IRASS Journal of Economics and Business Management
https://irasspublisher.com/journal-details/IRASSJEBM
ISSN *(Online) 3049-1320*

Livestock Marketing Interventions and Livelihoods in Pastoral and Smallholder Farming Systems in Sub-Saharan and East Africa: Evidence from the Literature

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: 28 / 08 / 2026

Published: 13 / 09 / 2026

Abstract: Livestock production is central to rural livelihoods across sub-Saharan Africa, particularly in pastoral, agro-pastoral, and smallholder farming systems. Livestock provide food, income, savings, employment, insurance against shocks, manure, and social and cultural capital. However, the contribution of livestock to household welfare depends not only on production but also on households' ability to participate effectively in livestock markets and obtain fair returns. This review synthesizes literature published primarily between 2020 and 2026, with particular attention to pastoral and smallholder systems in East Africa. The evidence shows that market infrastructure, market information, producer organizations, transport, veterinary services, financial services, value addition, and improved market governance can reduce transaction costs, increase market participation, improve producer returns, and strengthen livelihood resilience. Evidence from Ethiopia demonstrates that improved livestock market sheds can increase smallholder earnings, while evidence from northern Kenya indicates that improvements in physical and communication infrastructure have strengthened market integration. However, market participation does not automatically improve welfare. Drought, climate variability, conflict, distress sales, weak bargaining power, gender inequalities, inadequate services, and restrictions on pastoral mobility can limit or reverse livelihood gains. Informal information networks, brokers, customary institutions, and cross-border trade also remain important in connecting remote producers to markets. The review therefore argues that livestock marketing should move beyond increasing sales volumes toward resilient, inclusive, equitable, and sustainable livestock value chains. Effective interventions should integrate market infrastructure, information, producer organization, animal health, finance, value addition, climate-risk management, gender empowerment, rangeland governance, conflict management, and predictable trade regulation.

Keywords: *Livestock marketing; Pastoral livelihoods; Smallholder farmers; Market access; Livestock value chains; Climate resilience.*

How to Cite in APA format: Anno, E. F. (2026). Livestock Marketing Interventions and Livelihoods in Pastoral and Smallholder Farming Systems in Sub-Saharan and East Africa: Evidence from the Literature. *IRASS Journal of Economics and Business Management. 3(9), 10-19.*

1. Introduction

Livestock are central to pastoral, agro-pastoral, and smallholder livelihoods, providing food, income, employment, savings, insurance, wealth, and, in mixed farming systems, manure and animal traction. Their contribution to welfare and resilience depends on households' ability to convert livestock assets into reliable economic returns. Livestock marketing provides this link by connecting producers to traders, processors, abattoirs, exporters, and consumers through transport, finance, veterinary services, producer organizations, infrastructure, regulation, and market information.

Recent literature increasingly assesses livestock marketing not only by sales and market turnover, but also by the quality and inclusiveness of participation, value distribution, resilience, gender equity, and sustainability. Evidence from Kenya and Ethiopia shows that market participation is shaped by market distance, infrastructure, herd size, education, extension, grazing resources, information, group marketing, credit, animal health, climate risks, and conflict. Importantly, market integration can increase income through timely and strategic sales, but drought, disease, food shortages, and conflict may trigger distress sales when livestock are in poor condition and prices are low, resulting in asset depletion and reduced future production capacity.

Livestock marketing is therefore closely linked to ecological and institutional conditions. Access to grazing areas, water, livestock corridors, mobility routes, and secure trading environments is essential for productive and resilient pastoral systems. Restrictions on mobility, resource access, or trade routes can increase transaction costs, disrupt markets, and undermine livelihoods.

Against this background, the review examines how livestock marketing interventions influence market participation, household income, resilience, and equity, and identifies the factors that determine their effectiveness. It considers market infrastructure and transport, information, producer organizations, veterinary services, finance, value addition, gender and social inclusion, climate resilience, rangeland governance, conflict, and trade regulation as interconnected components of livestock value chains. The review therefore adopts a systems perspective, emphasizing coordinated interventions that strengthen productive

capacity, market access, bargaining power, risk management, and the ecological foundations of livestock production.

2. Methodology

This study employed a systematic literature review and qualitative thematic synthesis to examine evidence on livestock marketing interventions and their effects on livelihoods in pastoral, agro-pastoral, and smallholder farming systems in Africa, with particular emphasis on East Africa. The review primarily covered peer-reviewed studies published between 2020 and 2026, while selected earlier studies were included where they provided important foundational evidence. Literature was searched using 61 sources across ProQuest, Scopus, Google Scholar, and ResearchGate, using the search string “Livestock production” AND “Livestock Marketing” AND “Pastoral livelihoods.” Studies were included if they were published between 2020 and 2026, focused on Africa, and provided relevant evidence on livestock marketing, market participation, livelihoods, income, resilience, value addition, or related institutional and socioeconomic factors. Studies that fell outside the geographical or temporal scope, lacked sufficient relevance to the review objectives, or did not provide adequate empirical evidence were excluded. Following screening and application of the eligibility criteria, 22 studies were retained for analysis.

The selected studies employed quantitative, econometric, qualitative, and case-study approaches and were assessed for methodological quality. The quality appraisal examined the clarity of study objectives, appropriateness of research design, sampling procedures, data collection and analysis, validity and reliability, transparency of reporting, and consistency between findings and conclusions. Evidence was then organized and synthesized thematically around market infrastructure and transport, market information and digitalization, producer organizations, animal-health and financial services, value addition, gender inclusion, climate and drought resilience, governance, conflict, and domestic and cross-border trade. Findings were compared across geographical and livelihood contexts to identify recurring patterns, enabling conditions, constraints, and knowledge gaps.

The thematic synthesis followed a systematic process of study findings, coding, grouping of codes, development of descriptive themes, cross-study comparison, development of analytical themes, overall synthesis and conclusions. The analysis further developed a livelihood pathway linking marketing interventions to reduced transaction costs, improved market access and bargaining power, increased market participation and returns, and ultimately improved income, food security, asset accumulation, and livelihood resilience. Attention was also given to the moderating effects of climate shocks, drought, conflict, gender inequality, environmental constraints, and market governance. This approach enabled an integrated assessment of how livestock marketing interventions contribute to inclusive, resilient, and sustainable livelihoods in African pastoral, agro-pastoral, and smallholder systems.

3. Evidence from Literature

3.1 Livestock Marketing Systems and Livelihood Pathways

A livestock marketing system consists of the actors, institutions, infrastructure, information, services, and transactions through which livestock and livestock products move from producers to consumers. Core marketing functions include assembling, sorting, grading, transporting, financing, negotiating prices, processing, and distributing livestock and livestock products. These functions create time, place, and form utility by enabling livestock to reach appropriate markets, at appropriate times, in suitable condition and in forms demanded by consumers (Collishaw et al., 2023; Abate et al., 2021).

For rural households, livestock marketing affects livelihoods through several pathways. Direct livestock sales generate cash for food, education, health care, agricultural inputs, debt repayment, and investment. Livestock also function as savings and insurance assets; particularly where formal financial services are limited. During periods of environmental or economic stress, households can adjust herd or flock sizes through sales. Consequently, livestock markets influence both income generation and households' capacity to manage risk (Tilahun et al., 2023).

The benefits of market access depend, however, on the conditions under which animals are sold. Long distances, inadequate roads, high transport costs, poor animal condition, limited price information, weak bargaining power, and inadequate market facilities can substantially reduce producer returns. These constraints are especially important in pastoral areas, where mobility is itself a critical component of production. Market development must therefore improve connectivity without undermining access to the rangeland resources that sustain livestock.

Abay and Jensen (2020) demonstrate the interaction between markets, production, and risk in Ethiopia. Households located closer to markets were more likely to engage in market-oriented livestock production and adopt modern livestock inputs. However, increasing weather uncertainty encouraged some households, particularly in arid and semi-arid areas, to retain livestock as precautionary savings. Commercialization decisions are therefore shaped by a balance between market opportunities and the insurance value of livestock (Ndiritu & Gichuki, 2025).

This finding has a broader implication: livestock marketing should be evaluated not simply by the number of animals sold but by whether market participation improves household welfare while maintaining productive assets and resilience. An intervention that increases sales but causes rapid asset depletion may not represent sustainable commercialization. Conversely, interventions that enable households to sell strategically, invest returns productively, and maintain viable herds can strengthen long-term livelihoods.

3.2 Market Access and Infrastructure

3.2.1Physical infrastructure and transaction costs

Physical infrastructure is among the most consistently identified determinants of livestock-market participation. Roads, livestock markets, holding grounds, loading facilities, watering points, weighing equipment, slaughter facilities, quarantine stations, cold-storage systems, and communication infrastructure can reduce transaction costs and improve connectivity.

Strong causal evidence comes from Zeleke et al. (2021), who examined livestock market sheds in Ethiopia using panel data and a difference-in-differences approach. The study found that market sheds increased smallholder farmers' earnings from small-ruminant sales and increased market participation among farmers

living near improved markets. This provides important evidence that relatively simple infrastructure investments can generate measurable livelihood gains.

Evidence from Tana River County, Kenya, similarly demonstrates the importance of market proximity. Lutta et al. (2021) found that market distance, group marketing, education, age, and herd size significantly affected pastoral market participation. In southwest Ethiopia, Tilahun et al. (2023) reported that 65.4% of surveyed smallholder livestock producers participated in livestock markets, although the intensity of participation remained limited. Education, livestock ownership, production experience, grazing access, market access, and extension contact increased participation, while distance to markets reduced it.

These findings indicate that infrastructure should not be viewed as an isolated intervention. Roads and market facilities are more likely to generate sustained economic and livelihood benefits when complemented by extension services, veterinary support, market information, producer organizations, and financial services. This finding is consistent with Anno's (2025) study on strategic outcomes for addressing food security challenges in dryland areas, which emphasizes the need to transform pastoral and agro-pastoral economies into more market-oriented systems capable of generating economic returns and sustainable benefits for actors across the livestock value chain.

3.2.2Communication infrastructure and market integration

Market connectivity also depends on communication systems. Chelanga et al. (2022) found evidence of price transmission and increasing integration among pastoral livestock markets in northern Kenya. Improvements in physical and communication infrastructure contributed to stronger market linkages, although smaller production-area markets continued to exhibit relatively lower prices. The findings suggest that infrastructure can reduce spatial market segmentation but may not automatically eliminate inequalities in value distribution. Improved connectivity must therefore be accompanied by mechanisms that strengthen producer bargaining power and access to reliable market information.

3.2.3Infrastructure for livestock products

Infrastructure is especially important for perishable livestock products. Nori (2023), examining camel-milk marketing in northern Kenya, shows that cooling facilities, transportation, collection systems, and cooperative organization enabled pastoral producers to supply distant urban markets. Women played important roles in milk collection, aggregation, processing, and retailing. The camel-milk case illustrates that market infrastructure can create employment and stable income beyond live-animal sales. It also demonstrates the value of combining physical investments with locally embedded organizations and market networks.

3.3 Market Information, Brokers, Digitalization, and Producer Organization

3.3.1Market information and bargaining power

Information asymmetry is a major constraint in livestock markets. Producers in remote areas often lack reliable and timely information on prevailing prices, market demand, potential buyers, quality requirements, and alternative market opportunities. This information gap can increase their dependence on intermediaries, weaken their bargaining power, and reduce their ability to make informed marketing decisions. Similarly, Anno (2026), in a study on competition, competitiveness, and determinants of competitive rivalry in dryland livestock marketing systems, identifies information asymmetry as a key bottleneck limiting local traders' ability to enter, compete, and sustain access to potential markets. Limited access to market information constrains traders' ability to respond effectively to changing market conditions and increases their exposure to risks associated with livestock marketing investments. Strengthening market information systems, therefore, is critical for improving transparency, enhancing bargaining power, promoting competitive participation, and enabling both producers and traders to make timely and risk-informed marketing decisions.

Abate et al. (2021) found that market access, education, livestock ownership, selling prices, grazing resources, and feed availability influenced the intensity of smallholder sheep-market participation in northern Ethiopia. The study recommends improved market information, roads, extension, and training. Tilahun et al. (2023) similarly found that education, extension contact, market access, and livestock ownership influenced participation intensity. These findings indicate that information should be treated as a core component of market infrastructure. Reliable information can help producers determine where and when to sell, compare prices, identify buyers, assess quality requirements, and negotiate more effectively.

3.3.2Local and digital information systems

Evidence from Kenya during the 2021–2023 drought highlights the continued importance of informal information networks. Ndiritu and Gichuki (2025), using data from 1,053 pastoral households, found that neighbours, family members, and local networks remained highly influential in livestock-market channel choices, while radio and mobile-phone communication were less influential. This does not imply that digital technologies are unimportant.

Mobile-based price information, electronic payments, buyer platforms, weather alerts, and disease information can improve market participation. Their effectiveness, however, depends on network coverage, literacy, affordability, trust, and institutional support. Digital systems should therefore complement trusted local networks rather than attempt to replace them (Abay & Jensen, 2020).

3.3.3Brokers and intermediary institutions

Brokers perform important functions in many livestock markets. They connect buyers and sellers, reduce search costs, provide information, negotiate prices, arrange transportation, and facilitate transactions across geographic, linguistic, and social boundaries. Their presence should therefore not automatically be interpreted as evidence of market failure (Tilahun et al. (2023). Nevertheless, excessive dependence on brokers can weaken direct producer-buyer relationships and potentially reduce the share of final market value captured by producers. Interventions should therefore focus on reducing harmful information asymmetries through transparent weighing and grading, accessible price information, producer organizations, and direct links to larger buyers rather than simply attempting to eliminate brokers.

3.3.4Producer organizations and collective action

Producer organizations and cooperatives can address several market constraints simultaneously. They can aggregate livestock, reduce transport costs, strengthen bargaining power, facilitate access to credit and information, improve quality management, and connect producers to larger buyers. The camel-milk experience in northern Kenya demonstrates the potential of collective organization to improve storage, quality management, aggregation, and access to urban markets (Nori, 2023). Collective marketing is particularly valuable for smallholders who individually produce insufficient quantities to attract large buyers or negotiate favorable terms.

3.3.5Value Addition, Gender, and Inclusive Participation

Livestock-market development should not focus exclusively on increasing the number of animals sold. A more important objective is to increase the value retained by producers and local communities. Value addition can occur through aggregation, grading, fattening, milk processing, meat processing, improved handling, packaging, cooling, and specialized transport. These activities can generate employment, diversify household income, and reduce dependence on live-animal sales. The camel-milk sector in northern Kenya provides a useful example. Improved collection, cooling, transportation, and cooperative organization enabled pastoral producers to reach urban consumers while creating employment opportunities, particularly for women (Nori, 2023). Similar opportunities may exist in meat processing, small-ruminant fattening, hides and skins, and other livestock products where market demand and infrastructure are sufficient.

Gender, however, should not be assessed simply through women's participation in value chains. Kinati et al. (2023), using baseline evidence from Ethiopia's Small Ruminant Value Chain Development Program, identified gender differences in market participation, marketing decisions, and control over income. Access to market information, extension, livestock ownership, and participation in sales were associated with different dimensions of empowerment. Participation therefore does not automatically translate into economic empowerment. Women may contribute substantial labor to livestock production and marketing while having limited control over livestock assets, income, finance, or marketing decisions.

Effective interventions should address decision-making authority, ownership and control of productive assets, access to finance and training, participation in producer organizations, and control over income. The same principle applies to poorer households and youth. Producers with small herds may be excluded from higher-value markets because they cannot individually meet volume or quality requirements. Collective marketing, aggregation, targeted finance, training, and market linkages can help overcome these barriers. Youth can also benefit from opportunities in livestock trading, transport, processing, digital marketing, veterinary support, and other value-chain services (Abate et al. 2021).

3.4 Climate and Environment factors

3.4.1Climate Change, Drought, and Livestock-Market Resilience

Climate variability is a defining feature of pastoral and many smallholder livestock systems. Drought affects animal body condition, mortality, milk production, feed availability, prices, mobility, and household decisions about livestock sales. Livestock marketing should therefore be considered part of climate adaptation and risk management rather than solely a mechanism for commercialization.

Yitayew et al. (2023), studying 357 pastoral households in drought-prone areas of Ethiopia, found that flock size, transaction costs, and access to veterinary services influenced goat-market participation. Participation in goat markets was associated with increased per-capita income and reductions in poverty indicators. Households also demonstrated willingness to pay a substantial proportion of variable transaction costs for marketing services, suggesting opportunities for cost-recovery approaches where services are reliable and valuable.

The timing and purpose of livestock sales are nevertheless critical. Strategic sales occur when households can sell productive animals under relatively favorable conditions. Distress sales occur when households are forced to sell because of hunger, disease, drought, conflict, or other shocks. Gebresenbet (2021) documents distress livestock sales among Bodi agro-pastoralists in Ethiopia's Lower Omo Valley, demonstrating how crisis-driven sales can contribute to asset depletion and impoverishment rather than sustainable commercialization. This distinction has important policy implications. An intervention that increases livestock sales may appear successful while simultaneously worsening welfare if households are liquidating productive assets under crisis conditions. Effective market systems should therefore be linked with drought early-warning systems, veterinary services, feed markets, livestock insurance, savings, credit, and timely social protection. These mechanisms can reduce the need for households to sell productive livestock at unfavorable times.

Evidence from northern Kenya on livestock insurance further underscores the importance of risk-management instruments in reducing households' exposure to drought and enabling productive investment (Jensen et al., 2016, 2017). Although these studies predate the main review period, they provide important foundational evidence on how financial risk-management mechanisms can complement livestock marketing interventions by protecting productive assets and strengthening households' capacity to engage in markets during periods of climatic stress. Similarly, Anno (2026), in a study on resource scarcity and insecurity as drivers of livestock productivity and trade efficiency in pastoral areas, emphasizes that uncoordinated access to and management of scarce livestock production resources, including water, pasture, and marketing infrastructure, can increase livestock keepers' vulnerability to drought and income insecurity.

The study further highlights that maintaining peace, security, and effective resource governance can facilitate pastoral mobility, strengthen resource-sharing arrangements, and expand opportunities for livestock trade within and across borders. Collectively, these findings suggest that resilient livestock marketing systems require not only financial risk-management mechanisms but also coordinated resource governance, adequate infrastructure, and a secure environment that enables producers and traders to participate effectively in livestock markets (Anno, 2026).

3.4.2Rangeland Governance, Mobility, Conflict, and Security

Livestock markets cannot be separated from the natural-resource systems that sustain livestock production. This is especially important for pastoral communities, whose production strategies depend on mobility across spatially and temporally variable grazing resources. Akall (2021) found that some development interventions in Turkana County, Kenya, including irrigation, settlement, and infrastructure development, contributed to fragmentation or loss of communal grazing resources. Such interventions can improve physical connectivity while simultaneously weakening pastoral production systems. The implication is that market development should be compatible with pastoral mobility and rangeland governance.

Roads, markets, and livestock corridors should therefore be planned in ways that maintain access to grazing and water resources. Market infrastructure cannot produce sustained benefits if livestock-producing households lose access to the ecological resources necessary to maintain their herds. Conflict represents another major constraint. Competition over grazing land, water, livestock, and trade corridors can disrupt mobility and restrict market access. Ndiritu and Gichuki (2025) found that conflict reduced local market participation during drought. Earlier evidence similarly shows that livestock raiding, resource competition, and insecurity can increase transaction costs and restrict livestock movement.

Livestock-market interventions should therefore incorporate conflict-sensitive approaches, customary institutions, peacebuilding, resource-sharing arrangements, and dispute-resolution mechanisms. Livestock corridors should be treated as interconnected economic and social systems rather than simply transportation routes.

3.4.3Animal Health, Food Safety, and Market Governance

Animal health is directly connected to livestock productivity, quality, market value, and trade. Livestock markets bring animals from different production areas together, creating both opportunities for animal-health interventions and potential sites for disease transmission. Markets can serve as strategic locations for disease surveillance, vaccination, animal identification, information dissemination, inspection, and certification. Conversely, inadequate surveillance, quarantine, and movement controls can facilitate disease spread. Animal-health problems can reduce animal condition, increase mortality, reduce reproductive performance, and restrict access to higher-value markets (Gebresenbet, 2021).

Veterinary services should therefore be integrated into livestock markets and trade corridors. For export markets, health certification and traceability can facilitate access to premium markets. However, poorly designed restrictions can isolate production areas and create substantial losses. Regulation should consequently be risk-based and predictable, protecting animal and public health while minimizing unnecessary disruption to legitimate trade. Transparent weighing, grading, inspection, and quality-assurance systems can simultaneously improve market transparency, food safety, animal health, and producer returns. Such measures can reduce disputes over animal quality and weight while increasing confidence among producers, traders, processors, and consumers (Kinati et al., 2023).

3.5 Livestock Commerce

3.5.1Domestic, Export, and Cross-Border Livestock Trade

Livestock trade in East Africa extends across local, national, regional, and international markets. Cross-border trade is particularly important in the Horn of Africa, where pastoral production systems frequently extend across national boundaries and connect remote production areas to major urban and export markets. Cross-border trade generates income, employment, foreign exchange, and opportunities for livestock-producing communities (Gebresenbet, 2021). The Somali livestock economy provides an important example of how pastoral production systems can become integrated with terminal markets in Kenya and markets in the Arabian Peninsula.

However, cross-border trade is constrained by disease-control requirements, taxation, border procedures, insecurity, infrastructure limitations, and differences in national regulations. Informal trade often emerges where formal channels are costly, slow, or inaccessible. Informal trade should therefore be understood partly as a response to institutional and market conditions rather than simply as a regulatory problem.

The policy response should focus on making formal trade more attractive through efficient border procedures, veterinary and quarantine services, appropriate taxation, market facilities, reliable information, security, and predictable regulations. Regional coordination is particularly important because livestock may move through multiple jurisdictions. Harmonized animal-health standards, documentation, quarantine procedures, taxation, and border-market systems can reduce unnecessary barriers. Traders and brokers should also be recognized for the functions they perform in connecting remote producers with urban and export markets. Improving transparency and producer bargaining power is preferable to eliminating market actors whose services remain necessary in geographically dispersed livestock economies (Tilahun et al., 2023).

3.5.2Smallholder Commercialization, Livelihood Diversification, and Food Security

Smallholder and emerging family farmers face many of the same market constraints as pastoralists but often operate within mixed crop-livestock systems. Limited herd size, poor roads, inadequate information, insufficient finance, weak veterinary services, and low productivity can restrict commercialization. Livestock contribute to household food security directly through milk, meat, and other products and indirectly through income used to purchase food. They also provide manure and, in some systems, draft power (Anno, 2025). Their role as savings and insurance assets is especially important where formal financial institutions are limited.

Nevertheless, excessive dependence on livestock can increase vulnerability. Diversification into crop production, wage employment, trade, processing, and other enterprises can reduce the need for distress livestock sales during drought or economic shocks. Financial services can support investment in breeding stock, feed, veterinary care, transport, and market participation, but such services should reflect the seasonal and risk-sensitive nature of livestock production. The broader evidence on livestock-development interventions indicates that livestock assets can improve household welfare, although impacts vary according to household characteristics, market conditions, and intervention

design (Collishaw et al., 2023). Livestock commercialization should therefore be integrated with broader livelihood-development strategies rather than treated as a stand-alone pathway out of poverty.

3.5.3Policy and Institutional Frameworks

Livestock marketing operates within a policy environment covering animal health, land and rangeland governance, infrastructure, taxation, finance, trade, food safety, environmental management, and social inclusion. Poorly coordinated policies can undermine market performance through abrupt market closures, inconsistent movement restrictions, excessive taxation, weak border administration, and inadequate animal-health systems. Conversely, predictable regulation can support commercialization. Policies should facilitate legitimate livestock movement while maintaining appropriate safeguards for animal and public health. Regional trade requires particular attention because pastoral livestock frequently cross-national borders.

Policy should also recognize the coexistence of formal and informal market institutions. Informal systems often provide essential services to remote producers, including information, brokerage, transport coordination, finance, and market linkage. Formalization is more likely to succeed when governments improve incentives for compliance and access to services rather than simply criminalizing existing practices (Nori, 2023). A supportive policy framework should therefore combine market development with predictable regulation, efficient trade facilitation, animal-health safeguards, rangeland protection, conflict management, and social inclusion.

3.5.4Conceptual Interpretation of the Livelihood Pathway

The conceptual framework shows how livestock marketing interventions influence market participation, household income, livelihoods, and resilience among pastoralists and smallholder farmers. Key interventions including market infrastructure, information, producer organizations, transport, veterinary and financial services, and value addition reduce transaction costs, improve market access and information, strengthen bargaining power, enhance livestock quality, and expand market opportunities.

These mechanisms can increase market participation, prices, sales returns, and livestock-related income, which in turn support food and nutrition security, education, health care, productive investment, asset accumulation, and resilience to climate and economic shocks. However, outcomes are shaped by contextual factors such as drought, conflict, gender inequalities, weak bargaining power, restricted mobility and rangeland access, poor infrastructure, weak governance, inadequate services, and unpredictable trade regulations.

The framework also highlights feedback effects: higher and more stable incomes enable households to reinvest in livestock, animal health, marketing, and other enterprises, strengthening future productive capacity and market participation. Conversely, distress sales and asset depletion can undermine production and future market opportunities. Thus, sustainable livestock marketing requires an integrated approach that combines market access with productive capacity, bargaining power, risk management, social inclusion, and ecological sustainability.

3.6 Factors Determining the Effectiveness and Inclusiveness of Interventions

The effectiveness of livestock marketing interventions depends on environmental, institutional, socioeconomic, and market conditions. Climate shocks, drought, conflict, and insecurity can reduce livestock condition, disrupt mobility and trade, and force distress sales, while gender inequalities and weak bargaining power can limit access to assets, finance, information, markets, and decision-making. Pastoral mobility, rangeland and water access, market governance, taxation, regulations, infrastructure, transport, veterinary, financial, extension, and information services also influence participation and benefits.

Effective interventions can reduce transaction costs, improve market access, strengthen producer organizations, animal health and quality, expand financial services, and support value addition. Their benefits are more inclusive when women, youth, poorer households, and small-scale producers can access these opportunities and participate in decision-making. When enabling conditions are in place, livestock marketing can increase and stabilize incomes, improve food security and asset accumulation, strengthen resilience, and create a reinforcing cycle of investment and adaptation to future shocks.

3.7 Summary of Key Findings

The review identifies nine (9) major findings.

1. Livestock marketing interventions are most effective when they reduce transaction costs, strengthen producer bargaining power, increase local value capture, and build resilience.
2. Improved roads, markets, holding grounds, watering and loading facilities, weighing and slaughter systems, cooling, and communication infrastructure can increase market participation and producer returns. Reliable market information and producer organizations further improve access to buyers, finance, aggregation, transport, and better prices.
3. Value addition through milk processing, cooling, grading, fattening, packaging, meat processing, and improved handling can create income, employment, and diversification opportunities. However, benefits are not automatically equitable.
4. Gender, poverty, and youth-related barriers can limit access to assets, finance, information, decision-making, and higher-value markets, requiring deliberate inclusion measures.
5. Marketing interventions must also strengthen climate and livelihood resilience. Drought, disease, conflict, and food insecurity can trigger distress sales and erode livestock assets; therefore, marketing should be linked to early warning, veterinary and feed services, savings, credit, insurance, and social protection.
6. Sustainable marketing depends on pastoral mobility, rangeland governance, water access, and livestock corridors, which must be protected alongside market infrastructure.
7. Animal health and market governance including vaccination, disease surveillance, quarantine, certification, traceability, transparent weighing, grading, and predictable regulation are essential for productivity, market confidence, and domestic and export access.

8. Cross-border and informal markets also provide important livelihood opportunities and should be supported through improved border procedures, veterinary services, infrastructure, security, information, and appropriate taxation.
9. Overall, the evidence supports an integrated livestock marketing approach combining infrastructure, information, producer organizations, animal health, value addition, finance, social inclusion, climate-risk management, rangeland governance, conflict management, and predictable trade policies. Isolated interventions are unlikely to deliver sustainable improvements in livelihoods and resilience.

3.8 Research Gaps

Despite substantial progress, important evidence gaps remain.

1. There is limited causal and longitudinal evidence on the livelihood effects of livestock-market interventions, particularly among highly mobile pastoral populations. Many studies measure participation without examining longer-term changes in income, assets, food security, poverty, or resilience.
2. More evidence is needed on digital livestock-market systems, including mobile price platforms, electronic trading, digital payments, buyer platforms, and their effects on transaction costs and producer bargaining power.
3. Although recent studies increasingly examine gender differences in market participation and control over income, longitudinal evidence remains limited regarding whether interventions produce sustained improvements in women's economic empowerment.
4. Youth participation in livestock value chains remains under-researched despite the importance of employment, entrepreneurship, and generational renewal in pastoral and smallholder systems.
5. More research is needed on the relationship between market commercialization and rangeland sustainability. Improved market access can encourage productive investment, but commercialization may also create incentives for herd expansion or land-use changes that increase ecological pressure.
6. Informal and cross-border trade requires more systematic analysis. Informal markets are often treated primarily as regulatory problems despite their important livelihood functions. Research should investigate how formalization can improve transparency and public regulation without eliminating services provided by existing networks.
7. Future research should adopt a systems perspective linking production, markets, climate risk, animal health, rangeland governance, conflict, gender, finance, and policy. Such research would provide stronger evidence about which combinations of interventions produce sustainable livelihood improvements under different pastoral and smallholder contexts.

4. Discussion

4.1 Livestock benefits and impact to humanity

Livestock provide food, income, savings, insurance, and social security, but ownership alone does not guarantee improved livelihoods. Market access, infrastructure, reliable market information, bargaining power, transport, finance, veterinary and extension services, and producer organizations determine how livestock assets translate into income and welfare. Improved roads, markets, communication systems, and collective marketing can reduce transaction costs, strengthen market participation, improve prices, and reduce dependence on brokers.

Value addition and inclusive commercialization are essential for increasing the value retained by producers. Milk cooling and processing, grading, fattening, packaging, and meat processing can increase returns, create employment, and retain value within producing communities. These opportunities should deliberately include women, youth, poorer households, and small-scale producers through better access to assets, information, finance, organizations, and decision-making. Animal health measures including vaccination, disease surveillance, veterinary services, quarantine, inspection, certification, and traceability are also critical for maintaining productivity, quality, and access to formal and cross-border markets.

Livestock marketing must also be climate-resilient, conflict-sensitive, and environmentally sustainable. Drought, insecurity, resource competition, and mobility constraints can disrupt trade and force distress sales, while pastoral marketing depends on access to grazing, water, mobility corridors, and effective rangeland governance. Integrating markets with early-warning systems, feed supplies, insurance, savings, credit, social protection, and efficient trade regulation can help households manage shocks and sell strategically. Overall, the evidence supports an integrated and inclusive livestock value-chain approach that addresses infrastructure, information, finance, animal health, governance, gender, mobility, climate, and conflict together, thereby reducing transaction costs, increasing value capture and income, protecting household assets, improving food security, and strengthening long-term livelihood resilience.

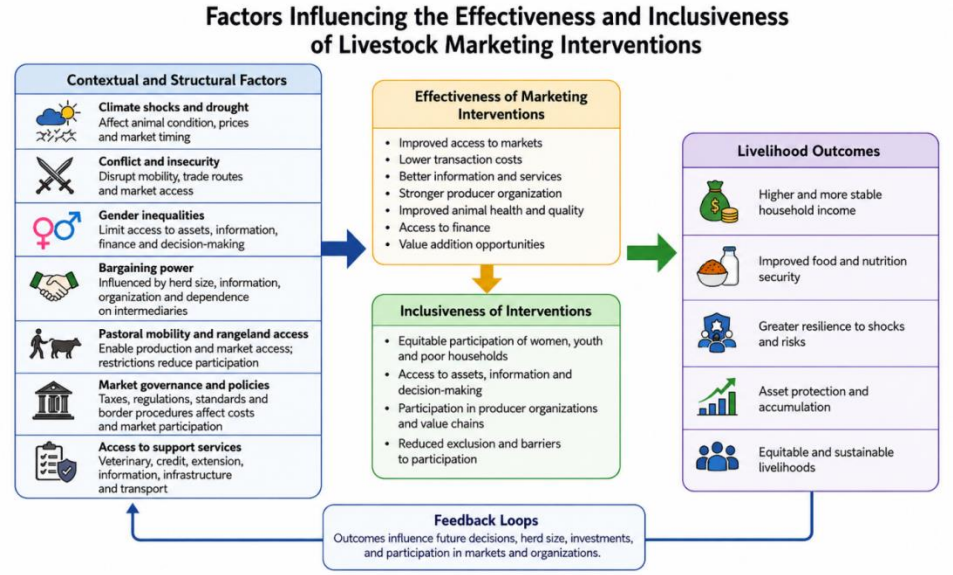

Figure 1: Effectiveness and Inclusivity of Livestock Marketing Interventions Framework. Source: Researcher made.

4.2 Integrated Framework for Livestock Marketing Interventions

Effective livestock marketing requires an integrated package of interventions rather than a single measure. This includes strategic market infrastructure, roads, holding and watering facilities, weighing, slaughter, quarantine and cooling facilities, supported by reliable market, weather, disease and transport information. Producer organizations can aggregate supply, strengthen bargaining power and reduce transaction costs, while veterinary services, disease control, grading and traceability improve animal quality and market access.

Finance, risk management and value addition further strengthen marketing outcomes by reducing distress sales and enabling investment. Savings, credit and insurance can improve producers' financial capacity, while fattening, milk cooling and processing, grading, packaging and meat processing increase local value capture and employment. These interventions should be supported by inclusive governance that ensures women, youth, poorer households and small-scale producers have equitable access to markets, finance, information, training and decision-making.

Overall, integrated interventions can reduce transaction costs and improve market access, information, bargaining power, animal quality and value capture, thereby increasing market participation, producer returns, household income, food security, asset accumulation and resilience. However, climate shocks, conflict, gender inequalities, weak governance and environmental constraints can limit these benefits, highlighting the need for context-specific, inclusive and climate-resilient livestock marketing systems.

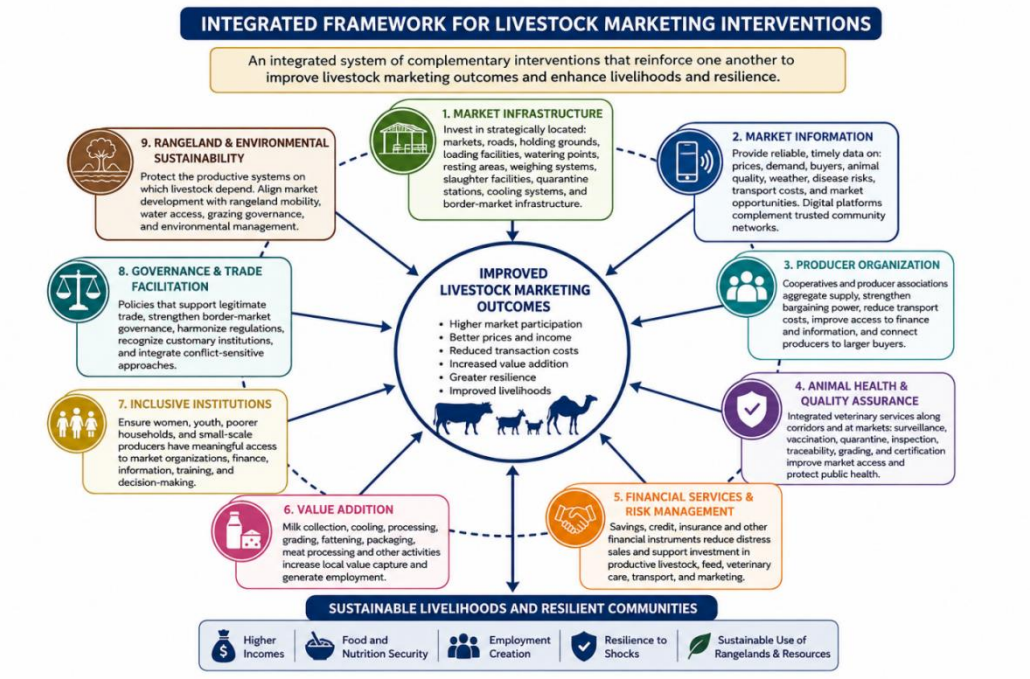

Figure 2: Livestock Marketing Integration. Source: Researcher made.

5. Recommendations

Based on the reviewed literature, the following priorities are recommended:

1. Develop integrated livestock-marketing strategies that link production, infrastructure, animal health, information, finance, processing, and trade.
2. Invest in strategic market infrastructure, including roads, livestock markets, holding grounds, watering points, loading facilities, weighing systems, quarantine stations, slaughter facilities, cooling systems, and communication networks.
3. Strengthen market-information systems covering prices, demand, buyers, animal quality, disease risks, weather, transport costs, and market opportunities while integrating digital systems with trusted local networks.
4. Promote producer organizations and cooperatives to improve aggregation, bargaining power, access to finance and training, transport efficiency, and relationships with larger buyers.
5. Integrate veterinary services into livestock markets and trade corridors, including vaccination, disease surveillance, inspection, quarantine, certification, and animal identification.
6. Introduce transparent weighing, grading, and quality-assurance systems to reduce information asymmetry, improve market transparency, and strengthen producer returns.
7. Expand appropriate livestock-finance and risk-management instruments, including savings, credit, insurance, and mechanisms that reduce distress sales.
8. Support viable value-addition enterprises in milk, meat, small-ruminant products, hides and skins, and other livestock products.
9. Promote women's economic empowerment through improved access to assets, finance, training, market information, producer organizations, income control, and decision-making.
10. Expand youth employment and entrepreneurship in livestock production, trading, processing, transport, digital marketing, veterinary services, and other value-chain activities.
11. Protect pastoral mobility and rangeland resources when developing livestock infrastructure and commercialization programs.
12. Integrate conflict-sensitive approaches involving customary institutions, peacebuilding, resource-sharing arrangements, and dispute-resolution mechanisms.
13. Facilitate safe and predictable cross-border trade through harmonized regulations, efficient border procedures, veterinary certification, quarantine systems, market infrastructure, and regional coordination.
14. Use risk-based regulation rather than unnecessarily disruptive movement restrictions or market closures.
15. Promote livelihood diversification so households are less dependent on livestock liquidation during droughts and other shocks.
16. Integrate environmental sustainability into livestock-market development through sustainable rangeland management, responsible waste management, efficient transport, and environmentally appropriate infrastructure.
17. Strengthen causal and longitudinal research on the effects of marketing interventions on income, poverty, food security, assets, resilience, gender empowerment, youth employment, and environmental sustainability.

6. Conclusion

Livestock marketing is a critical pathway through which pastoral, agro-pastoral, and smallholder households convert livestock assets into income, food security, employment, savings, and resilience. Its benefits depend not only on livestock ownership and production but also on access to markets, infrastructure, information, transport, animal-health services, finance, producer organizations, value addition, and fair-trading institutions. These complementary interventions can reduce transaction costs, strengthen bargaining power, improve market participation, and increase producer returns.

However, commercialization does not automatically lead to equitable or sustainable livelihoods. Drought, climate variability, disease, conflict, weak bargaining power, limited information, gender inequalities, and inadequate financial services can restrict participation and encourage distress sales that deplete productive assets. Effective interventions should therefore integrate climate-risk management, inclusive finance, gender and youth empowerment, social protection, and stronger producer institutions. For pastoral systems, marketing must also remain compatible with rangeland governance, livestock mobility, water access, animal health, and conflict management, while certification, quarantine, grading, traceability, and predictable trade regulations support wider market opportunities.

Overall, the evidence supports a shift from simply increasing livestock sales toward developing resilient, inclusive, equitable, and sustainable livestock value chains. Coordinated investment in infrastructure, market information, producer organizations, animal health, finance, value addition, inclusion, rangeland governance, and trade regulation can enable households to sell strategically, obtain fairer prices, retain productive assets, and capture more value. Such integrated systems can strengthen income, food security, employment, poverty reduction, and livelihood resilience while sustaining the ecological and social systems on which livestock production depends.

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.

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