, customer satisfaction, business diversification, competitiveness, profitability, market stability, change in business capital, and change in policy regulations (dependent variables).

B) *Sampling, Data Collection and Pretesting of Research Tools*

The sampling of primary respondents, i.e., livestock traders in the secondary markets, was done statistically, involving 180 traders (n = 60 per market). Using a 95% confidence level, a 2% margin of error, and a 50% response rate, n = 168 traders were sampled to participate in the study (n = 56 per market). 16 respondents, who were livestock development experts from government and civil society organizations, were purposefully selected to be secondary study participants to provide data on livestock programs, policies, and socioeconomic matters. The semi-structured questionnaire with closed and open-ended questions was administered to primary study participants, i.e., livestock traders, while a study schedule was administered to secondary respondents. Participatory Rural Appraisal (PRA) tools, i.e., interviews, visualization, ranking, and scoring techniques, were applied accordingly. Direct observation and a literature review provided additional information on the data output from PRA tools and the triangulation used to validate the resultant data.

The data from 10% of the study respondents (17 participants) was used to ascertain the validity and reliability of the research tools (mainly the questionnaire). Three livestock development experts identified and scored the research tools on a 5-point Likert scale on relevance, organization, and completeness (SD=Strongly disagree; D=Disagree; N=Neutral; A= Agree; SA= Strongly agree). On the item content validity index (I-CVI), an average congruency percentage (ACP) of 0.97% was obtained. Face validity results showed that CVI was 0.90 and ACP was 0.96. The validity result of 0.97% was above the minimum acceptable level. On the reliability of the instruments, test-retest reliability of 0.821 was statistically good reliability ($\geq 0.8 < 0.9$ [good reliability]). The 2-tailed correlation was significant at the 0.01 level. Cronbach's alpha reliability coefficient analysis results were 0.832 above the minimum of 0.7. Therefore, the study tools were highly valid, reliable, and appropriate for the study.

C) Data Analysis and Presentation Techniques

Numeric variables were first analyzed by means and standard deviation, and frequencies and percentages for categorical variables. A chi-square test was used to test for significant differences between variables across the markets. The Kruskal-Wallis test compared variables in the 3 markets, while post-hoc pairwise comparisons using the Dunn-Bonferroni approach were used since the data did not meet the normality and homogeneity tests of variance to allow the use of one way analysis of variance (ANOVA). The level of significance was set at 0.05. Cronbach's alpha was used to assess the internal consistency of the statements; statements with a Cronbach's alpha of 0.5 and above were retained for further analysis and for the determination of the means of the study themes, where differences were confirmed through the one-way ANOVA. A simple linear regression was used to determine the crucial factors in livestock marketing systems, pricing strategies, pricing and consumer behavior and market performance, and pricing and market acceleration. All data was statistically analyzed using the software IBM SPSS Statistics (Version 25.0).

IV. RESULTS AND DISCUSSION

A) Demography Characteristics of Respondents

The average age of the respondents in the three markets was similar; respondents were 35.09 years old on average, standard deviation of 8.43 years and range of 18 to 68 years. Most (84.8%) of the respondents were male. Overall, 73.7% of the respondents were non-literate with only 6.3% of them with certificate level of education. On average, respondents had 13.10 years in livestock production with a standard deviation of 5.73 years. Most (94.87%) of the respondents were livestock keepers and the finding was similar across the three markets.

Table 1: Descriptive Statistics for Demographics

Market	Overall	Kerio Livestock Market	Lorugum Livestock Market	Lokori Livestock Market
Demographic characteristics	n=168	n=56	n=56	n=56
Age	35.09(8.43)	34.75(6.80)	32.87(10.67)	37.66(7.81)
Male (%)	84.8	82.4	85.4	86.6
Female (%)	15.2	17.6	14.6	13.4
Adult Education	20	27	15	18
Certificate	6.3	5	8	18
Non-literate	73.7	68	77	76.1
Years in livestock marketing	13.1(5.73)	12.3(5.32)	17(5.11)	9.7(6.745)
Business	5.7	6.1	4.14	7.13
Livestock keeping	94.87	96.4	95.12	93.1

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

Regarding test for statistically significant differences across the three markets, a Kruskal-Wallis test revealed that the mean number of years in livestock production was statistically different across the three markets (p-value = 0.029). Respondents in Kerio Livestock market had the highest mean in livestock marketing (12.3 years) with farmers in Lokori Livestock market having the lowest mean of 9.70 years. The average age of respondents was not statistically different across the three markets (p-value = 1.00).

B) Role of Livestock in Socioeconomic Transformation

While 72.1% of the participants stated that livestock rearing is the way of life in Turkana, 17.1% of those who disagreed and those with no opinion valued the contribution of the alternative livelihoods to the well-being of Turkana population. 63%, 58%, and 61% of participants, respectively, concurred that livestock is essential for food security, savings, and cultural purposes. Nonetheless, 59.44% and 59.4% of respondents, respectively, disputed that livestock is a means of acquiring prestige and supports environmental management. The study's findings indicate that livestock is not the main source of prosperity for the Turkana people, particularly those who have diversified their businesses and found alternative sources of livelihood. Livestock could be the only source of income for those who live a rural lifestyle. The results of livestock production and market access parameter distributions are presented in Table 2.

Table 2: Livestock Production and Market Access

Statements	SD	D	N	A	SA
Livestock keeping is the way of life of my community	6.5	10.6	10.8	30.6	41.5
Livestock is essential for food security and nutrition	15	12	10	20	43
Livestock is a source of savings for livestock keepers	12	17	13	25	33
Livestock is important for culture of my community	8	13	18	24	37
Livestock is a means for acquiring status	50.54	8.9	12.5	5.36	22.7
Livestock maintain family and community values	20.12	19	10.43	25.1	25.35
Livestock help manage the environment	46.4	10.3	20	15.2	8.1

Key: SD=Strongly disagree; D=Disagree; N=Neutral; A= Agree; SA= Strongly agree

The sampled respondent's scores on the seven (7) statements retained on livestock production and market access are summarized in Table 3. The sampled respondents scored an overall mean of 2.51 (equivalent to a neutral opinion score) with a standard deviation of 0.61. The highest and lowest scores were 3.86 and 1.14, respectively, and the one-way ANOVA results for the difference in livestock production and market access scores of the three livestock markets (Kerio, Lorugum, and Lokori) revealed a significant difference between the respondent scores ($F(2,164) = 34.252$; P-value = 0.000). An analysis of the average mean score of the livestock production and market access in the sampled livestock markets indicated that Kerio Livestock Market had the highest mean of 2.89 (with a standard deviation of 0.49), while Lorugum Livestock Market had the lowest mean of 2.08 (with a standard deviation of 0.49). Lokori market had a mean of 2.53 (with a standard deviation of 0.52).

Table 3: Summary of Livestock Production and Market Access

Statements	N	Minimum	Maximum	Mean	Std. Dev.
Livestock keeping is the way of life of my community	168	1.00	5.00	2.88	1.20
Livestock is essential for food security and nutrition	168	1.00	5.00	2.35	1.12
Livestock is a source of savings for livestock keepers	168	1.00	5.00	3.05	1.27
Livestock is important for culture of my community	168	1.00	5.00	3.52	1.32
Livestock is a means for acquiring status	168	1.00	4.00	1.43	0.82
Livestock maintain family and community values	168	1.00	5.00	2.36	1.25
Livestock help manage the environment	168	1.00	5.00	1.95	1.07
Overall	168	1.14	3.86	2.51	0.61
1 Kerio livestock market	56	1.57	3.86	2.89	0.49
2 Lorugum livestock market	56	1.14	3.00	2.08	0.49
3 Lokori livestock market	56	1.43	3.57	2.53	0.52

Calculated $F(2,164) = 34.252$; critical $F(2,165) = 3.050$; P-value = 0.000

A post hoc analysis results for multiple comparison using Tukey HSD indicated a significant difference in the mean score of livestock production and market access between all markets, that is, Kerio and Lorugum livestock markets, Kerio and Lokori livestock markets, as well as, Lorugum and Lokori livestock markets at 5% level.

Table 4: Post Hoc Multiple Comparisons

(I) Livestock Market	(J) Livestock Market	Mean Difference (I-J)	Std. Error	Sig.
1 Kerio Market	2 Lorugum Market	.8036*	.0973	.000
	3 Lokori Market	.3546*	.0973	.001
2 Lorugum Market	1 Kerio Market	-.8036*	.0973	.000
	3 Lokori Market	-.4490*	.0973	.000
3 Lokori Market	1 Kerio Market	-.3546*	.0973	.001
	2 Lorugum Market	.4490*	.0973	.000

The qualitative study results on the role of livestock in socioeconomic development show that the majority of study participants regard livestock as crucial to Turkana values, as well as a source of money and social standing. Turkana society and economy are primarily dependent on livestock, which also serves as their principal source of food and income. The availability of animal food provided by livestock helps the social prosperity of populations. Regarding government policies on livestock production, the integration of Kenya livestock marketing council services with the county livestock marketing system and market-based associations strengthens the connection between livestock production areas, marketplaces, and the marketing chain.

The adoption of improved livestock breeds and the establishment of livestock holding and breed improvement facilities are crucial for the transformation of the livestock sector in the county. Turkana has the ability to diversify livestock production, enterprises, and goods by introducing new livestock species and cultivating micro-livestock in refugee situations, e.g., cricket and Black Soldier Fly (BSF) farming, in order to improve livestock husbandry and utilize existing production and business opportunities. Turkana has the ability to diversify livestock production and associated businesses through the introduction of novel species and the development of micro-livestock in refugee situations. Fish supplies from Lake Turkana are growing in refugee settings, enabling livestock fishermen to diversify their livelihoods and businesses and contribute to the local economy.

C) Livestock Marketing Systems

Respondents agreeing with livestock trading being practiced in their locality and local traders taking part in livestock trading were 70.5% and 60.8%, respectively. However, external traders doing business in Turkana local markets, local traders doing business in terminal markets, the organization of livestock markets, traders having adequate capital resources, and good exercise of competition were highly disagreed upon by 70.79%, 63%, 59.46%, 60.7%, and 56.52%, respectively. There was a sharply divided opinion among respondents on the livestock trade taking place in modern sale yards and barter trading. The scores were evenly spread on the Likert scale. The results of the parametric analysis of livestock marketing systems are presented in the Table 5.

Table 5: Livestock Marketing Systems Analytics

	SD	D	N	A	SA
Livestock trading is practiced in my area	8	10	11.5	38.3	32.2
Local traders are taking part in livestock marketing activities	12	18	9.2	33.5	27.3
Livestock trade takes place in modern sale yards	17.2	20.4	16	25	21.4
Barter trading is still a system of trading livestock	17.7	15.2	24.4	12.5	30.2
External traders come to buy animals from local markets	48.54	22.25	15	5.36	8.85
Local traders transport animals to terminal markets	41.5	21.5	17	8	12
Livestock marketing is well organized	33.21	26.25	8.44	15.7	16.4
Traders have adequate capital to do livestock trade	46.4	14.3	20	11.2	8.1
Competition is well exercised	33.14	23.38	13.33	10.5	19.65

Key: SD=Strongly disagree; D=Disagree; N=Neutral; A= Agree; SA= Strongly agree

The sampled respondents' scores on the nine (9) statements on livestock marketing systems are summarized in Table 6. The sampled respondents scored a mean of 3.12 with a standard deviation of 0.63. The lowest and highest scores were 1.11 and 4.89, respectively. The one-way ANOVA was used to determine whether there was a significant difference in the mean score across the three markets. The one-way analysis of variance revealed a significant difference between the respondent scores ($F(2,165) = 39.966$; P-value = 0.000). An analysis of the average mean score of markets indicated that respondents in Kerio Livestock Market had the highest mean of 3.62 (with a standard deviation of 0.49), while respondents in Lokori Livestock Market had the lowest mean of 2.79 (with a standard deviation of 0.44). Lorugum Livestock Market had a mean of 2.79 (with a standard deviation of 0.62).

Table 6: Summary of Marketing Systems Analytics

Statements	N	Minimum	Maximum	Mean	Std. Dev.
Livestock producers and traders relate well	168	1.00	5.00	3.41	1.16
Livestock traders relate well among themselves	168	1.00	5.00	3.60	1.11
Competition is beneficial to individuals and the sub sector	168	1.00	5.00	2.48	1.34
Competitive rivalry is evident in livestock markets	168	1.00	5.00	3.24	1.42
Competitive rivalry affecting market performance	168	1.00	5.00	3.57	1.42
Competitive rivalry instigated by traders for own benefit	168	1.00	5.00	3.84	1.19
A system in place to regulate competition in markets	168	1.00	5.00	2.42	1.32
Competition strengthening markets	168	1.00	5.00	2.77	1.41
Competition reducing livestock prices in markets	168	1.00	5.00	2.74	1.46
Overall	168	1.11	4.89	3.12	0.63
1 Kerio Livestock Market	56	2.67	4.89	3.62	0.49
2 Lorugum Livestock Market	56	1.11	3.89	2.79	0.62
3 Lokori Livestock Market	56	2.11	4.33	2.94	0.44

Calculated $F(2,165) = 39.966$; critical $F(2,165) = 3.050$; P-value = 0.000

A post hoc analysis results for multiple comparison using Tukey indicated a significant difference in the mean score of respondents in Kerio and Lorugum Livestock Market, as well as Kerio and Lokori livestock Market at 5% level. There was however no significant difference between Lorugum and Lokori Livestock Market.

Table 7: Multiple Comparisons - Marketing Systems

(I) Livestock Market	(J) Livestock Market	Mean Difference (I-J)	Std. Error	Sig.
1 Kerio Market	2 Lorugum Market	.82738*	.09849	.000
	3 Lokori Market	.67460*	.09849	.000
2 Lorugum Market	1 Kerio Market	-.82738*	.09849	.000
	3 Lokori Market	-.15278	.09849	.270
3 Lokori Market	1 Kerio Market	-.67460*	.09849	.000
	2 Lorugum Market	.15278	.09849	.270

The qualitative study results, especially on modes of livestock marketing systems used in Turkana, found that livestock producers and traders must negotiate transactions in order for livestock trading to take place, with bartering still prevalent in rural regions. Turkana engages in cross-border animal commerce through access to foreign markets, mostly through non-official trade routes. Cash is the primary medium of exchange for animals and livestock goods in Turkana, influencing the trade of commodities. Regarding the performance of local livestock markets, local livestock markets are hindered by livestock keepers' lack of understanding of livestock marketing and limited access to cash and transportation services. Insecurities in livestock production and marketing are a major concern due to raids on traders transporting animals to the market, the dominance of high-capital traders, and barter livestock trading, which has been abused by wealthy livestock traders, resulting in losses for livestock farmers.

On application of modern livestock marketing systems, the Livestock Marketing Association (LMA) and Co-Management model was adopted from Samburu County. Livestock markets provide income to support livelihoods and business capital for Turkana's population. Barter trade and convectional livestock marketing are helping livestock keepers access cash to meet household and development needs. Regarding relations between trader categories, local traders cooperate to shift livestock and financial resources between markets. Although the relationship between primary and secondary livestock traders is viewed as positive, the disparities in capital resources and income streams have harmed low-capital traders, particularly those from primary markets. This distinction has allowed secondary traders to dominate primary marketplaces, with some of them using primary traders as mere labourers and suppliers. Relationships between primary and secondary traders from Turkana and Kenya's terminal livestock marketplaces are extremely incongruent. The objective of tertiary traders is to raise prices to persuade producers and other traders to sell straight to them. This renders local merchants uncompetitive in their native markets.

a. Management of Competition in Markets

Turkana's livestock markets are marked by rivalry as a kind of competition. Differences in knowledge and capital resources between traders in Turkana and those from exterior marketplaces lead to unethical behavior in the livestock business. Inculcating an organized livestock marketing system in which itinerary traders link directly with primary markets, which are then linked with secondary traders, who in turn trade with external traders, is one of the most long-lasting measures taken to reduce competitive rivalry in the Turkana livestock market. Also, providing local merchants with access to capital will increase their competitiveness, resulting in more organized trading. Given the technical nature of competition and the technical nature of demand and supply market factors, livestock development stakeholders view traders' training as an investment to improve their knowledge, abilities, and attitudes about livestock trade and the ethics involved. The extension services supplied are resulting in a paradigm shift in attitudes and behaviours, which has resulted in diverse market sectors' traders embracing one another and promoting cooperation.

b. Challenges on and Opportunities to Improve Livestock Trade

According to reports, the adoption of the LMA and co-management model improves livestock marketing compared to the more traditional barter trade approach, which does not involve the use of cash. However, the LMA model is also said to have flaws because it lacks a corporate perspective that would encourage livestock markets and traders to build capital bases capable of enhancing business access to capital. Compared to cooperatives, which boost resource mobilization and usage by members, the LMA model must be enhanced to include corporate aspects not only for resource mobilization but also for corporate governance of livestock markets and associated companies by the members. Turkana's livestock marketing processes can be significantly improved through research. Given the historical context of the livestock industry and the achievements and difficulties of each model, value-added livestock marketing strategies can be developed and implemented.

Sharing knowledge from regions where formal livestock selling systems have been implemented can aid in the development of Turkana's livestock industry by making it more dynamic and competitive. The close proximity of Turkana to international borders presents an excellent opportunity for international livestock commerce and interactions. This type of animal commerce necessitates distinct marketing systems that account for cross-border opportunities and dynamics. According to reports, the Loiya, Lokiriama, and Lokichoggio markets are exemplary in their use of cross-border commercial prospects to foster cross-border animal commerce. Peaceful coexistence between pastoral and business communities along borders and livestock trade corridors also contributes to cross-border commerce. This demonstrates the role of livestock markets and cross-border trade engagements in fostering harmony among peaceful and even hostile populations that are geographically close.

D) Pricing Strategies in Livestock Markets

The parameters on pricing strategies in livestock markets were sharply divided as per the Likert scale results. Price information being shared, an increase in supply and demand, turnover of livestock and products in the market, traders

diversifying their businesses, and market stakeholders being delighted were evenly distributed across the scale. Regarding the setting of prices in the market, methods of discovering and setting prices, affordability of prices, and affordability of meat products were largely disagreed upon by 54%, 51.6%, 71.50%, and 63% of respondents, respectively. The distribution of the scores is presented in Table 8.

Table 8: Pricing Strategies Analytics

	SD	D	N	A	SA
Prices in markets are well discovered and set	33.90	20.10	23	12	11
Methods of setting prices are good	35.60	16.00	28	9	11
Information of pricing is shared	27.00	25.02	13.98	18	16
There is increase in supply in markets	16.00	10.00	15	32	27
Demand is on the increase	18.00	21.75	16	21.30	22.50
Livestock and prices are affordable	41.00	30.50	10	10.50	8
Meat products are affordable in the county	37.00	26.00	15	13	9
There is high turnover of livestock and products in the market	9.23	16.90	25	23.57	25.30
Traders are diversifying their businesses	14.74	16.50	18	27.11	23.65
Market stakeholders are delighted with prices	38.25	28.18	18	10.70	4.87

An analysis of average mean score of the balance between supply and demand in the livestock market indicated that respondents in Kerio Livestock Market had the highest mean of 2.74 while respondents in Lorugum Livestock Market had lowest mean of 2.17. To determine whether there was a significant difference in mean score of supply and demand in the livestock market across the three markets, one way analysis of variance was used. The analysis results revealed a significant difference between the respondent scores ($F(2,165) = 25.124$; P-value = 0.000).

Table 9: Summary of Pricing Strategies Analytics

Statements	N	Minimum	Maximum	Mean	Std. Dev.
Livestock marketing is season-long	168	1.00	5.00	4.03	1.05
Traders diversifying their businesses and livelihoods	168	1.00	5.00	3.74	1.13
Livestock prices are consistent and affordable throughout the year	168	1.00	5.00	2.73	1.17
Overall	168	1.00	5.00	3.50	0.83
1 Kerio Livestock Market	56	2.33	5.00	3.74	0.53
2 Lorugum Livestock Market	56	1.00	4.67	2.93	0.88
3 Lokori Livestock Market	56	2.33	5.00	3.82	0.75

Calculated $F(2,165) = 25.124$; critical $F(2,165) = 3.050$; P-value = 0.000

A post hoc analysis results for multiple comparison using Tukey indicated a significant difference in the mean score of respondents in Kerio Livestock Market and Lorugum Livestock Market, and Lorugum Livestock Market and Lokori Livestock Market at 5% level. There was however no significant difference in scores for respondents in Kerio Livestock Market and Lokori Livestock Market (Table 10).

Table 10: Post Hoc Comparisons - Pricing Strategies

(I) Market_Two Market	(J) Market_Two Market	Mean Difference (I-J)	Std. Error	Sig.
1 Kerio Market	2 Lorugum Market	.80952*	.13860	.000
	3 Lokori Market	-.07738	.13860	.842
2 Lorugum Market	1 Kerio Market	-.80952*	.13860	.000
	3 Lokori Market	-.88690*	.13860	.000
3 Lokori Market	1 Kerio Market	.07738	.13860	.842
	2 Lorugum Market	.88690*	.13860	.000

*. The mean difference is significant at the 0.05 level.

a. Strategies used in Pricing Livestock and Livestock

Qualitative study results depict that pricing live animals mostly involves buyer-seller talks to establish a price. During offtake, particularly involving tertiary market traders, animals are classified into three (3) grades, namely G1, G2, and G3, with a fixed average price for each grade category. In retail butcheries, livestock products, such as meat, are measured in

kilograms, and the corresponding prices apply. Pricing varies by region. In this instance, Lodwar is the most expensive (KES 800-1000/kg), while Kerio is the most affordable (KES 400/kg). In informal markets, meat is measured by "hand," which corresponds to the amount of cash in the buyer's possession.

Observation of the animals up for sale or acquisition is a crucial aspect of pricing. The animal's bodily state reveals more about its health and the quality of its meat, fats, and oils. The buyer performs palpation of the body, particularly on body parts such as the lumber, the flacks, and the sternum, to determine the health of the animals. As a result of palpations, the price discussion might be expedited, resulting in a purchase. Typically, 0.25 kg or 0.5 kg containers are utilized to measure milk. This requires both fresh and sour milk, with the former being more expensive. Regarding hides and skins, goats and sheep are priced similarly. Cattle hides are more prized than camel hides. The most expensive donkey skins on the Chinese market are in high demand. The skin of a donkey is more expensive than the meat of the animal itself. The historical pricing systems for animal products are still in use today. The use of weighing scales to determine the price of animals based on their live weight has been discussed for many years but has not been adopted.

b. Pricing Affecting Buyers, Sellers and Consumers

In Turkana, pricing methods are not formally set. Are simply set and fixed to the market based on customer behaviour in the region. Keir, Lorugum, and Lokori are located on the outskirts of the county and in close proximity to locations where animals are raised. This also indicates that the majority of households in these regions have access to livestock and products. Meat prices in butcheries are determined by the ownership of livestock by households. In contrast, the town of Lodwar, where the majority of citizens do not keep animals at home, has high costs for live animals and products. This situation is the result of a strong demand for meat and consumer behaviour in which meat is consumed as an accompaniment to meals and beverages, such as beer and spirits.

In most cases, informal pricing of animals and goods deprives livestock farmers of the value of their animal resources. Given the compelling reasons for a seller to bring animals to market, they ultimately accept the prices that buyers would provide. This dynamic is also unfavourable for local merchants, whose revenue projections are jeopardized by the tertiary market merchants' pricing decisions.

c. Effects of informal pricing to the market

In regions where meat prices are so high, consumers have restricted access to animal proteins. Many of them regard meat as a delicacy. The only inexpensive meat available to them is offal. Lack of access to foods derived from animals has enormous effects on the nutritional state of populations. This is true in Turkana, particularly for the poorest class, which does not possess animals or cannot purchase meat products and thus suffers from nutritional deficiencies. Informal pricing of animals and goods has an effect on the profitability and competitiveness of livestock markets. Less income from cattle, the principal commodity traded in Turkana, results in sluggish economic growth and the socioeconomic transformation of the regions and their residents. Turkana can use livestock as an economic resource to develop a solid financial basis and diversify enterprise and home livelihoods. There are currently no further goods produced in Turkana that are marketable. If any, it is imported from foreign countries and traded by foreign businesses.

The biggest untapped market opportunity in Turkana is the enhancement of livestock health and productivity. This includes adopting new livestock species that are prolific, climatically adapted to Turkana, and highly marketable. To avoid exploitation of local producers and due to the fact that Lodwar is an economic center in northern Kenya, weighing animals to determine prices and strengthening the application of health standards in the production, management, and processing of livestock products can create a larger market for Turkana livestock and products. Given the informal determination of livestock and product pricing, the price of meat products in Turkana, which is the epicenter of livestock production, has an effect on the market. This has caused a lot of hotels and homes to source their meat from neighbouring Kenyan towns. The standard price for animals and products is determined based on supply and demand, as well as anticipated profitability and competitiveness when trading in other markets. As livestock farming is an economic activity in Turkana, markets play a vital role in ensuring that livestock and products become a sustainable revenue source for the county.

Current livestock and product pricing in Turkana is a cause of needless competition and rivalry. It predisposes the vast majority of cattle business owners to exploitation, placing their business resources at risk. Poor pricing systems impede market expansion and the capacity to successfully contribute to the local economy. The Turkana consumer market, which comprises residences, hotels, hospitals, and schools, can be maximized through competitive pricing. Fair pricing correlates positively with sales, resulting in increased turnover of animals and items bound for diverse market sectors. Fair pricing will improve the demand for commodities produced in Turkana as well as consumer loyalty and satisfaction.

E) Pricing and Consumer Behavior

The parameters assessed for pricing and consumer behavior showed that respondents' agreement with the parameters (consumers of livestock and livestock products and consumers communicating their feelings on prices) was 65.3% and 56.3%, respectively. However, the parameters on which the respondents were not in agreement included: attractiveness of the market to consumers, fairness of prices, affordability of prices, and loyalty of prices, scored at 66%, 53%, 568.59%, and 80.52%, respectively. Also, consumer delight, meeting consumer choices, and consumer perceptions of prices were disagreed upon at 71.3%, 50.32%, and 60.4%, respectively. The distribution of scores on the Likert scale is presented in Table 11.

Table 11: Pricing and Consumer Behaviour

	SD	D	N	A	SA
There are many consumers for livestock and livestock products in the market	7.70	9.00	18.00	43.00	22.30
Market is attractive to consumers due to pricing	41.50	24.50	15.60	13.50	4.90
Commodity pricing is fair	31.23	21.78	22.00	11.86	13.13
Prices are affordable	45.14	23.45	14.87	9.32	7.22
Loyalty on local prices is high among consumers	51.12	29.40	6.38	10.30	2.80
Consumers are delighted and happy of pricing strategies	41.76	29.54	12	11.40	5
Pricing meeting consumer choices and preferences	24.89	25.43	23.30	15.00	11.38
High turnover of livestock and products in the market	23.98	18.50	37.20	14.70	5.62
Consumers are communicating their feelings about pricing	9.60	13.10	21	32.80	23.50
Consumer perception on the pricing is good	31.87	28.53	21	11.50	7.10

a. Factors Attracting Consumers to Local Markets

The qualitative study results showed that the livestock market attracts a variety of clients. This includes producers who wish to increase their herds. They acquire breeding stock for their own households. During times when weddings and rites of passage are performed, markets serve as a resource for acquiring the necessary animals. Moreover, markets are essential during national, traditional, and religious holidays. During these events, producers and traders are able to transact large quantities of animals. The result is a rise in cash flow and market revenue.

Attracting sellers, buyers, and consumers to the market are reasonable prices and high-quality animals and merchandise. In addition, transport efficiency enhances the supply of goods on the market, thereby regulating prices and ensuring market accessibility and affordability. Strong connections across market sectors promote the effective communication of items across marketplaces, encouraging both buyers and sellers to engage in commercial activity. Consumer preferences and likes are behavioural characteristics that must be effectively addressed through pricing tactics. Due to the fact that consumers require affordable goods, effective pricing will foster consumer loyalty, particularly for locally made goods.

b. Measures to Regulate Pricing

Pricing is identified as a crucial aspect of organizing livestock markets and making them more effective, dynamic, and sustainable, according to the study. Pricing is crucial to the competitiveness of markets and consumer loyalty. The sharing of information greatly aids in the regulation of livestock and commodity prices on local marketplaces. This is accomplished effectively by regularly collecting prices from all relevant markets and disseminating them to all market category stakeholders. It will include not just current market prices but also the economics of entering such marketplaces for business purposes. Market research procedures result in the mobilization and analysis of data for decision-making objectives. The market analytics provide further insight into the feasibility of markets and the opportunities they bring for entrepreneurs and local markets. Also, adding value to the goods presented on the market can increase demand, which is essential for maximizing the possibility of generating more goods for market capitalization and monetization by existing and future consumer clients.

Regularization of participatory monitoring and evaluation of marketing programs and processes to maintain a check on market operations and commercial arrangements facilitates the development of market-based insights that are essential for market-based managerial and accounting choices. Having different pricing strategies and implementing them in different seasons as a means of maintaining product consumption and managing supply and demand dynamics will result in the application of different prices to ensure that consumers remain satisfied with the market throughout the different seasons.

c. Role of Government in Management of Livestock Markets

The government is in charge of livestock production and marketing initiatives, whether they are conducted by government programs or private entities. The development of livestock is regulated, and there are suitable policies in place. Kenya and other leading livestock-farming regions derive a substantial economic benefit from livestock. To guarantee livestock maintains its significance in the socioeconomic development of livestock-rearing regions, policy formulation should include all livestock sector components. The government should play a major role in improving the livestock production and marketing sector's capacity to supply the services necessary to improve the sector's performance.

The government can provide access to data on cattle production and market conditions. Through market research and formal channels of information dissemination, all market segments are effectively reached. The government must ensure that all market participants have access to sufficient money to control market supply and demand and stay competitive and profitable. The government can assist local entrepreneurs in enhancing their competitiveness and securing large market shares on both domestic and international markets. The addition of value to livestock through the improvement of breeds and products through agro processing enables livestock products to be changed into a variety of finished goods aimed at a larger market. Regulatory frameworks and ethical behavior in livestock markets and modalities of transactions can improve the performance of local markets, such as the sustainability of livestock marketing operations, price regulation, and consumer loyalty across the seasons.

F) Conclusion

The study concludes that livestock is a critical resource for the socioeconomic development of livestock-dependent populations in Turkana County, and livestock marketing is the only way that livestock resources can be integrated into the economy and made beneficial to populations depending on them and to entrepreneurs who maximize them for business. A radical transformation of livestock production and marketing systems requires the crafting of efficient and effective models and strategies that can help improve production and marketing, which will also improve the competitiveness of local entrepreneurs and the capabilities of local producers to create livestock products with value. The current livestock marketing association and co-management model should be transformed into cooperative systems to structure its business components and make them market-driven.

Pricing strategies for Turkana livestock and products should be defined based on the state of supply and demand market forces and the influence of non-market forces, which include government policy and regulations. The pricing of livestock-based commodities should also be informed by the economy of the area and the need to venture into and compete successfully in external markets. Pricing correlates with sales, purchases, and consumption of products; entrepreneurs realize incomes and reruns on their investments; and consumers have access to food, nutrition, and delight.

G) Recommendations for Application

It is strategic to recommend that government and development partners engage in youth and women's empowerment initiatives to reduce illiteracy and ignorance in Turkana County, invest in forage and enhanced feed to enable year-round production and trade of healthy and productive livestock, and provide local traders with capabilities to enhance their competitive and comparative advantage. Coordination of breeding systems and the introduction of superior breeds will help alleviate Turkana's production dilemma, allow the government to protect livestock production areas from urbanization, and enhance the collaborative agenda of analyzing climate change phenomena to improve the resilience of pastoralists. Institutions responsible for livestock production and marketing should encourage widespread adoption of viable business models to reduce competition and improve communication, pricing, and transportation in the livestock production areas and markets.

Livestock development stakeholders need to understand the importance of the cash economy and store income in cash instead of animals. This will strengthen the incorporation of formal banking systems and technology in the livestock trade. They should also standardize operations at livestock markets and create stakeholder connections to prevent market malpractice. Governments and civil society organizations can enable livestock traders and business owners to compare livestock supply to current demand, allowing surplus livestock to be sold on other markets. Farmers, traders, and consumers need access to information about livestock prices. Farmers, traders, and consumers need to have access to information about livestock prices, promoting healthy competition in markets through enhanced pricing and information exchange to make livestock and livestock products affordable to both vendors and consumers.

H) Value and Implications of the Research Output

Implementation of the identified recommendations will increase the value and implications of the research output, which includes: Raising livestock and investing in socioeconomic opportunities that can foster and expand livestock farming can make it a key source of income, contribute to the economy, and improve the well-being of livestock-dependent populations. To close the information gap and expand the livestock sector in Kenya, the study output will define knowledge on

traditional and conventional livestock marketing systems compared and analyzed in Turkana and identify optimal livestock marketing systems that will facilitate livestock commerce and production projects in Turkana.

While price is a variable independent of sales, purchases, revenue, and economic returns on investments, the study output will guide the determination and setting of prices. The study will empower the county government of Turkana to regulate livestock and product pricing, improving viability and sustainability. It will also increase public awareness of the new structure of market operations, performance, and benefits of livestock marketing initiatives and their impact on the socioeconomic transformation and development of dryland pastoral areas.

I) Suggestions for Future Research

To further build livestock production, marketing, and pricing management, livestock development stakeholders need to improve livestock production in Turkana, explore viable and sustainable avenues for rangeland ecosystem development and management, create profitable livestock-based businesses, integrate value addition to livestock production and marketing to transform subsistence farming into a market-based livestock economy, and assess the potential of corporate ideas and models to improve dryland cattle production and marketing.

Stakeholders should also evaluate the effectiveness of Turkana Lomidat Slaughterhouse through the lens of a tertiary market for Turkana, begin plans for its reopening based on the best applicable business model, and transform it from being managed by the Livestock Marketing Association (LMA) to becoming a cooperative society. Also, there is a need to gather scientific knowledge to improve livestock markets, guide potential advancements to create disease-free zones in pastoral areas, and motivate pastoralists to sell animals when market conditions improve. This will continue the campaign to commercialize livestock production in Turkana.

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