

Review on Ethiopia Meat Export: Navigating Opportunities and Challenges in Global Market

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ABSTRACT

Ethiopia's livestock population, one of Africa's largest, generates significant foreign exchange revenues, income for farming communities, and investment, contributing 12-33% of the country's overall GDP. Five of Ethiopia's nine privately operated export abattoirs ship 150 MT of carcasses every week to the Middle East. Ethiopia's meat and live animal industries benefit from the country's large animal population, flexible genotypes, varied agroecology, government assistance, and a growing number of export abattoirs, which raises local value addition. Ethiopia produces most of its meat from sheep and goats, with smaller amounts coming from cattle and chickens. The yearly consumption of sheep and goat meat is increasing, driving up export demand. There is potential for Ethiopian meat exports to the Middle East, with the UAE and KSA being two important markets. Countries with abundant animal resources, like Ethiopia, have a great chance to export meat to Middle Eastern and African nations due to the rising demand for meat products. The lack of proper infrastructure in Ethiopia's meat export business results in short shelf lives because of antiquated packaging techniques, inadequate freezing and chilling facilities, and non-specialized transportation. Producers face challenges such as feed shortage, diseases, drought, grazing land shortage, market access, veterinary services, poor management, phytosanitary regulations, low literacy, local genotypes, inadequate research support, low technology uptake, weak policies, financing, and implementation of existing policies, hindering the development of livestock and meat value chains. In the Middle East, Ethiopia faces rivalry for livestock and product markets from the European Union, Australia, New Zealand, South America, Somalia, Sudan, and Eastern Europe. The highland feedlot industry, focusing on commercial animal husbandry, could boost abattoirs and meat exporters by increasing input quality. Enhancing packers' quality standards, branding, meat quality standardization, and supply structure will improve performance. This will benefit investors and farmers by increasing profit margins and enhancing veterinarian service and airport cargo administration.

Keywords: Ethiopia, Meat, Export, Opportunities, Challenges, Global Markets.

Vol No: 09, Issue: 01

Received Date: December 28, 2024

Published Date: January 21, 2025

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Citation: Jima B, et al. (2025). Review on Ethiopia Meat Export: Navigating Opportunities and Challenges in Global Market. *Mathews J Vet Sci.* 9(1):58.

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INTRODUCTION

One of Africa's biggest populations of livestock is found in Ethiopia. In Ethiopia, livestock is a major source of foreign exchange revenues for the country and serves as a method of draught power, income for farming communities, savings, and investment. 65% of the population makes their living from this subsector, which contributes 12 and 33% of the GDP overall and the GDP from agriculture, respectively [1].

The agricultural industry is vital to Ethiopia's economy, providing both rural and urban residents with jobs, food, and cash. According to Dadi et al. [2], one of the segments of the global agriculture and food business that has grown the fastest is livestock and meat products. Since the invention of meat processing, meat has been an exportable food item that has helped Ethiopia's GDP grow and its earnings from exports abroad. Despite the abundance of cattle resources in the nation, meat and other byproducts of slaughter account for little more than 2% of total export goods. It is anticipated that there will be a positive correlation between meat exports and economic growth since they stimulate productive growth and produce foreign exchange [1].

The nation offers a multitude of prospects for the livestock and meat industries because of its advantageous position, ideal climate, abundant animal resources, and rising demand from both local and international markets. The current value chain for livestock and animal products is underdeveloped despite the opportunities that are emerging because of many obstacles [3].

Ethiopia is home to about nine export abattoirs that are privately run. For the past six or seven years, five of them have been in operation, exporting 150 MT of sheep and goat carcasses every week on average to the Middle East. The daily throughput capacity of these tiny abattoirs is between 1,500 and 2000 shoats. A couple of them can even butcher animals to some extent, and they occasionally ship beef by air to certain African nations. Seasonal shortages of supplies also affect these abattoirs. The lack of resources is also a result of high transportation costs and accessibility issues to certain surplus areas in the nation [4]. The study proposed five quality attributes tenderness, marbling, juiciness, fattiness, and meat color based on expert comments and data from a market survey [3]. When it comes to making judgments about what to buy, consumers consider meat quality, which is determined by a variety of chemical, microbiological, and sensory factors [5].

Nonetheless, there are several difficulties with Ethiopian meat exports. The most prevalent ones among them are illnesses and technological infrastructure. The amount of meat exported from Ethiopia is decreasing daily [6]. This

seminar's major goal is to examine the opportunities and challenges faced by Ethiopian exporters of meat and meat products, as well as the importance of product quality, marketing strategies, and the competitive advantages of these exporters.

LITERATURE REVIEW

Opportunities

According to Ameha, [7] Ethiopia possesses significant prospects that impact the meat and live animal industries, especially in the export sector. The nation has a vast population of animals with a variety of genotypes that are adaptable; distinct agro-ecologies that may be used to produce different kinds of animals; government backing and interest in the livestock business; and an increasing number of export abattoirs, such as Frigorico Boran Foods PLC/Allana. which are capable of killing 3,000 heads of cattle and 6,000 heads of sheep and goats per day. The Federal Democratic Republic of Ethiopia's government values livestock as one of the nation's most important economic resources and wants to boost domestic value addition by promoting meat exports rather than live animal exports [8].

Growth demand

The share of meat sources livestock was indicated did sheep, goat, and chicken meats follow beef. Beef contributed to more than half of the total meat produced in 2017. Ethiopia cannot influence the prices of meat in the world market. Hence, foreign demand for Ethiopian meat can be considered as perfectly elastic at the given world price [6]. Export demand from Ethiopia has been rising especially from the Gulf countries.

The annual growth rate in sheep and goat meat consumption per person from 2010 to 2020 is estimated at 3.4% and 1.3%, respectively. An overall change of 41% in sheep meat consumption and 14% in goat meat consumption is also expected over the 2010–2020 period [5]. There are several reasons for this low meat consumption, including low per capita income, high domestic meat prices, and the fasting days by the Orthodox Christian which lasts for at least 200 days in a year which reduces the aggregate demand by 20–35% [3].

However, the domestic meat demand is believed to increase with increasing literacy and family income. But, the global figure for some selected countries indicated that the correlation between high income and increased per capita meat consumption is not strong enough for some countries to justify the effect of income on meat consumption [9].

There is a large potential to expand Ethiopian meat exports to the Middle East if the value chain actors in Ethiopia meet

export market standards [7]. Quality requirements and associated issues of the export market include UAE and the KSA are the major traditional destination markets to which 95% of the chilled carcass (mainly goat meat) is exported. The customers of meat from Ethiopia in these markets are the low-to-middle-income community that has less stringent quality demands [3].

Proximate Chemical Analysis: Pre-weighted muscles from the left sides were dried at 55°C for 72 hours for ease of grinding. After recording partial dry matter (PDM), the meat samples were ground to pass a 1 mm sieve screen stored in air-tight plastic bags, and put at 4°C pending chemical analysis. From partially dried ground samples, 3 g was weighed into a pre-weighed crucible dish and then dried overnight at 105°C in a forced draft oven for determination of dry matter. Then the moisture content was determined by subtracting a hundred from the dry matter. Ash was determined by burning the samples dried during moisture determination by incinerating them in a muffle furnace at 600°C for 12 h, cooled in desiccators and the incinerated sample (ash) was weighed and the ash content was expressed as a percentage of the weight of ash to the weight of the dried sample. Nitrogen (N) was analyzed by the Kjeldahl method [5] and CP was determined as $N \times 6.25$. Crude fat was extracted using the Soxhlet apparatus where a 2 g sample was extracted repeatedly for 6 hours by reflux with diethyl ether (boiling point of 34.5°C). After all the solvent evaporated, the weight of the flask along with the extracted oil was recorded. Crude fat content was calculated using the following formula and all analyses were run in duplicates. $\text{Crude fat \%} = \frac{\text{Flask weight after extraction} - \text{Flask weight before extraction}}{\text{Sample weight}} \times 10$ [10].

Flavor is one of the most important sensory attributes for the overall acceptance of sheep meat [11]. The degree of marbling of the muscle is significantly related to flavor intensity, and meat with a desirable flavor tended to have higher levels of IMF and more intense marbling. The flavor of mutton in particular has been attributed to the carbonyl, or other polar compounds found in sheep fat. Sulfur compounds and branched chain fatty acids are also responsible for sheep meat flavor [10].

The rapid growth in demand for meat products in the world represents a great opportunity for livestock resource-rich countries. For Ethiopia, opportunities to export meat to Middle Eastern countries and other African countries have been growing. Ethiopia's lowland cattle, sheep, goat, and camel breeds are also highly demanded in the Middle East due to their better taste and the organic nature of their production [1]. In addition to the growing opportunity to

export live animals and meat, there will also be an increase in domestic demand due to urbanization and economic growth. Therefore, to exploit emerging market opportunities there is a need to improve both the quality and quantity of livestock and livestock products under the different production systems [12].

People with a higher social or economic status demand a greater amount of high-quality meat products. The per capita consumption of meat in developed/industrialized countries is much higher than in developing countries. Countries whose population consumes the least amount of meat are located in Africa and Asia. Developed countries consumed a consistent level of 77 kg of meat per capita annually while developing countries struggled to maintain a diet with only 25 kg of meat per capita annually. Ethiopians remained slightly below the meat intake of all low-income countries and consumed 9 kg per capita annually [5].

High quality of Ethiopian meat which is a unique opportunity for Ethiopian meat exporters. They stated that even though the price of Ethiopian meat is high, customers are willing to buy Ethiopian meat because of its uniqueness and taste. 29.17% of the respondents mentioned that they do the business to earn foreign currency and use that money to import goods from abroad. This is considered a great opportunity for Ethiopian meat exporters. There are also other opportunities such as proximity to key markets, especially in the Middle East, growing demand for Ethiopian meat, a large population of livestock in Ethiopia, and increasing awareness about the health benefits of meat products [13].

International Recognition: A crucial element in assessing the feasibility of the proposed system is to identify and cost out specific certification activities, including surveillance, vaccination, diagnosis, traceability, quarantine, etc.; organizational and institutional mechanisms for instituting and financing a system; existing market failures and constraints Scenarios of a model with the above components, all of which must comply with international requirements and be compatible with export market requirements [3].

Market expansion: Improve Ethiopia's capacity and competitive advantage for meat and livestock exports, with an emphasis on improving and increasing meat production for export and expanding market opportunities in the Middle East, North Africa, and other international [1].

Diverse Livestock

Ethiopia has one of the largest livestock populations in Africa. Livestock in Ethiopia provides draught power, income for farming communities, means of savings and investment, and is an important source of foreign exchange earnings

to the nation (Arend, 2006). The subsector contributes 12 and 33% to the total Gross Domestic Product (GDP) and agricultural Gross Domestic Product (GDP), respectively, and provides livelihood for 65% of the population [5].

Major preference of breeds in the export market According to the abattoirs, among sheep breeds, the Black Head Somali and Afar are preferred. The Borana, Somali, and Afar are the preferred goat breeds. However, during periods of high demand from different importers, mainly during holiday and festival periods, other breeds of small ruminants are also slaughtered and exported [14].

There are some complaints concerning highland sheep and goats due to the alleged darkening of meat during storage. This problem is being investigated so that both the highland and the lowland small ruminant breeds could be made to contribute to alleviating the constraints related to the consistent and uniform supply for the export market [15]. Menz sheep have significantly higher carcass fat (8.7% vs 5.9%), and lean: bone ratio (2.7% vs 2.4%) but lower total saleable meat yield.

Borana goats are the most preferred animals for export [14]. Lately, there has been a gradual shift to sources such as Guji, Bale/Ginhir, South Omo/Jinka, Konso, and parts of Afar and Somali due to a shortage of Borana goats. Borana goat carcasses constitute about 10% of the chilled carcasses exported due to the short supply, even though they are the most preferred.

Ethiopia possesses a vast livestock wealth inventory, but its current proportion of the global meat export market is rather tiny, despite this. The United Arab Emirates (51%) and the Kingdom of Saudi Arabia (28%) are Ethiopia's top importers of chilled sheep and goat carcasses, together accounting for 79% of the country's total meat exports. In 2011–12, Yemen, Oman, Kuwait, Egypt, the Comoros Islands, the Congo Democratic Republic, and Angola received almost 21% of the world's meat exports [12].

According to the value chain evaluation, about 64,430 TECs of goat meat are brought into various value chains annually. Four smaller chains provide this. Two of them provide live

goats to specific customers so they can kill them in their backyards. The large export demand for goat meat from Ethiopia is a notable recent development in the goat value chain. Goat meat makes up over 80% of all meat shipped to the Middle East. Each year, these nations receive about 12% of the goat meat that comes from lowlands (7,924 TECs) that enters the value chain. Live goats are supplied to the export market by two of the six sub-chains (one official and one informal). 9.1% (5,992 TECs) of the total goat meat shipped through informal sub-chains and only 0.3% (193 TECs) of the goat meat entering the value chain are exported legitimately [15].

Over time, the value chains in Ethiopia for meat and live animals have grown into a complex web of actors that include producers, collectors, small-scale private and cooperative fatteners/feedlots, a variety of middlemen (and sometimes a large number of them), cooperatives that trade livestock, individual traders, and exporters [16].

The main meat products exported from Ethiopia are chilled whole sheep and goat carcasses, chilled beef, chilled camel meat, chilled offal, and preparation of poultry. The total volume of meat exported between July 2007 and June 2008 was about 6,486 metric tons and chilled sheep and goat carcasses accounted for about 99 percent of the total quantity of meat exported [17].

The demand structures for goat/sheep meat and cattle meat/live animals are different. In the case of goat/sheep meat, there is excess foreign demand for goat and sheep meat even with the current quality level. Abattoirs have reported that they are supplying only 50% of the purchase order of importing countries. However, the foreign demand can absorb 10,000 goats per day [16].

Ethiopian exports of livestock products, especially chilled meat, have expanded both within and outside the Middle East. Apart from Egypt, which is emerging as a major meat export market, exports now reach West Africa, parts of Europe, and even the Far East. The challenge now is getting easy access to sufficient numbers of good quality meat animals even from pastoral area [17].

Table 1. Number of slaughters in Ethiopia [1]

NO	Animal Type	Number of slaughters	Share in %
1	Cattle	391,991	28.9
2	Sheep	4,441,433	24.3
3	Goat	3,982,556	21.8
4	Camel	124,440	9.2
5	Poultry	14,354,131	15.9
6	Total		100

Quality assurance

Compliance with standards through certification can be used as a marketing tool to enhance customers' confidence in the products and assure the consumer that the products are of quality, safe, and free from hazards. Food standards are "rules of measurement established by regulation or authority" and are enforced by governments, food companies, and retailers [16].

They aim to assure the confidence of consumers in the food systems (from farm to table), but also increase the information available to the final consumer, enabling them to make informed decisions concerning the food they purchase [18].

Strategic partnership: The Norman Borlaug Institute for International Agriculture of Texas A&M University, in collaboration with the Ethiopian Ministry of Agriculture and other public and private sector actors, designed and carried out the Ethiopia Sanitary and Phytosanitary Standards and Livestock and Meat Marketing (SPS-LMM) Program as an intervention strategy to grow the export meat industry. The program's main goals are to increase Ethiopia's ability and competitive advantage in the meat market, as well as the ability of Ethiopian veterinary services to carry out SPS-related operations [19].

Product integrity: Several incidents related to food-borne infection and intoxication caused public alarm and loss of confidence in the role of producers and governments in food supply. As a result, there is now increased public awareness and concern for food safety and quality, forcing governments to put comprehensive and integrated food safety policies and stringent requirements on the import of livestock and livestock products [18]. Assurance of the safety of foods principally through control at the source, product design, and process control, and the application of Good Hygiene Practices during production, processing (including labeling), handling, distribution, storage, sale, preparation, and use, in conjunction with the application of "Hazard Analysis and Critical Control Point System and Microbiological Criteria" is becoming a standard [7].

Hygiene; Codex also sets more general standards, such as the Code of Hygienic Practice for Meat, which makes it a highly relevant institution for Horn countries. The Code covers the hygiene of the environment in which animals grow, their feed, the manner of transportation to slaughterhouses, the design and construction of the slaughter area, the entire food chain after slaughter, and a traceability requirement back to the beginning (Muleta, 2022). Established jointly by the FAO and the WHO in 1963, Codex is a key player in international food trade. It was set up to implement the Joint FAO/WHO Food Standards Programme, whose purposes include protecting

consumer health, ensuring fair practices in food trade, and coordinating the development and harmonization of food standards. With a membership of 183 countries, Codex is the principal global institution with the mandate to develop international food safety and hygiene standards [1-3].

CHALLENGE

Infrastructure

Ethiopia's meat export market has inadequate market infrastructure. Meat's shelf life is impacted when live animals and meat are transported from the abattoir in an unspecialized vehicle. The majority of enterprises in Ethiopia lack adequate freezing and chilling facilities [7,9]. Presently, the majority of Ethiopian factories that export meat uses antiquated packing systems. Customers of Ethiopia, notably importers from the Middle East and Angola, frequently lament the negligence and subpar quality of the meat packaging that Ethiopians provide. Currently, the majority of exporters only utilize stockinette covering as a packing method [18,19].

A multitude of internal issues, ranging from inadequate infrastructure to SPS (sanitary and phytosanitary regulations) and the ongoing prohibition enforced by the Middle Eastern importing countries, limit Ethiopia's ability to boost its live animal exports. Meat and live animal exports from Ethiopia are disproportionately dependent on demand coming from just Saudi Arabia and Dubai. Ethiopia's traditional export markets for meat and livestock include the Middle Eastern nations. The availability of brokers and their impact on the markets, together with the market infrastructure, all affect beef cattle prices [1,19].

Processing plant: Low meat quality and inconsistent supply are the main challenges limiting Ethiopia's capacity to compete in the Middle East meat market. Order-based animal slaughter renders processing facilities operating at reduced capacity and raises overhead expenses, rendering abattoirs less competitive in terms of pricing [8-9]. The main obstacles to the development of red meat and cattle feedlot systems include inadequate market information, poor market infrastructure and roads, low technical knowledge of value chain actors, particularly processing technicians, and weak connections between producers, processors, and export abattoirs [15].

The transportation of chilled meat presents significant difficulties because cold chain containers are scarce and transit periods are long. Furthermore, high-volume cargo is typically given priority by shipping companies, which makes it challenging for Ethiopian exporters to obtain the required cold chain containers. Due to the possibility of the cargo needing to be combined for several destinations,

this preference for large shipments also increases delivery times. To take control of their supply chain and guarantee the prompt delivery of their goods, Ethiopian meat exporters must build a cutting-edge transportation infrastructure with sufficient cold chain facilities [13,14].

Based on cold-dressed weights, for livestock slaughtered in abattoirs, Ethiopia has been classified as one of the lowest in the world, with carcass weights averaging 110 kg/head for cattle, 10 kg/ head for sheep, and 8 kg/head for goats, all of which are below the average productivity of all least developed countries [6]. Although Botswana has fewer beef animals than Ethiopia, it produces superior carcasses averaging 190 kg cold-dressed weights for traditional cattle and 230 kg cold-dressed weight for commercial and feedlot cattle [5:15]. Inferior carcasses from agro-pastoral and pastoral systems in Ethiopia can be attributed to many important factors including but not limited to low genetic potential for indigenous cattle, prolonged nutritional stress, overstocking which leads to overgrazing heavy parasite burdens, etc. [14].

Regulatory Hurdles

The main challenges faced by producers are shortage of feed, diseases and parasites, drought, shortage of grazing land, market access, veterinary services, and extension services, poor management, restriction to markets (exports) due to phytosanitary regulations, literacy of farmers and beef handlers, local genotypes for beef production, inadequate research-based support to beef production, low technology uptake, weak policies, weak financing, weak implementation of existing policies [16-19]. Price fluctuation, weak market integration, limited business skills, and inadequate input supply, are other challenges that hindered the development of the value chain and market of livestock and meat [5]. To deal with these challenges, companies around the world are increasingly using standard quality assurance systems to improve the quality and safety of products and production processes. Quality assurance systems enable the application and verification of control measures intended to assure the quality and safety of food. They are required at each step in the food production chain to ensure safe food and to show compliance with regulatory and customer requirements [7-10].

Certificates According to Business 2, "The poor state of animal health in Ethiopia is one of the main barriers that prevents the country's meat industry from accessing the markets of the European Union (EU) and the United States (US)." Animal diseases like foot-and-mouth disease, Rift Valley fever, and bovine tuberculosis are highly prevalent in Ethiopia. These illnesses represent a severe risk to food safety and human health, as well as to the cattle industry's

profitability and production. A further obstacle facing Ethiopia's meat business is the absence of a trustworthy system for tracking animals. This implies that keeping an eye on the transportation of animals from farms to processing plants and slaughterhouses is challenging. Because of this, it is challenging to ensure that meat is safe and does not originate from sick animal [2-4]. Ethiopia will be permitted to export meat to the US and the EU when these issues are resolved and exports of meat become certified. Ethiopia's export competitiveness is greatly impacted by the quality of its meat and meat products; major obstacles include a lack of expertise, a lack of compliance with international standards, and inadequate marketing. ISO and HACCP food safety standards are among the particular quality criteria and prerequisites for accessing foreign markets [4,8].

Competition

Low meat quality and inconsistent supply are the main challenges limiting Ethiopia's capacity to compete in the Middle East meat market [17]. Order-based animal slaughter renders processing facilities operating at reduced capacity and raises overhead expenses, rendering abattoirs less competitive in terms of pricing [12]. The development of red meat and cattle feedlot systems faces several major challenges, including inadequate market information, poor market infrastructure, and roads, low technical knowledge of value chain actors, particularly processing technicians, and poor links between producers, processors, and export abattoirs [7,16]. Ethiopia's ability to compete in the Middle East meat industry is hampered by two key issues: low-quality meat and irregular supply (USAID, 2010) [18,19].

Many countries compete with each other for livestock and product markets in the Middle East. The European Union, Australia, New Zealand, South America, Somalia, Sudan, and Eastern Europe are Ethiopia's main enemies. As per the currently available data, Somalia exports up to 2 million head of sheep and goats annually and up to 10,000 head of cattle annually. Its primary supply sources are believed to be parts of the Oromia Bale zones, Eastern Hararghe, and the Ethiopian Somali Region. South America's two largest exporters are Uruguay and Argentina. These countries have an advantage over others in the Middle East and Europe since they are not sick. There are certain advantages Ethiopia has over its competitors. These are the preferred animal species, the location, and the steady supply [20].

Making processing facilities more competitive in terms of both price and quality, especially in the export market, should be the primary focus of the largest intervention focused on meat processors. Meat processors will be able to process meat continuously, increase capacity utilization, and maintain competitive prices for high-quality meat by putting

these strategies into practice [6]. In the Middle East market, Argentina, Australia, New Zealand, Brazil, India, Pakistan, and Iran are Ethiopia's principal competitors. Ethiopia's meat export performance during the first Growth and Transformation Plan (GTP) in contrast to its other animal products [21].

Despite having a large stock of livestock, Ethiopia's share of the world's meat export industry is now very small [19]. Together, the two largest importers of chilled sheep and goat carcasses into Ethiopia are the United Arab Emirates (51%), and the Kingdom of Saudi Arabia (28%), making up 79% of the nation's total meat exports. Nearly 21% of global meat exports in 2011–12 went to Yemen, Oman, Kuwait, Egypt, the Comoros Islands, the Congo Democratic Republic, and Angola [17].

STRATEGIES OF SUCCESS

Market Research

To improve the competitiveness of processing plants in the export market and the market success of smallholder producers, several issues require deliberate intervention. Cost-effective marketing channels and integrated supply chains that lower transaction costs across various supply chain actors are essential to enhancing the competitiveness of Ethiopia's live animal and meat exports [8]. Significant efforts are required to coordinate the sale of meat and cattle as well as to provide market support services. Along Ethiopia's value chains for live animals and meat, it is crucial to develop ways to lower transaction costs, boost producer returns, promote investment, and enhance product competitiveness in export markets [7].

The fundamental tactics for value chain upgrading in the livestock industry are as follows: coordinated government and sectorial organizational support; quality improvement; market interventions (market linkages and market information); value chain coordination; and enhancing the enabling environment [22]. The establishment of a standardized grading system for meat and live animals, increased capacity utilization that lowers costs and improves cost competitiveness, and the introduction of proper and improved feeding, fattening, animal health care, and other services, along with the encouragement of both domestic and foreign investment at all points along the value chain, are some ways that operators and investors along the value chain might think about to reach the targeted level of growth and development [16].

The most significant intervention aimed at meat processors must concentrate on making the processing facilities more competitive in terms of both price and quality, particularly in the export market [1]. By implementing these interventions,

meat processors will be able to process meat continuously and boost their capacity utilization while maintaining competitive prices for high-quality meat. The meat value chain will function more effectively if interventions are planned in collaboration with banks to remove barriers to effective capital access, foreign exchange, transportation, and the import of trucks and cold chain equipment [11].

One of the most significant breakthroughs for the industry's expansion would be the market-driven promotion of commercial animal husbandry. Given this, expanding the highland fattening and feedlot sectors to support the commercialization of raising live animals may benefit abattoirs and meat exporters by boosting the quantity and caliber of inputs they employ. Expanding the final market, improving the packers' quality standards, branding and labeling, standardizing the meat quality, and the organization and availability of the cattle market. Improving animal management, airport cargo administration, animal traceability, and veterinary services would all help the sector function better. Since the improved quality will enable them to earn a better profit margin, this will also benefit farmers and investors [23].

Ethiopia has the potential to increase the quantity and price at which meat and meat products are sold both locally and abroad. This might be accomplished by increasing the amount of Borena beef exported, commercializing the production and marketing of cattle, diversifying the products offered, such as making sausages and other similar meats and boosting domestic consumption [24]. However, several challenges must be addressed to boost exports and sales, the most important being poor product quality. Increasing pricing competitiveness and strengthening business relationships are further concerns. Most of the recommendations made to improve the sale of live animals would also contribute to raising the standard of Ethiopian beef production. These include highlighting the specialization of cow rearing, strengthening livestock tracking systems, and enhancing the transparency of livestock trading networks [16].

Export Market to effectively export cattle, meat, and meat products to international markets, several issues that impact the business's sustainability and competitiveness must be taken into account [25]. Among these are:

- Competitive strategy; how to set the products apart from those of other vendors in terms of cost, quality, security, and client support.
- Target market: The Gulf nations of the United Arab Emirates (UAE), Saudi Arabia, Kuwait, Qatar, Bahrain, and Oman are Ethiopia's main export destinations for meat. Because of their high expat populations and rising disposable

incomes, these nations have a sizable and expanding need for beef. Furthermore, Ethiopia and the Gulf countries are geographically close, which facilitates and lowers the cost of meat exports to these markets.

- Export destinations: Which nations or areas have the greatest potential and demand for the products, and what logistical, legal, and cultural obstacles need to be overcome to reach those markets?
- Market segmentation: what are the preferences, requirements, and expectations of the most profitable and devoted consumers in each industry, and how to find and target them
- Competitors: who are the main rivals in each market, and what are their strengths, weaknesses, opportunities, and threats?
- Long-term strategy: how to plan and execute a long-term vision for the business that ensures growth, innovation, and customer satisfaction [26].

The effectiveness of the FSMS certification system largely depends on the deployment of a successful certification procedure. ISO/IEC 17021, one of the certification requirements, proposes a certification procedure that proceeds in a logical sequence. illustrates the proposed certification process that was used to review the certification process. The QMS certification program was built using the standards of the ISO/IEC 17021 2006 edition. It was put into practice by the certification personnel using the certification process of the Certification Directorate. The FSMS certification scheme's certification procedure, which was to be based on ISO/IEC 17201 criteria, has to be amended to include the specific standards for food safety certification established in ISO/TS 22003 [27].

HACCP Hazard Analysis Critical Control Points, or HACCP, are a useful method for locating, measuring, and reducing risks to food safety. It establishes a framework that enables in-depth analysis of a process to identify hazards and determine how best to manage them [24]. The ISO 22000:2005 standard the international, auditable ISO 22000 standard outlines the requirements for a food safety management system by combining a thorough management system with every aspect of HACCP [28]. A HACCP-style standard called ISO 22000:2005 was developed specifically to ensure food safety. Based on the hazard analysis, ISO 22000 will dynamically integrate the required programs with the HACCP principles and implementation stages. To determine the most effective strategy for guaranteeing hazard control through the integration of precondition programs and the HACCP plan, [29].

Investing in Infrastructure

A roadmap is a strategic plan that describes the steps a nation needs to take to achieve stated outcomes and goals. It clearly outlines links among tasks and priorities for action in the near, medium, and long term [30]. An effective roadmap also includes metrics and milestones to allow regular tracking of progress toward the roadmap's ultimate goals [31].

The animal receiving pen (a digital cleaning system, an adjustable off-loading ramp, and an isolation cage) is one of the essential technologies chosen for the carcass. Lairage [Concrete Lairage, Pressurized Water Supply, Foot Bath, Showering, Animal Driving Devices, Electric Stick], Incinerations [Refractory Bricks Incinerator], Slaughter Laboratory [ISO Standard Laboratory, Food Scan Technologies, Microbial Testing Facilities], Emergency Slaughter [Independent Emergency Complete Slaughtering Lines], Complete Slaughter Lines [Gravity Complete Slaughter Lines, Fully Mechanized Lines, Conveyors, Leg & Horn Cutter, Splitter, Sterilizers, Plat Forms, Stunning, Rails, Hooks, Hanging], Slaughtering Amenities [ISO Safety Materials, Chemical Hand Washing, Sensor Hand Washing, Aprons, Stainless steel knives, chain gloves, and sterilizers Cold Storage [freezer room, chiller, ammonia system], Deboning [electric saw blade deboning cutting machinery], De-Hiding [Electrical motor rolling systems, hydraulic de-hiding systems], Preservation of the hide and skin [Solti Preservation, Brained Solution], Carcass Washing: Spray carcass washing, a tunnel made of stainless steel, chilled tracks [32,33].

In industrialized nations, "cold" handling and storage systems are commonly employed as an investment to reduce perishable food losses [34]. This approach can be quite economical when compared to continuously raising output to satisfy the rising demand for these goods. During the early 1950s as the mechanical refrigeration industry grew, cold technologies were used to develop agricultural supply chains for meat, dairy, fish, and horticultural products in the USA and EU. However, most developing countries still have limited cold chains. To reduce the loss of perishable food, policymakers in the fields of agriculture, energy, education and food must collaborate to advance the use of cold chain technology, enhance logistics, services, infrastructure, maintenance and management expertise and develop sustainable markets for the planning, implementation, and financing of cold chains [35].

Capacity Building

Countries that can provide an environment in which prices provide stable and credible long-run incentives are most likely to succeed as exporters in this sector [36]. But, in

addition, countries that are learning to convert their natural comparative advantage in meat production into export success must make investments in human capital at a variety of levels to ensure quality control in production [37].

Modernization of traditional systems

Company 2 emphasized “the importance of several factors for improving the livestock sector. First, they suggested that embracing modern technologies and practices in livestock production and processing can enhance efficiency and productivity [38]. Second, they recommended investing in cold chain infrastructure and transportation to minimize post-harvest losses and maintain product quality [39]. Third, they advocated for adopting digital solutions for record-keeping, tracking, and traceability to ensure transparency and accountability throughout the supply chain [40].

A recent assessment of cold chain growth indicates that “even in many regions or sites where adequate infrastructure is available, overall knowledge of proper cold chain practices, maintenance (including the availability of spare parts), and applications is weak in most of the developing world, and it is generally worse in facilities owned or operated by government than in facilities owned or operated privately” [41].

According to [42], “There has been reasonable growth in cold chain infrastructure in all [developing countries] there is still major room for growth and many great efforts to improve capacity training to form better technicians and to improve applications.” The cold chain technology sector needs to expand its capacity-building initiatives. the provision of mentorship for young scientists and extension workers beyond formal training programs [35].

Furthermore, ongoing formative evaluation to enhance programs is required to guarantee that capacity-building initiatives continue to satisfy the needs of target audiences, as training and capacity-building demands will vary over time as changes take place in cold chains and agricultural value chains [43]. Countries that can provide an environment in which prices provide stable and credible long-run incentives are most likely to succeed as exporters in this sector. But, in addition, countries that are learning to convert their natural comparative advantage in beef production into export success must make investments in human capital at a variety of levels to ensure quality control in production [35].

CONCLUSION AND RECOMMENDATION

Livestock products are the second major foreign exchange source, accounting for 12-17% of total foreign exchange earning of Ethiopia. Ethiopia’s comparative advantage in export of meat lies in the large livestock population and geographical location in order to meet the demands of

the very large animal and animal product importers in the Middle East and North Africa (MENA) region. These opportunities were because of growth demand, diverse livestock and quality assurance of the country. However, the meat market remains small in volume and earning when compared to the country’s resource potential and above-mentioned due to many challenges such as lack of infrastructure, competition, regulatory hurdles. The main challenges faced by producers are shortage of feed, diseases and parasites, drought, shortage of grazing land, market access, veterinary services, and extension services, believed to be constrained by inefficiencies in purchasing, poor animal handling and inadequate facilities at the abattoir and export level. Strategies of success such as market research, capacity building and investing in infrastructure will be overcame the challenges.

Based on the above conclusion the following recommendations are forwarded

- Should be increase the meat marketing in the global as well as local markets both in quantity and quality.
- Should be introducing well equipped and technologically advanced meat processing and exporting firms at the central level and establishing their suppliers (abattoir/ slaughter house) of fresh meat at each potential supply areas in the country.

LISTS OF ABBREVIATION

UAE: United Arab Emirates; KSA: Kingdom of Saudi Arab; USAID: United States Agency for International Development; GDP: Gross Domestic Product; SPS: Phytosanitary Standards; LMM: Livestock and Meat Marketing; HACCP: The Hazard Analysis Critical Control Point; MT: Metric Ton; QMS: Quality Management System; FSMS: Food Safety Management System; GTP: Generalized Trade Preferences; ISO: International Organization For Standardization; US: United State, EU: European Union; WHO: World Health Organization; FAO: Food And Agriculture Organization; TECs: Technical Barriers To Trade, CP: Crude Protein; PDM: Partial Dry Matter.

DECLARATION

Ethics approval and Consent to participate

Not applicable

Consent for publication

Not applicable

Availability of data and materials

All the datasets generated or analyzed during this study are included in this manuscript.

Competing interests

All authors have nothing to disclose in this work.

Funding

The current study was not funded by any institution.

Authors' contributions

All authors contributed to data collection, study design, data interpretation, reference search, manuscript writing, and editing, and all authors have approved the submission of the final manuscript.

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