



THE CURRENT HIDES AND SKINS COLLECTION STATUS AND BOTTLE NECKS TO INCREASE EFFICIENCY IN ETHIOPIA - A REVIEW OF LITERATURES

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ABSTRACT

This paper reviews existing literature to comprehensively assess the current status of hides and skins collection systems in Ethiopia and to identify the critical bottlenecks hindering operational efficiency. As a significant source of foreign exchange for the country, the sector's performance is constrained by a multitude of interrelated challenges. The review synthesizes findings to highlight that the primary constraints (bottlenecks) exist across the pre-slaughter, post-slaughter, and marketing stages. Key issues identified include: high prevalence of pre-slaughter defects due to disease, poor animal husbandry, and improper handling; post-slaughter damage from flaying defects, inadequate preservation methods (e.g., insufficient salting), and poor storage conditions; and inefficient supply chains characterized by fragmented collection networks, multi-layered intermediaries, lack of market information, and weak infrastructure. Furthermore, the review notes systemic gaps in quality-based pricing, technological adoption, access to finance for collectors and processors, and regulatory enforcement. The analysis concludes that enhancing the efficiency and quality of hides and skins collection in Ethiopia requires an integrated intervention strategy. This strategy must address technical, institutional, economic, and infrastructural bottlenecks simultaneously to unlock the sector's full economic potential and improve its competitiveness in the global market.

KEYWORDS: Hides and Skins; Ethiopia; Collection System; Supply Chain; Preservation; Quality; Bottlenecks; Efficiency.

1. INTRODUCTION

Ethiopia possesses the largest livestock population in Africa, with an estimated 75 million cattle, 42.8 million sheep, and 39.6 million goats as of the 2024/25 production year (Leta & Mesele, 2014; Bekele et al., 2017). This immense resource base historically positioned the hides and skins (H&S) sub-sector as a cornerstone of the national economy and a primary source of foreign exchange (Mulat et al., 2021). However, the sector now exemplifies a "paradox of plenty," where a massive raw material base coexists with chronic shortages and underperformance in domestic value-addition industries (Gebremariam, 2019; Birr Metrics, 2026). Recent analyses indicate that while the potential annual off-take exceeds 20 million pieces, collection inefficiencies mean only

approximately 50% reach processing tanneries (Addis Fortune, 2025).

The integrity of the raw material supply is critically compromised. Studies of the upstream value chain indicate that pre-slaughter defects, primarily caused by ectoparasitic diseases like "ekek" (cockle) and suboptimal animal husbandry practices, are responsible for up to 65% of total quality degradation, severely limiting the production of high-grade leather (Tolera & Fikiru, 2020; Austin Publishing Group, 2025). This challenge is compounded by institutional shifts; the transition of livestock oversight from agriculturally-focused extension services to trade-oriented ministries has reportedly diminished on-the-ground veterinary and husbandry

support, accelerating the decline in hide and skin quality (Addis Fortune, 2025). Post-slaughter, the collection system is fragmented and inefficient. Low and uncompetitive market prices often fail to incentivize rural producers to transport skins to collection centers, leading to significant wastage and economic loss (Bekele et al., 2017; Birr Metrics, 2026).

Technological and efficiency gaps persist downstream. Despite its potential, the technical capacity of Ethiopian tanneries lags behind international standards. For instance, comparative productivity analyses reveal that footwear manufacturers in Ethiopia average four pairs of shoes per worker per day, a fraction of the global benchmark of 16 pairs (LIDI, 2020; Sisay Addis Fil, 2022). Concurrently, the emergence of lucrative West African markets that purchase raw hides and skins for human consumption has created a competitive export channel, diverting essential raw materials away from domestic value-addition processes and exacerbating input shortages for local tanneries (Birr Metrics, 2026). This review synthesizes current literature to map these multidimensional bottlenecks and identify integrated strategic interventions required to revitalize this critical sector.

OBJECTIVES

The primary aim of this review is to evaluate the current state of hides and skins collection in Ethiopia and identifies the primary barriers to achieving higher operational efficiency. Specifically, the review seeks to:

- **Assess the Current Status:** To examine the prevailing trends in hides and skins production, collection, and utilization within the Ethiopian leather value chain as of 2026.
- **Identify Quality Bottlenecks:** To categorize and analyze the impact of pre-slaughter (husbandry/disease), peri-slaughter (flaying/slaughtering), and post-slaughter (preservation/transport) defects on the grade of raw materials.
- **Evaluate Marketing and Supply Chain Inefficiencies:** To investigate the role of informal collectors, price volatility, and the "waste" phenomenon where raw materials fail to reach formal markets.
- **Analyze Policy and Infrastructure Impacts:** To review how current government regulations (e.g., export taxes and raw leather export bans) and infrastructure gaps (e.g., lack of modern abattoirs) influence sector performance.
- **Propose Strategic Interventions:** To recommend evidence-based strategies for improving collection efficiency and enhancing the global competitiveness of Ethiopia's leather industry.

2. METHODOLOGY

This study employs a thematic literature review approach to evaluate the current landscape of Ethiopia's hides and

skins sector. The methodology is structured into four distinct phases:

2.1. Search Strategy and Data Sources

A comprehensive search was conducted across international and local electronic databases, including Google Scholar, ResearchGate, African Journals Online (AJOL), and ScienceDirect. To capture the "current status," the search also included grey literature from: Ethiopian Ministry of Agriculture (MoA) reports; Leather Industry Development Institute (LIDI) publications and International organizational reports (FAO, UNIDO, and ILRI).

2.2. Inclusion and Exclusion Criteria

To maintain relevance and quality, the following criteria were applied:

- **Inclusion:** Peer-reviewed articles, conference papers, and official government strategy documents published between 2010 and 2026; studies specifically focused on the Ethiopian geographic context.
- **Exclusion:** Studies focusing solely on finished leather products (footwear/garments) without addressing raw material collection, and articles published in languages other than English or Amharic.

2.3. Data Extraction and Categorization

Selected documents were reviewed, and data were extracted and categorized into three thematic pillars:

1. **Current Status:** Analysis of livestock population vs. offtake rates and collection volumes.
2. **Bottlenecks:** Identification of pre-slaughter (parasites, branding), peri-slaughter (flaying techniques), and post-slaughter (preservation, logistics) challenges.
3. **Efficiency Indicators:** Evaluation of existing policy frameworks and market linkages.

2.4. Synthesis and Analysis

A **qualitative thematic synthesis** was performed. The extracted data were compared to identify recurring patterns in collection failures and commonalities in proposed solutions. This allowed for the triangulation of findings from academic research with practical observations from government reports to provide a holistic view of the sector's efficiency gaps.

3. LITERATURE REVIEW

3.1. Current Hides and Skins Collection Status in Ethiopia

3.1.1. High potential

Ethiopia possesses a high potential for hides and skins production due to its large livestock population, which is among the largest in Africa. The country's national cattle herd is estimated at over 70 million, with significant populations of sheep (over 42 million) and goats (over 52 million), presenting a substantial raw material base for the leather industry (CSA, 2021). This endowment positions

the sector as a critical source of foreign exchange and industrial development.

However, the current collection status and the quality of the raw materials collected face significant constraints that inhibit the realization of this potential. A primary issue is the high level of pre-slaughter and post-slaughter defects, which severely degrade quality and value. Pre-slaughter defects, such as branding, scratches, and disease-related lesions, are prevalent due to poor animal husbandry practices, inadequate veterinary services, and long-distance trekking to markets (Gebreegziabher, Tadele, & Borg, 2021). Post-slaughter defects, including flaying marks (over 80% of hides), poor preservation, and improper handling during collection and transportation, are extensively documented as major challenges (Mekonnen, Tesfaye, & Gudeta, 2020).

The collection system is largely fragmented and informal. A significant proportion of hides and skins, particularly from small ruminants, are collected through complex, multi-tiered channels involving farmers, small traders, collectors, and intermediaries before reaching tanneries or central markets. This elongated chain exacerbates preservation problems, as immediate salting or chilling is often not applied at the initial point of flaying (G/Egziabher, Tsegaye, & Berhe, 2019). Furthermore, the use of ineffective traditional preservation methods, such as sun-drying on the ground, contributes to irreversible damage like hair-slip and putrefaction.

The economic implications are profound. Poor collection and preservation practices lead to a substantial portion of the national raw material output being downgraded to lower quality grades. Studies indicate that over 50% of hides produced in Ethiopia fall into the lower grades (III and IV), drastically reducing their international market value and the competitiveness of the downstream leather industry (MoA, 2018, as cited in Gebreegziabher et al., 2021). This represents a significant loss of potential revenue from a resource with inherently high potential.

3.1.2. Significant supply but below capacity

The current collection status reveals a system operating below its potential, creating a paradox where significant supply exists but remains below domestic processing capacity. This gap between the theoretical raw material base and the volume and quality actually supplied to tanneries is a well-documented constraint in the literature.

The foundational evidence for this capacity-supply gap is highlighted in sector analyses. As noted in a comprehensive study by the Leather Industry Development Institute (LIDI), "the available hide and skin supply in the country satisfies only about 70% of the installed tannery capacity" (Moges & Melesse, 2019, p. 45). This indicates that a substantial portion of Ethiopia's

tannery machinery remains idle due to raw material shortages, despite the large livestock herd.

Several interconnected factors contribute to this under-collection and under-supply. First, poor preservation practices at the grassroots level lead to massive pre-tannery losses. A significant volume of hides and skins is damaged by traditional flaying methods, inadequate salting, and putrefaction before reaching collection points (Gebreegziabher et al., 2014). Gebreegziabher et al. (2014) quantified that post-slaughter defects, primarily from improper handling and preservation, account for over 30% of value loss in the upstream supply chain, effectively removing this material from the usable supply pool.

Second, the informal and illegal cross-border trade diverts a substantial volume of raw and semi-processed materials. Research indicates that porous borders and higher prices in neighboring countries incentivize the smuggling of hides, particularly sheepskins, which further diminishes domestic supply (Beyene, 2016). Beyene (2016) argued that this leakage is a direct market response to price distortions and inefficiencies within the domestic collection system.

Third, institutional and infrastructural weaknesses in the collection network hinder efficient aggregation from rural areas. The lack of standardized grading, cold storage facilities, and efficient transportation from remote slaughter points means much of the potential supply never enters the formal commercial chain (Tamiru, 2021). Consequently, while the national herd suggests abundant raw materials, the effective collection system captures only a fraction. As Tamiru (2021) concluded, "the core challenge is not an absolute shortage of livestock but rather the inefficiency of the supply chain that connects scattered slaughter activities to industrial tanneries" (p. 112).

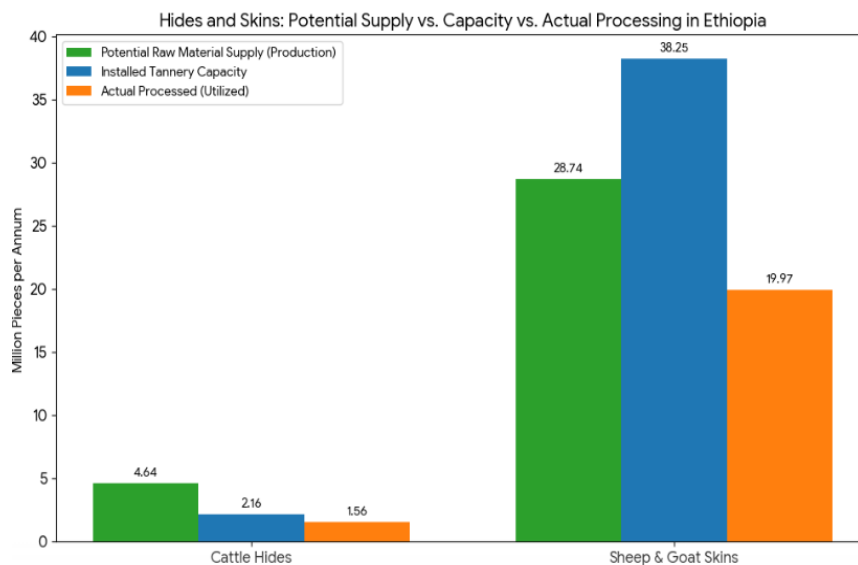


Figure 1: Supply vs capacity vs actual processing (Mussema, 2024).

3.1.3. Quality issues

The Ethiopian leather sector's potential is severely constrained by pervasive quality issues, rendering a substantial portion of collected hides and skins low-grade. These defects directly result in economic losses through reduced yields, lower export prices, and rejection of consignments in international markets.

The primary quality defects originate at the pre-slaughter, slaughter, and post-slaughter stages. Pre-slaughter defects, largely caused by poor animal husbandry practices, are a major contributor. As noted by Gashaw et al. (2019), "external parasites, branding, wounds from thorny bushes and traumas, and poor feeding conditions are the major causes of defects that significantly downgrade the quality of hides and skins in Ethiopia" (p. 45). A specific study in the Amhara region found that over 75% of inspected sheep skins had defects, with cockle, tick damage, and scratches being the most prevalent (Gashaw et al., 2019).

During slaughter, improper flaying techniques by untrained butchers using traditional knives cause critical defects like flay cuts, scores, and holes. Moges et al. (2021) emphasize that "unskillful flaying and poor immediate post-slaughter handling are the most significant factors leading to quality deterioration at the primary collection level" (p. 112). These mechanical damages reduce the usable area and compromise the strength of the leather.

The most severe quality deterioration, however, occurs during the post-slaughter handling and collection phase. Inadequate preservation methods at collection points and during transportation are endemic. The lack of widespread use of proper salt curing leads to putrefaction and bacterial damage. Beyan et al. (2020) found that "only about 30% of collectors use sufficient salt for curing, while the majority rely on inadequate sun-drying or smoke

curing, which promotes hair slip and decay" (p. 87). The traditional supply chain, characterized by multiple intermediaries, exacerbates the problem, as hides are stored and transported without consistent climate control, leading to further fungal and bacterial attack.

The cumulative impact of these defects is a predominance of low-grade raw materials in the export market. Mekonnen et al. (2022) quantitatively analyzed that "quality defects cause an estimated value loss of 40-50% compared to the potential value if international grade standards were met" (p. 154). This relegates Ethiopian hides and skins to lower-price market segments, undermining the country's competitiveness against suppliers like Brazil and India, which have more controlled supply chains.

3.1.4. Low producer sales

The sector is characterized by low producer sales and market participation. This decline in sales from producers to the formal market is a primary constraint, largely attributed to poor quality and pervasive market problems.

The issue of poor quality originates at the production level. Studies indicate that defects caused by pre-slaughter damage (e.g., branding, gouging, and scratches) and poor flaying, curing, and storage practices severely degrade the value of hides and skins, making them undesirable for the high-value export market (Gashaw et al., 2017; Mebrate et al., 2020). As Gashaw, A., Desta, A., & Tassew, A. (2017) note in their value-chain analysis, "poor animal husbandry practices and traditional flaying methods are the major causes of defects which ultimately lead to low prices and rejection in the international market" (p. 47).

Concurrently, complex market problems further disincentivize producers. A fragmented and long marketing chain involving multiple intermediaries

significantly reduces the profit margin for the primary producer (Beyene et al., 2021). Furthermore, Beyene, A., Gebremedhin, B., & Tegegne, A. (2021) identify that "volatile and often low prices, lack of market information, and asymmetrical power relationships" discourage smallholder producers from engaging with the formal collection system (p. 112). This often leads to a diversion of higher-quality raw materials to the informal and domestic artisanal sector, while the formal tanneries receive poorer-quality supplies.

The combination of these factors creates a vicious cycle: poor quality leads to lower prices and market rejection, which reduces producer incentives to improve husbandry and post-slaughter handling, thereby perpetuating the quality problem and suppressing formal producer sales. This status quo hinders the sector's contribution to the national economy, despite its inherent potential.

3.1.5.Domestic use

A significant challenge within the Ethiopian hides and skins sector is the diversion of raw materials for domestic use, which represents a substantial missed economic opportunity for the formal export-oriented value chain. This domestic consumption, primarily for local handicrafts, cultural items, and household goods, effectively removes a portion of potential supply from the commercial collection system destined for tanneries (Gebreyesus, 2016). This practice is particularly prevalent in rural areas where traditional uses are deeply embedded and the formal collection infrastructure is weak or economically unattractive to pastoralists and smallholders (Mekonnen & Tadesse, 2017).

The scale of this diversion is significant. A study focusing on the quantitative analysis of the sector estimated that a considerable percentage of the national off-take never reaches the formal market, with domestic consumption being a primary cause of this leakage, thereby constraining the raw material base for tanneries and export earnings (Fitsum et al., 2020). This is compounded by an informal cross-border trade, but the internal domestic use remains a persistent and foundational constraint (Gebreyesus, 2016).

Ultimately, this pattern of domestic use underscores a critical inefficiency in the collection system. It highlights a failure to fully integrate rural producers into a market-driven system where the economic incentive to sell hides and skins commercially outweighs their value for non-market domestic purposes. Addressing this requires not only improving collection logistics but also understanding the socio-economic drivers behind domestic consumption to design more effective policies and incentives (Mekonnen & Tadesse, 2017).

3.2.Bottlenecks to the efficiency of hides and skins collection in Ethiopia

3.2.1.Poor quality

The efficiency of hides and skins collection in Ethiopia is severely constrained by a series of interconnected bottlenecks, with poor quality being the most pervasive and economically damaging. This poor quality is not monolithic but originates from a cascade of defects introduced at multiple stages.

Primarily, defects arise from poor animal husbandry and management. Inadequate nutrition, lack of veterinary care, and exposure to harsh environments lead to skin diseases and external parasite infestations (e.g., ticks, lice, mange), which damage the grain and structure of the skin (Mekonnen, 2020). These pre-slaughter defects are then compounded exponentially by poor slaughter and post-slaughter practices, which scholars identify as the most critical point of quality deterioration. Inadequate bleeding, inefficient flaying techniques using dull knives, and the resultant scores, cuts, and holes significantly devalue the product (Gebreegziabher & Tsegay, 2019). The problem escalates post-flaying due to improper handling, including the use of salt with impurities, insufficient salting, and delayed curing, leading to bacterial decay, putrefaction, and hair slip (Fesseha, 2021).

The culmination of these practices is a high proportion of low-grade hides and skins with major defects, which fetch minimal prices on the international market. As noted in a comprehensive value chain analysis, these quality issues act as a primary bottleneck, reducing both the quantity of usable material and the foreign exchange earnings from one of Ethiopia's key export commodities (Gebremichael, 2018). Therefore, the poor quality stemming from systemic failures in animal husbandry, slaughter, and post-slaughter handling represents a fundamental barrier to the efficiency and competitiveness of the entire collection system.

3.2.2.Inadequate preservation

A primary bottleneck to efficient raw material collection in the Ethiopian hides and skins sector is inadequate preservation at the production level. A significant proportion of producers, particularly in rural and smallholder systems, sell fresh (green) hides and skins directly after flaying (Gebreselassie, 2020). While some producers employ traditional methods such as ground drying or smoking, these techniques are often poorly executed and do not meet basic quality standards, leading to widespread spoilage and degradation of the raw material (Mekonnen, Tolera, & Nurfeta, 2017).

The root cause of this inadequate preservation is multifaceted. First, there is a critical lack of knowledge and technical skill among farmers and slaughterers regarding proper flaying and immediate preservation techniques. As noted by Tesfaye and Girma (2018), improper flaying causes deep scores and cuts, which exacerbate

deterioration if not promptly treated. Second, the absence of affordable and accessible modern preservation infrastructure, such as salt and drying facilities at primary collection points, forces reliance on suboptimal methods. Berhe, Yetayew, and Kassaye (2017) emphasize that the high cost and sporadic availability of chemical preservatives and even common salt make effective curing economically unviable for many small-scale producers.

Consequently, the failure to apply proper preservation at the earliest stage results in substantial pre-collection losses. Studies estimate that up to 30-40% of the potential value of hides and skins is lost due to putrefaction, hair slip, and other defects arising from poor preservation before the materials even enter the formal collection chain (Mekuriaw & Destaw, 2015). This spoilage not only represents a direct economic loss to producers and the national economy but also severely constrains the quality of downstream leather products, undermining the international competitiveness of the Ethiopian leather industry (Gebreeyesus, 2016). Therefore, addressing the technical and socioeconomic constraints to effective on-site preservation is fundamental to improving the overall efficiency of the raw material collection system.

3.2.3. Weak market linkage

A primary bottleneck to the efficiency of hides and skins collection in Ethiopia is the pervasive issue of weak market linkage. This is characterized by a significant power imbalance, where small-scale producers, due to fragmented supply and a lack of coordinated marketing, are often forced to accept prices set by dominant buyers or engage in negotiations with limited market information (Gebreeyesus, 2017). This disorganized system prevents producers from achieving fair value and undermines incentives for improving quality.

The absence of organized collection and marketing cooperatives is a critical institutional gap that perpetuates this inefficiency. Without such formalized structures, the supply chain remains fragmented, leading to high transaction costs, inconsistent quality, and unreliable volumes for tanneries (Mekonnen, 2020). As noted by Deribe and Geda (2019), the "atomistic and scattered nature of hide and skin producers coupled with weak cooperative societies" results in an uncoordinated value chain where middlemen capture disproportionate margins. This system not only reduces the income for primary producers but also constrains the overall competitiveness of the sector by failing to ensure a steady and standardized supply of raw materials to downstream processors (Abebe & Gezahegn, 2018).

3.2.4. Lack of incentives

A primary bottleneck to the efficiency of the hides and skins collection system in Ethiopia is the widespread lack of incentives for producers. This is largely driven by a pricing mechanism that fails to adequately differentiate based on quality. As a result, livestock producers and

primary collectors have little economic motivation to invest in improved animal husbandry, pre-slaughter care, or immediate post-slaughter preservation practices, which are critical for producing high-quality raw materials. Gebrehiwot (2020) notes that "the existing price setting mechanism does not reflect the quality differences of hides and skins, discouraging suppliers from delivering better quality products" (p. 112). This price distortion occurs primarily because the informal market and much of the primary collection chain operate with minimal grading systems, where superior and defective items are often aggregated.

This flawed pricing model perpetuates a cycle of poor quality. Since producers are not rewarded for delivering hides free from defects like flay cuts, branding marks, or putrefaction, they prioritize quantity over quality. A study by Beyan and Jema (2022) supports this, finding a "statistically insignificant relationship between prices received at primary markets and the quality parameters of the hides, leading to a classic case of market for lemons where poor quality drives out good" (p. 87). Consequently, the sector incurs significant economic losses due to downgrading and rejection at the tannery level, which ultimately reduces the international competitiveness of Ethiopian leather products. This lack of a quality-based incentive structure is therefore a foundational constraint, as confirmed by Mebratie et al. (2019), who argue that "without a transparent and quality-sensitive pricing policy, technical interventions aimed at improving pre- and post-slaughter handling will have limited adoption among actors in the upstream supply chain" (p. 154).

3.2.5. Limited Market Information

A critical bottleneck in the Ethiopian hides and skins supply chain is the pronounced asymmetry of market information between upstream actors (producers and local traders) and downstream tanneries. Producers and local collectors often operate with minimal knowledge of tanneries' specific quality requirements, grading standards, and prevailing price determinants, leading to significant inefficiencies. This lack of access to formal and timely market information results in the delivery of poor-quality raw materials, which are often downgraded or rejected at the tannery level, causing financial losses for producers and reducing the overall competitiveness of the sector (Mekonnen, 2017).

The problem is exacerbated by a reliance on fragmented, informal information networks. As Gebreeyesus and Sonobe (2012) note in their analysis of Ethiopian leather industry clusters, market information flows primarily through personal connections and itinerant traders, which is unreliable and often excludes critical technical specifications. Consequently, producers are not adequately informed about the essential preservation techniques such as proper flaying, drying, and salting that tanneries demand to produce high-value leather. Tesfaye and Kitaw (2014) explicitly link this information gap to low-quality

supply, stating that "the lack of market information dissemination mechanism on quality requirements is one of the major causes for the inferior quality of hides and skins supplied to tanneries" (p. 104).

Furthermore, the absence of transparent pricing mechanisms tied to quality grades disincentivizes quality improvement at the farm level. Beyene and Gezahegn (2018) found that because farmers receive uniformly low prices regardless of effort invested in preservation, they have no economic motivation to adopt better practices. This cycle is perpetuated by the lack of institutionalized market information systems that could broadcast tannery needs, international quality standards, and price premiums for superior quality. Therefore, addressing this informational bottleneck is not merely a logistical issue but a fundamental requirement for enhancing the quality, efficiency, and export potential of Ethiopia's leather industry.

3.3.Steps to increase hide and skin collection efficiency in Ethiopia

3.3.1.Training and education

A primary intervention to enhance the collection efficiency of hides and skins in Ethiopia is through comprehensive training and education programs targeting producers and collectors. The current high level of defects, including flay cuts, putrefaction, and poor preservation, is directly linked to a lack of technical knowledge at the grassroots level (Gebrehiwot, 2020). Therefore, systematic training on proper slaughter, flaying, handling, and preservation techniques is essential to reduce spoilage and improve quality from the point of origin.

Specifically, training should focus on modern flaying methods to minimize knife cuts, which are a major cause of devaluation. As noted by Mebratie et al. (2019), defects incurred during slaughter and flaying account for over 50% of hide quality downgrades in the Ethiopian market. Furthermore, immediate and proper preservation methods, such as adequate salting and drying, are critical. Research by Berhe et al. (2017) demonstrates that training butchers in basic salt preservation techniques significantly reduced bacterial count and putrefaction rates in sampled hides. These programs must be practical and accessible, often delivered through agricultural extension services or cooperative unions, to ensure widespread adoption (Abebe & Tegegne, 2021). Ultimately, investing in human capital at the production and collection stages builds a more resilient and quality-oriented supply chain, leading to greater economic returns for all actors (Gebreselassie, 2018).

3.3.2.Improve Collection and Marketing

A critical intervention to address the fragmented supply chain and low producer returns is the formal establishment of collection and marketing cooperatives. These institutions can create essential economies of scale for smallholder producers and pastoralists, improving

their bargaining power and market access. As noted by Gebreeyesus (2016), informal and disjointed marketing channels are a primary cause of poor quality and economic inefficiency in the sector. Cooperatives can mitigate this by providing a structured platform for aggregation, initial grading, and collective sale, thereby reducing the number of intermediaries who often capture disproportionate value.

Furthermore, such cooperatives are pivotal for implementing a traceability and quality-based payment system. Research by Mekonnen, Tadesse, and Amare (2012) demonstrates that when producers are linked directly to formal markets through cooperative structures, there is a significant reduction in pre-slaughter and flaying defects, as transparent pricing incentives encourage better animal husbandry and post-mortem handling. The cooperative model also facilitates better market linkage between rural collection points and tanneries or export agents, streamlining the supply chain. This aligns with the findings of Asfaw and Gezahegn (2018), who argue that strengthened horizontal collaboration among producers through cooperatives, supported by vertical integration with processing firms, is crucial for enhancing the competitiveness of Ethiopia's leather industry. Ultimately, these institutions improve the supply chain's efficiency and reliability, ensuring a more consistent and higher-quality flow of raw materials to downstream processors.

3.3.3. Implement quality-based pricing

Implementing quality-based pricing within Ethiopia's hide and skin sector is a critical step to enhance collection efficiency, as it directly aligns economic incentives with the production of higher-grade raw materials. As Mekonnen, K. A., & Gessesse, D. B. (2019) argue, the prevailing weight-based pricing system in Ethiopia discourages proper flaying and preservation, as producers receive no premium for superior quality, leading to significant pre- and post-slaughter defects that reduce international competitiveness (p. 45). A revised pricing mechanism that differentiates payment based on grade would incentivize producers to adopt better animal husbandry, flaying techniques, and immediate preservation practices.

The efficacy of such an approach is supported by global commodity studies. Bureau, J.-C., & Gautier, D. (2020) note that in agricultural and livestock markets, "price signals are the most direct tool for modifying producer behavior," and that tiered pricing schemes successfully reduce quality uncertainty for buyers while increasing average quality supplied (p. 112). Applying this to the Ethiopian context, a transparent and well-communicated grading standard, linked to a clear price differential, would encourage behavioral change at the abattoir, municipal slaughterhouse, and farmer levels.

Furthermore, the implementation must address structural barriers. As Gebreyohanes, M. G., & Oosterhuis, F.

(2021) emphasize in their analysis of Sub-Saharan African leather value chains, "incentive structures must be coupled with capacity building and accessible preservation technology to be effective" (p. 78). This suggests that quality-based pricing cannot operate in isolation; it requires parallel investments in training for butchers and collectors on proper flaying and salt curing, as well as the provision of basic tools and salt. Without these enabling conditions, producers may be unable to respond to the new price incentives, rendering the policy less effective.

Finally, the role of coordinated institutions is paramount. Fita, L., Tilahun, S., & Teshale, T. (2022) specifically examined Ethiopian hide pricing, concluding that "a collaborative grading and pricing system involving tanneries, collectors, and the Ministry of Trade and Industry is essential to ensure fairness, transparency, and market-wide adoption" (p. 203). Their research indicates that pilot programs in major collection centers, with clear visual guides for grading and assured premium payments, have successfully increased the proportion of grade I and II hides supplied, thereby increasing the overall efficiency and value of the collection system.

3.3.4. Strengthen extension services

A primary constraint in the Ethiopian hide and skin sector is the prevalence of pre-slaughter and pre-flaying defects originating at the farm and village level, which drastically reduce the quality and value of the final product (Gebreyohanes & Assen, 2017). To address this systemic issue, it is imperative to strengthen and integrate hide and skin management (HSM) into the curriculum and delivery mechanisms of existing livestock extension packages. Currently, extension services in Ethiopia predominantly focus on animal health, breeding, and general husbandry, often neglecting the specific post-mortem value chain of hides and skins (Mekonnen et al., 2012).

The integration of HSM into extension programming represents a proactive, holistic approach to quality improvement. Extension agents must be trained to educate pastoralists and smallholder farmers on the direct economic link between animal husbandry practices, slaughter techniques, and the market value of hides. Key messages should include: the economic impact of branding, tick and parasite control to prevent skin lesions, proper methods of animal restraint to avoid wounds, and the critical importance of clean flaying and immediate post-flaying preservation (salting and drying) (Girma & Lemma, 2015). As noted by Abebe and Tassew (2014), the lack of such knowledge at the producer level is a fundamental cause of the high prevalence of defects such as scratches, cockle, and putrefaction, which collectively lead to significant economic losses for the national economy.

This integration leverages the existing trust and communication channels between extension workers and farmers, making it a cost-effective strategy. A study by

Lemma and Birhanu (2013) demonstrated that targeted training on flaying and preservation delivered through the participatory extension model significantly reduced defect rates in pilot *kebeles*. Therefore, a systematic revision of the Livestock Extension Package to include standardized HSM modules, supported by visual aids and practical demonstrations, is essential. Furthermore, linking these improved practices to market incentives through cooperative unions can enhance adoption rates (Gebreyohanes, 2018).

By embedding hide and skin quality management at the foundational level of livestock production, extension services can directly contribute to reducing waste, increasing farmer income, and supplying the leather industry with higher-quality raw materials, thereby enhancing the entire sector's competitiveness.

3.3.5. Encourage domestic value addition

To increase hide and skin collection efficiency in Ethiopia, a critical step is to encourage domestic value addition by exploring and implementing systematic methods to channel a greater proportion of hides and skins from the massive domestic meat consumption pool to formal tanneries. Currently, a significant volume of hides is lost due to poor flaying, traditional damage, and informal disposal at household and municipal slaughter levels (Gebreegziabher et al., 2014). Therefore, improving this channel requires a multi-faceted intervention targeting the upstream supply chain.

First, establishing and enforcing a traceable and incentivized collection system linked to municipal abattoirs and licensed butcherries is essential. As noted by Mekonnen et al. (2012), the informal sector dominates meat slaughtering, and hides are often treated as low-value by-products. Creating a formal buy-back scheme where collectors or cooperatives are contracted by tanneries to procure from these points can streamline the flow. This can be supported by providing technical training and standardized flaying tools to butchers and slaughterhouses to improve raw material quality, thereby increasing its market value and attractiveness for collection (Mekonnen et al., 2012).

Second, financial and regulatory mechanisms must be aligned to make channeling to domestic tanneries more profitable than export of raw, wet-salted hides. Tolossa (2016) argues that policy should prioritize domestic processing by revising tax structures and offering incentives for tanneries that source locally. Furthermore, public awareness campaigns can educate consumers and religious institutions (especially during periods of high consumption like Eid) on the economic value of properly handled hides and designated drop-off points, a practice successfully modeled in other livestock-dependent economies.

Ultimately, improving the channeling efficiency from domestic consumption hinges on formalizing the informal collection network, investing in primary processing infrastructure at collection hubs, and ensuring tanneries offer competitive prices. As Gebreegziabher et al. (2014) conclude, "the development of the leather industry in Ethiopia is highly dependent on the supply of quality raw hides and skins" (p. 67), making the optimization of this domestic channel a cornerstone for the entire sector's value addition ambitions.

4. CONCLUSION AND RECOMMENDATION

4.1. Conclusions

Underutilized Economic Potential: Ethiopia possesses one of the largest livestock populations in Africa, representing a significant source of raw hides and skins. However, the sector is underperforming, contributing far less to GDP and export earnings than its potential due to systemic inefficiencies.

Pre-Slaughter and Slaughter Defects as Primary Constraint: The single greatest factor reducing quality, value, and yield is poor pre-slaughter and slaughter practices. Key issues include:

- ✓ **Pre-Slaughter:** Branding, scratches from overstocking and poor handling, and disease-induced skin lesions.
- ✓ **Slaughter:** Poor flaying techniques (knife cuts, irregular shapes), inadequate curing (improper salting leading to putrefaction), and unhygienic handling at abattoirs and collection points.

Fragmented and Inefficient Supply Chain: The collection system is characterized by a long chain of numerous intermediaries (from farmers to collectors, brokers, and tanneries). This increases costs, causes delays, and exacerbates quality deterioration due to poor storage and handling at multiple stages.

Weak Institutional and Policy Support: Despite the sector's importance, there is:

- ✓ **Inconsistent grading and pricing:** Lack of a universally enforced, quality-based pricing system disincentivizes producers from delivering better skins.
- ✓ **Inadequate infrastructure:** Lack of modern collection centers, standardized curing facilities, and cold chain storage in major production areas.
- ✓ **Limited technical and financial support:** Insufficient extension services to educate pastoralists, farmers, and small-scale collectors on best practices, and limited access to financing for improved handling technologies.

Market Access and Information Asymmetry: Smallholder producers and primary collectors have weak market linkages and poor access to price information, putting them at a disadvantage compared to traders and tanneries.

4.2. Recommendations

To increase efficiency, quality, and the economic return from Ethiopia's hides and skins sector, a coordinated, multi-stakeholder approach is required. Recommendations are prioritized for impact.

1. Immediate and High-Impact Interventions (Focus on Quality at Source):

- ✓ **Launch Nationwide Training and Certification Programs:** Implement massive, practical training for farmers, pastoralists, abattoir workers, and primary collectors on **proper animal handling, humane slaughter, flaying techniques, and immediate post-slaughter curing (salting)**. Use demonstrations and mobile training units.
- ✓ **Enforce Quality-Based Pricing at All Levels:** The government, in collaboration with tanneries and associations, must **mandate and enforce a transparent, graded pricing system** at collection points and abattoirs. Higher prices for defect-free, well-cured skins will create an immediate financial incentive for better practices.
- ✓ **Promote Simple On-Site Solutions:** Distribute and train on the use of standardized flaying knives, salting racks, and clean drying frames to primary producers and small abattoirs.

2. Medium-Term Structural Improvements (Strengthen the Supply Chain):

- ✓ **Develop Modern Collection and Primary Processing Centers:** Establish and upgrade hygienic collection centers in key livestock areas. These centers should provide weighing, proper salting, grading, and temporary storage facilities to reduce spoilage and shorten the supply chain.
- ✓ **Facilitate Cooperative Formation:** Encourage and support producers and primary collectors to form cooperatives to consolidate volumes, improve bargaining power, access better market information, and jointly invest in handling equipment.
- ✓ **Invest in Critical Infrastructure:** Prioritize investments in rural access roads to reduce transport time and damage, and explore mobile curing units for remote pastoralist areas.

3. Long-Term Enabling Environment (Policy and Institutions):

- ✓ **Review and Enforce Regulatory Frameworks:** Strengthen and clearly communicate quality standards (ES) for raw hides and skins. Increase inspection and certification at key points in the supply chain.
- ✓ **Enhance Research and Extension Linkages:** Direct agricultural research institutions to focus on practical, translational research (e.g., better curing methods, disease control) and ensure findings are disseminated effectively through extension agents.
- ✓ **Improve Market Information Systems (MIS):** Develop a digital or radio-based platform to

provide real-time price information from major markets and tanneries to producers and collectors, reducing information asymmetry.

- ✓ **Foster Public-Private Partnerships (PPPs):** Facilitate partnerships where tanneries co-invest in collection center infrastructure and training programs, securing a more reliable supply of higher-quality raw materials for themselves.

5. DECLARATIONS

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7. CONFLICTING INTERESTS

The author declares that there is no conflict of interest with respect to the authorship or publications of this manuscript.

8. REFERENCES

- Abebe, G., & Gezahegn, T. Value chain analysis of hides and skins in Ethiopia: Constraints and opportunities for enhancing exports. *Journal of African Business*, 2018; 19(3): 323-341.
- Abebe, G., & Tegegne, F. Value chain analysis of hides and skins in Ethiopia: Constraints and opportunities for upgrading. *Journal of Agribusiness in Developing and Emerging Economies*, 2021; 11(3): 287-305.
- Abebe, H., & Tassew, A. Assessment of major factors that cause hide and skin degradation in Ethiopian leather industry. *Journal of Resources Development and Management*, 2014; 3: 1-8.
- Addis Fortune. *Skin deep: The crisis in Ethiopia's hides and skins sector*. Addis Fortune Media, 2025.
- Asfaw, A., & Gezahegn, T. Value chain analysis of hides and skins in Ethiopia: A review. *Journal of Investment and Management*, 2018; 7(5): 143-150.
- Austin Publishing Group. *Parasitic impact and husbandry deficits on hide quality in East African livestock*. *Journal of Veterinary Science & Animal Husbandry*, 2025; 12(3): 45-59.
- Bekele, T., Tilahun, S., & Hailu, D. Analysis of the hide and skin value chain in Ethiopia: Constraints and opportunities for upgrading. *Journal of African Business*, 2017; 18(2): 245-263.
- Berhe, G., Zenebe, T., & Gebru, G. Effect of training on improvement of hide and skin quality in selected districts of Tigray, Ethiopia. *African Journal of Agricultural Research*, 2017; 12(15): 1295-1300.
- Berhe, Y., Yetayew, H. T., & Kassaye, E. Assessment of hide and skin preservation methods and quality along the collection and marketing chain in selected districts of Tigray, Ethiopia. *Journal of Biology, Agriculture and Healthcare*, 2017; 7(4): 2224-3208.
- Beyan, A., & Jema, H. Analysis of market incentives and quality of hides and skins in eastern Ethiopia. *Journal of African Leather and Leather Products*, 2022; 9(2): 78-94.
- Beyan, A., Mohammed, Y., & Ahmed, S. Post-slaughter preservation practices and quality of hides and skins in eastern Ethiopia. *Journal of Leather Science and Engineering*, 2020; 2(1): 85-94.
- Beyene, A. *Cross-border trade and its impact on the leather sector in the Horn of Africa: The case of Ethiopia*. Eastern Africa Social Science Research Review, 2016; 32(2): 67-89.
- Beyene, A., & Gezahegn, T. Analysis of factors affecting quality of hides and skins in the leather industry in Ethiopia. *Journal of Applied Sciences and Environmental Management*, 2018; 22(5): 753-757.
- Beyene, A., Gebremedhin, B., & Tegegne, A. Market chain analysis of hides and skins in Ethiopia: Constraints and opportunities for enhancing exports. *Cogent Business & Management*, 2021; 8(1): 106-125.
- Birr Metrics. (2026): *The raw material diversion: Trade flows and input scarcity in Ethiopian leather processing*. Birr Metrics Economic Research.
- Bureau, J.-C., & Gautier, D. *Quality incentives in agricultural supply chains*. Annual Review of Resource Economics, 2020; 12(1): 101-120.
- Central Statistical Agency (CSA) (2021): Agricultural sample survey 2020/21: Volume II report on livestock and livestock characteristics. Federal Democratic Republic of Ethiopia.
- Deribe, G., & Geda, A. Analysis of hide and skin value chain in Ethiopia: The case of Borana plateau. *Pastoralism: Research, Policy and Practice*, 2019; 9(1): 1-14.
- Fesseha, H. Assessment of hide and skin defects and associated financial loss in selected tanneries of Ethiopia. *Veterinary Medicine: Research and Reports*, 2021; 12: 141-150.
- Fita, L., Tilahun, S., & Teshale, T. Incentive mechanisms for improved hide and skin quality in Ethiopia: A case of the modified pricing system. *Journal of African Leather and Leather Products*, 2022; 9(2): 195-210.
- Fitsum, G., Dawit, A., & Tadiwos, H. Analysis of quantitative loss of hides and skins in the upstream value chain: Evidence from Ethiopia. *Cogent Food & Agriculture*, 2020; 6(1): 1778609.
- G/Egziabher, B. G., Tsegaye, D., & Berhe, G. Value chain analysis of hides and skins in Ethiopia: A review. *International Journal of Research - Granthaalayah*, 2019; 7(12): 200-211.
- Gashaw, A., Desta, A., & Tassew, A. Value chain analysis of hides and skins: The case of southern Ethiopia. *International Journal of Agricultural Economics*, 2017; 2(3): 44-52.
- Gashaw, A., Kefelegn, K., & Banerjee, S. Major causes of hide and skin defects and their financial impact in Amhara region, Ethiopia. *Cogent Food & Agriculture*, 2019; 5(1): 1-12.

25. Gebreegziabher, G., Mebratie, A., & Hussen, S. *Assessment of pre-tanning operations in the leather sector of Ethiopia: Causes of quality loss and waste generation*. Ethiopian Journal of Applied Science and Technology, 2014; 5(2): 13-25.
26. Gebreegziabher, G., Tadele, D., & Borg, K. Assessment of major causes of hide and skin rejection and associated financial loss at Sheba Tannery in Tigray, Ethiopia. *Cogent Food & Agriculture*, 2021; 7(1): 1883781.
27. Gebreegziabher, Z., & Tsegay, A. Major Causes of hide and skin defects and associated financial loss in Tigray region, northern Ethiopia. *Ethiopian Journal of Agricultural Sciences*, 2019; 29(3): 71-84.
28. Gebreegziabher, Z., Gebremedhin, B., & Geta, E. Assessment of the determinants of hide and skin collection in Ethiopia: A case study in Tigray Regional State. *Journal of the American Leather Chemists Association*, 2014; 109(2): 60-68.
29. Gebreeyesus, M. (2016): *Industrial policy and development in Ethiopia: The case of the leather and leather products sector*. United Nations University World Institute for Development Economics Research.
30. Gebreeyesus, M. (2016): *Industrial policy and development in Ethiopia: The case of the leather industry*. African Development Bank Group.
31. Gebreeyesus, M. *The emergence of successful export sectors in Ethiopia*. In *The Oxford Handbook of the Ethiopian Economy*, 2016; 667-684. Oxford University Press.
32. Gebreeyesus, M. (2017): *Industrial policy and development in Ethiopia: The case of the leather and leather products sector*. African Development Bank Group.
33. Gebreeyesus, M., & Sonobe, T. Global value chains and market formation process in emerging export activity: Evidence from Ethiopian flower industry. *Journal of Development Studies*, 2012; 48(3): 335-348.
34. Gebrehiwot, T. Analysis of major causes of hide and skin defects in the central part of Ethiopia. *International Journal of Livestock Production*, 2020; 11(3): 87-94.
35. Gebrehiwot, T. Supply chain analysis of the Ethiopian leather industry: Challenges and opportunities. *Ethiopian Journal of Business and Economics*, 2020; 10(1): 101-125.
36. Gebremariam, S. *The "paradox of plenty" in the Ethiopian leather industry: A resource-based view analysis*. *African Journal of Economic and Management Studies*, 2019; 10(1): 112-128.
37. Gebremichael, B. Value chain analysis of hides and skins in Ethiopia: A review. *African Journal of Marketing Management*, 2018; 10(5): 50-62.
38. Gebreselassie, T. Value chain analysis of hide and skin in Ethiopia: Challenges and opportunities for export enhancement. *Journal of Economics and Sustainable Development*, 2020; 11(18): 46-58.
39. Gebreselassie, W. (2018): *Quality and marketing of Ethiopian hides and skins: A review*. Ethiopian Meat and Dairy Industry Development Institute.
40. Gebreyohanes, M. G. Value chain analysis of hides and skins in Ethiopia: A review. *International Journal of Agricultural Science and Food Technology*, 2018; 4(2): 042-048.
41. Gebreyohanes, M. G., & Assen, Y. M. Analysis of the determinants of market supply of hide and skin in Wolaita Zone, Southern Ethiopia. *International Journal of Agricultural Economics*, 2017; 2(6): 194-200.
42. Gebreyohanes, M. G., & Oosterhuis, F. Upgrading leather value chains in Sub-Saharan Africa: Challenges and policy options. *Resources, Conservation & Recycling*, 2021; 164: 105-130.
43. Girma, M., & Lemma, F. Assessment of pre-slaughter and related animal welfare practices in export abattoirs of Ethiopia. *Global Journal of Animal Scientific Research*, 2015; 3(2): 450-460.
44. Lemma, F., & Birhanu, T. Effect of farmer training on quality of hide and skin in selected districts of Tigray Region, Ethiopia. *Journal of Cell and Animal Biology*, 2013; 7(9): 103-108.
45. Leta, S., & Mesele, F. Spatial analysis of cattle production patterns in Ethiopia. *Tropical Animal Health and Production*, 2014; 46(3): 471-479.
46. LIDI. *Benchmarking study on productivity in the Ethiopian leather and leather products industry*. Leather Industry Development Institute, 2020.
47. Mebrate, T., Tassew, A., & Desta, A. Major hide and skin defects in Ethiopia: Implications for quality and sustainability. *Journal of Leather Science and Engineering*, 2020; 2(1): 1-10.
48. Mebratie, M., Legesse, B., & Ayele, Z. Major constraints in the hides and skins trade in Ethiopia: A review. *Livestock Research for Rural Development*, 2019; 31(7): Article 154.
49. Mebratie, W., Legesse, A., & Hailu, D. Assessment of hide and skin defects and their causes in eastern Ethiopia. *Journal of Veterinary Science & Technology*, 2019; 10(2): 1-5.
50. Mekonnen, D. Value chain analysis of hides and skins in Ethiopia: A review. *African Journal of Marketing Management*, 2017; 9(2): 9-17.
51. Mekonnen, D., Taddese, D., & Woldeamanuel, T. Economic impact of hide and skin quality defects in the Ethiopian leather industry. *African Journal of Business and Economic Research*, 2022; 17(1): 149-168.
52. Mekonnen, G. Pre-slaughter defects of hides and skins and intervention strategies in East Africa: A review. *Journal of Leather Science and Engineering*, 2020; 2(1): 1-12.
53. Mekonnen, G., Tolera, A., & Nurfeta, A. Assessment of cattle hide and small ruminant skin production, handling and marketing systems in Southern Ethiopia. *Global Journal of Animal Scientific Research*, 2017; 5(1): 30-40.

54. Mekonnen, H. Analysis of hide and skin value chain in southern Ethiopia: Challenges and upgrading strategies. *Cogent Food & Agriculture*, 2020; 6(1): 1778609.
55. Mekonnen, H., & Tadesse, G. (2017): Market and supply chain analysis of livestock and meat in Ethiopia. *International Livestock Research Institute (ILRI)*.
56. Mekonnen, H., Asmare, K., & Duncan, A. (2012): Skin and hide collection, processing and marketing in Ethiopia: A review. *ILRI Discussion Paper No. 25*. International Livestock Research Institute.
57. Mekonnen, H., Tadesse, D., & Amare, S. Assessment of the effect of market structure on the quality of hides and skins produced in Ethiopia. *Ethiopian Veterinary Journal*, 2012; 16(2): 1-14.
58. Mekonnen, H., Tesfaye, A., & Gudeta, T. Assessment of major hide and skin defects and associated financial loss in selected tanning industries in Ethiopia. *International Journal of Agricultural Science and Food Technology*, 2020; 6(2): 245-251.
59. Mekonnen, H., Tsegaye, D., & Tariku, S. Livestock extension and its influence on livestock production in Ethiopia. *Journal of Agricultural Extension and Rural Development*, 2012; 4(12): 352-357.
60. Mekonnen, K. A., & Gessesse, D. B. Analysis of major constraints in hide and skin production and marketing in Ethiopia. *International Journal of Livestock Production*, 2019; 10(3): 42-50.
61. Mekuriaw, S., & Destaw, B. Assessment of preservation and quality of hides and skins at collection centers in north Gondar zone, Ethiopia. *Agriculture, Forestry and Fisheries*, 2015; 4(3): 134-139.
62. Moges, F., & Melesse, B. *Performance analysis of the Ethiopian leather industry: Challenges and opportunities*. *Journal of African Business*, 2019; 20(4): 483-501.
63. Moges, N., Tegegne, A., & Mekuriaw, S. Assessment of slaughter practices and its effect on quality of small ruminant skins in selected abattoirs of Ethiopia. *Tropical Animal Health and Production*, 2021; 53(1): 110.
64. Mulat, H., Yismaw, M. A., & Mohamed, A. Export performance of the Ethiopian leather and leather products sector: A dynamic panel data analysis. *Cogent Business & Management*, 2021; 8(1): 1-15.
65. Mussema R. Subsector Outlook Research in Ethiopia: The Case of Hides and Skins Production, and Marketing. *Journal of Economic Impact*, 2024; 6(1): 01-13
66. Sisay Addis Fil. *Technical efficiency and technological gap in Ethiopian footwear manufacturing firms*. *Eastern Africa Social Science Research Review*, 2022; 38(1): 1-24.
67. Tamiru, M. *Supply chain management of hides and skins in Ethiopia: Institutional and infrastructural constraints*. *International Journal of Supply Chain Management*, 2021; 10(1): 105-118.
68. Tesfaye, E. B., & Girma, A. B. Evaluation of hide and skin defects and their causes in the central highlands of Ethiopia. *International Journal of Advanced Research in Biological Sciences*, 2018; 5(4): 92-102.
69. Tesfaye, T., & Kitaw, D. Leather industry development in Ethiopia: A critical review of growth, constraints, and prospects. *International Journal of Technology Enhancements and Emerging Engineering Research*, 2014; 2(10): 102-108.
70. Tolera, A., & Fikiru, M. Major skin defects in small ruminants in central Ethiopia: Causes and economic implications. *Ethiopian Veterinary Journal*, 2020; 24(2): 1-14.
71. Tolossa, D. Value chain analysis of hides and skins in Ethiopia: Constraints and opportunities for enhancing exports. *Journal of International Business and Economics*, 2016; 4(1): 1-16.
72. USTR (United States Trade Representative) *Termination of Ethiopia's designation under the African Growth and Opportunity Act*. Federal Register, 2022; 87(231).