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**What are the Factors Affecting Livestock Productivity and Marketing in
Somaliland?**

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Abstract

The livestock sector is the backbone of the Somaliland economy, accounting for 60-65% of GDP and employing about 70% of the population. However, its productivity is lower than that of other livestock-abundant countries, and it has not been successful in penetrating overseas markets. Therefore, this research aimed to identify factors that affect livestock productivity and marketing in Somaliland.

The study had the following three objectives: to assess the current livestock production practices and challenges involved, to identify the status of the quarantines and slaughterhouse's capacity, and to identify the current situation of livestock markets and transportation facilities. The study used a mixed-methods approach, combining both quantitative and qualitative data collection and analysis techniques. Questionnaires and interviews were used to gather data from a purposefully selected group of 84 participants.

This study found that Somaliland's livestock production system is extensive and that livestock producers face a number of challenges, including recurrent droughts, water shortages, lack of locally produced livestock feed, absence of genetically improved livestock, lack of government support, and inadequate veterinary health services in rural areas. Moreover, the study identified that Somaliland exports livestock to eight Arab countries: Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, the United Arab Emirates, Yemen, and Egypt. However, exports are irregular and vary from month to month due to several factors, including Saudi Arabia's repeated bans on livestock imports from Somaliland. In addition, this study discovered that livestock marketing in Somaliland is hampered by a number of challenges, including a lack of sufficient asphalt roads and suitable tracks for transporting livestock from production sites to markets and seaports, as well as high transportation costs.

The study also discovered numerous obstacles encountering the livestock meat processing industry such as lack of foreign markets, inadequacy of capital investment, and foreign consumers' lower trust in Somaliland meat. Regarding the status of the quarantines and slaughterhouses' capacity, the study found that livestock quarantine facilities in Berbera are well-equipped and follow all best practices. However, their location is a disadvantage due to the extreme weather conditions, which can harm livestock or make them more susceptible to diseases. Somaliland slaughterhouses are still in their early stages of development and face several challenges in exporting chilled meat to foreign markets, including incomplete infrastructure and lack of access to these markets.

Based on the above findings, the study recommends that the Somaliland government should develop and implement policies that encourage livestock producers to adopt intensive livestock-rearing systems in order to increase livestock productivity. The study also recommends that the government invest in building large dams and drilling boreholes in areas with a lot of livestock, in order to improve the country's water infrastructure. What is more, this suggests that the government start selective breeding programs to maximize the milk and meat production of the indigenous livestock. To reduce the risk of livestock dying from starvation during droughts, this study recommends that the government build more livestock-holding grounds where livestock can be kept and fed. Several other recommendations are written in the recommendation section of this study.

1. Introduction

1.1 An Overview of the Somaliland Livestock Industry and Its Challenges

In Somaliland, many people depend on livestock for their livelihood, so the sector is a significant factor in achieving food security and improving the citizens' nutrition (Somaliland Ministry of Livestock and Fishery Development {MoLFD},2023). Moreover, the sector generates a noteworthy amount of foreign currency through the export of live animals and their products as it accounts for 85 % of the country's exports (MoLFD,2023).

The ministry also stated that the sector's share in the GDP is about 60-65 % and that about 70 % of the Somaliland people are employed in this sector. Sheep and goats are the most commonly exported ones, constituting 92 % of animal exports (Ministry of Finance Development {MoFD},2022). Also, the MoFD pointed out that the livestock export value was \$245,679,087 and \$ 197,769,447 in 2022 and 2019 respectively. Due to the deep-rooted poverty and the prevalent unemployment, that amount of money significantly affects the Somaliland Economy. In order for Somaliland to increase its livestock sector earnings, new foreign markets must be found and the local ones should be supported. Nevertheless, both public and private sectors are able to improve livestock marketing systems because of a lack of financial and technical capacity(MoLFD,2023).

The majority (75%) of the Somaliland livestock live in Sool, Sanaag, and Togdheer regions.

Due to the pastoral livestock production approaches that are exercised in Somaliland, direct livestock products such as milk and meat are not sufficient to satisfy the local demand; therefore, 35, 601,103 kg of powder milk and 23,072,179 kg of fresh milk were imported in 2019-2021, in Somaliland (MoFD,2023). This lower production of livestock resources is also caused by the recurrent droughts that have been facing the country in the last two decades. The droughts affected fodder/feed production, and water availability negatively; as a result, livestock products decreased (MoLFD,2023). Around Hargeisa, several farms produce camel dairy; however, higher feed cost is one of the severe problems facing these farms (MoLFD,2023).

Apart from the above-discussed livestock direct products, the sector produces economically significant by-products such as wool, bones, and tallow. Mtimet et al., (2018) that bones and tallow value chains are not long, use inferior inputs, and produce poor-quality outputs. Moreover, the research stated that the value chains of these by-products are dominated by minority groups, women and youths. The last products of bones and tallow valued chains are trinkets and laundry soap respectively (Mtimet et al., 2018). Mtimet and his coauthors also mentioned that the two value chains haven't managed to capitalize on opportunities existing in the country to grow, for there are several barriers such as the absence of access to capital and investment, unstable raw material supply, and substandard products.

Hides and skin are other livestock by-products that Somaliland exports to other countries in the world. In this regard, MoLFD (2023) mentioned that 653,000 hides and skins were exported to Pakistan, Oman, and Nigeria. The hides and skin industry employs around 1,190 persons, of whom 1,1050 are men (Wanyoike et al.,2018). Besides, this study indicated that hides and skin collectors constitute 77 % of the while other actors (wholesalers and exporters) account for 23 %. The hides and skin industry encounters several challenges such as poor quality hides and skins and a lack of coherent government policy and coordination (Wanyoike et al.,2018).

In addition to the aforementioned livestock species, Somaliland has an infant-growing chicken industry. For instance, in Somaliland, there are effective marginal farmers who own chickens between 300-60,000 heads majority of whom are egg-layers (MoLFD,2023). Four effective poultry farms belonging to the Som-poultry cooperative based in Hargeisa supply an average of 56, 520 eggs each month in Somaliland markets (MoLFD,2023). Egg production levels may vary from month to month; for example, the Som-poultry farms produced 676,080 eggs in 2022, while 694,101 eggs were produced in 2023 (MoLFD,2023).

In Somaliland, there are several challenges facing the livestock industry which hinder investment and growth. These challenges include droughts, shortage of grazing reserves, scarcity in water infrastructure, ineffective marketing systems, lack of fodder production, absence of livestock research centers, and unavailability of credit (MoLFD,2023).

This research will study factors affecting livestock productivity and marketing in Somaliland.

1.2 Livestock Productivity in East Africa

1.2.1 Livestock Productivity Indicators

Livestock productivity can be measured with different indicators of which some are new and some are traditional. For example, Chilonda & Otte (2006) proposed several indicators such as total production, production density, per capita production, production per animal, production per animal, and number of animals. Total production refers to the number of metric tonnes of meat/milk/eggs produced from livestock species slaughtered in the country, regardless of whether they were exogenous or endogenous. Production density means total production divided by agricultural land used presented as kilograms of meat/milk/eggs per square kilometer of agricultural land per year. per capita production denotes the total production divided by the number of people in the country expressed as kilograms of meat per person per year. On the other hand, production per animal stands for total production “divided by the total number of animals of the species in the country expressed as kilograms of meat per animal per year” (Chilonda & Otte (2006, p. NA). Finally, production per animal refers to the total production divided by the number of livestock species slaughtered within the country expressed as kilograms of meat per animal slaughtered per year.

Moreover, Chilonda & Otte (2006) state quantitative methods that can be used to assess the livestock industry’s performance regarding its role in generating foreign exchange. These methods include “Exports, % total production/Imports, % total production”. To identify whether the sector is a net exporter or net importer, this approach exposes and compares the percentage of the country’s livestock products that are exported and the percentage of the country’s livestock products that are imported.

Total Factor Productivity (TFP) is another approach by which one can evaluate livestock productivity (Abed & Acosta, 2018). This approach is used to grasp how efficient livestock are in changing inputs like feed, water, and land into outputs such as meat, milk, and eggs. For instance, Abe & Acosta (2018) used this technique and stated that the average livestock TFP productivity was 1.014 between 1993 and 2013 in Africa while that of Somalia was 1.103. The greater the index the higher the efficiency in the livestock sector, so Somalia’s livestock sector efficiency was slightly better than Africa’s general TFP (1.014). In Sub-Saharan African countries, the non-ruminant TFP growth rate (0.80%) was higher than that of ruminants (0.59%) (Ludena et al., 2014).

1.2.2 Camel Milk Productivity

Based on the above-mentioned indicators, this section presents the results of empirical studies focused on livestock productivity mainly in East Africa and some other countries. The Camel, Cattle, and Goat species

were specifically targeted in this section since they are abundant in Somaliland; further, they were compared only in terms of milk production.

Camel is the most valued livestock species among Somaliland people, and it is mainly kept for milk purposes. There are several researchers studied camel milk productivity in East Africa, namely Gebremichael et al. (2019) pointed out that in the Afar region of Ethiopia, the Dromedary camel produces an average of 4.2 liters per day. Besides, these researchers indicated that the farmers sell a liter of camel milk for \$0.90, while middlemen sell it to consumers for \$1.22. On the other hand, Dokata (2014) found that the Dromedary camel produces about 7 liters per day in Kenya. This is a significant difference that might have been caused by factors relevant to feed quantity and quality. There is another noteworthy difference regarding camel milk prices in Kenya and Ethiopia because Isako and Kimindu (2019) reported that in Kenya, a liter of camel milk is sold to consumers for \$0.4.

In Somaliland, camel milk accounts for 50-60% of the entire milk production; moreover, the dromedary camel produces 2.7 liters per day in Somaliland (SomalilandBIZ, 2023). This shows that a dromedary camel produces less milk in Somaliland than in Ethiopia and Kenya. The price of one liter of camel milk ranges from \$ 0.6 to \$ 1.8 depending on the season and milk supply.

1.2.3 Cattle Milk Productivity

Cattle are a type of livestock that produce a lot of milk. Mudavadi (2020) stated that in East Africa, endogenous cow's average milk production ranges from 850-3150 kg/ per 305 days. However, in northern Kenya, on average cow produces 6.70 Kg of milk. However, in addition, Exotic breed crosses had a higher average of milk per day (6.80 kg) than the indigenous breeds (4.90 kg) (Muraya, 2018). Similarly, Muluye et al. (2017) pointed out that cows with 25% exotic blood level produce 13.6 liters per day (4,135.8 liters per 305 days), while cows with 50% exotic blood level produce 22.1 liters per day or 6,740.5 liters per 305 days. On the other hand, those with 75% exotic blood level produce 26.5 liters per day which is equal to 8,082.5 liters per 305 days. This indicates that genetically modified cows are extremely productive compared to the African indigenous breeds. Ayalew (2018) argued that cattle performance is very poor in Ethiopia due to the fact that 98% of the cattle breeds are indigenous. Therefore, this shows a need to opt for hybrid and exotic breeds. In Somaliland, cattle milk production constitutes 30-40% of the total milk production in the country, indicating that its role is significant (SomalilandBIZ, 2023). In addition, indigenous cattle produce 500-600 kg of milk per lactation when semi-intensive regimes are used, indigenous cattle in pastoral zones produce 200-250 kg per lactation, while hybrid breed cattle produce 1,500-1,800 kg per lactation. This fact shows that like other East African countries, Somaliland needs to encourage cattle cross-breeding.

1.2.4 Goat Milk Productivity

Goats and sheep milk contribute 10% of the Somaliland's milk production (SomalilandBIZ, 2023). The goat population in sub-Saharan Africa is about 141,945,838 head, and only 17.81 % of this number is kept for milk purposes (Kahi & Wasike (2019). In addition, the researchers mentioned that 1,659,116 tonnes of milk was produced in East Africa in 2017. This is a huge milk production in the harsh climate of East Africa. Ruvuga & Maleko(2023 claimed that Saanen, Alpine, and Toggenburg goats produce 1.6 liters of milk per day which is higher than that of other goat species such as Anglo-Nubian and Norwegian landrace. Aplocina and Spruzs (2009) stated that goats fed with pea seeds produce 2.8 liters of milk per day, while Galega seeds-fed goats produce 3.3 liters per day. However, Kagucia et al. (2020) reported a daily milk production of 1.3 liters per day in the Thika Region of Kenya. Conversely, Mestawet (2012) found that Somali goats produce only 0.85 kg of milk per day. However, the Somali goat breed can

produce an average mil of 1 liter per day. Finally, In East Africa, goat milk productivity is determined by several factors including feed and breed types.

1.2.5 Factors affecting Livestock milk productivity

In general, there are several challenges encountered by livestock in East Africa that influence productivity. For instance, Ayele et al . (2021) indicated that in western Ethiopia, irregular feed supply hindered livestock productivity. Similarly, Sudan's livestock milk production cannot satisfy the local demand due to a lack of sufficient investment and supportive government policies (Wilson, 2018). Adegoke & Abioye (2015) reported a shortage of water, inadequate feed with poor quality, and the high cost of veterinary services and drugs restrict livestock productivity in Burkina Faso. In the Somali region of Ethiopia, challenges such as shortage of feed, water scarcity, droughts, diseases, and lack of capital investment jeopardize livestock productivity Zewdie (2016). In Somaliland, there is no significant number of studies on livestock productivity and its determinant factors. However, all aforementioned challenges facing other East African countries are encountering the country's livestock industry too.

1.3 Objectives

1.3.1 General objective

The purpose of this study is to identify factors affecting livestock productivity and marketing in Somaliland

1.3.2 Specific objectives

The study tries to achieve the following specific objectives:

- i. To ascertain the current livestock production practices and challenges that exist in Somaliland
- ii. To discover the status of the quarantines and slaughterhouse's capacity and functionality in Somaliland
- iii. To identify the current situation of livestock markets and transportation facilities in Somaliland

2. Research Methodology

This is mixed research that applied both the qualitative and quantitative research approaches to achieve its objectives. The reason for using a mixed research method was to ensure the validity of the study's results. In this regard, both qualitative and quantitative were collected, and then thematic and statistical data analysis methods were used.

The target population of this study included all private and public stakeholders of the livestock sector; however, the was collected only from experts based at the MoLFD, and veterinarians that work at the research centers and universities. The purposive sampling method was employed, so the participants were selected based on their experience and knowledge of this research area.

Since this was a mixed research design questionnaire and interview data collection methods were used. The quantitative data were collected from 79 respondents with a questionnaire, while an in-depth interview was used to collect the qualitative data from a group of five participants working at universities, MoLFD, Quarantines, and holding-grounds. When it comes to data analysis, the quantitative data was analyzed with statistical data analysis methods like frequency, percentages, measures of central tendency, and measures of dispersion. Moreover, the thematic data analysis method was employed in analyzing the qualitative data.

To assess the validity of the data collection tools, a panel of experts containing four members was assigned to evaluate both the face and content validity of the survey questions.

3. Findings

3.1 Introduction

This section presents this study's findings, containing demographic information, dominant livestock production systems existing in Somaliland, and involved challenges, livestock marketing and challenges involved, and capacity of quarantines and slaughterhouses.

3.2 Demographic Information

Table 3-1 demographic information of the respondent

Demographic profile	Frequency	Percent	Cumulative percent
Gender			
Male	60	75.9	75.9
Female	18	24.1	100
Total	78	100.0	
Age			
18-24	4	5.1	5.1
25-34	60	76.9	82.1
35-44	10	12.8	94.9
45-54	3	3.8	100
55-64	1	1.3	
Total	78	100	
Education			
Bachelor's degree	49	62.8	62.8
Master's degree	28	35.9	98.7
PhD	1	1.3	100
Total	78	100	
Marital Status			
Single	36	46.2	46.2
Married	40	51.3	97.4
Separated	1	1.3	98.7
Divorced	1	1.3	100
Total	78	100	
Residence areas			
Togdher	36	46.2	46.2
Marodijeh	29	37.2	83.3
Sahil	11	14.1	97.4
Sol	1	1.3	98.7
Sanag	1	1.3	100
Total	78	100	

Source: primary data 2023

The 3-1 shows that 75.9 % of the respondents were male, while 24.1 % were female. Regarding the age of the respondents, 5.1 % were aged 18 to 24, the vast majority (76.9 %) were from 25 to 34, and 12.8 % were in the 35 to 44 age range. The remaining 4.1 % were between 45 and 64 years old. Moreover, most of the respondents (62.8%) had a bachelor's degree while 35.9% had a master's degree. smallest group of respondents (1.3%) had a PhD. When it comes to marital status, most people (51.3%) reported being married, 6.2% were single, and 42.6% indicated that they were either separated or divorced. In terms of the residence area, most of the respondents (46.2%) live in Togdher, followed by Marodijeh (37.2%) and Sahil (14.1%). A small percentage of respondents (2.%) live in Sool and Sahil.

3.3 Dominant Livestock Production Systems and the Difficulties Involved

3.3.1 Dominant Livestock Production Systems

Table 3-2 livestock production systems practiced in Somaliland

What kind of livestock production systems are practiced in Somaliland?	Frequency	Percentage of cases
Extensive system	69	92.0
Intensive production system	12	16.0
Semi-intensive	6	8.0

The Respondents were asked to mention the livestock production systems that were practiced in their districts.

In this regard, 92.0 % stated an extensive system, 16 % mentioned an intensive system, and 8 % pointed out that they semi-intensive system was practiced in their area as shown

in Table 3-2. Similarly, most of the interviewees interviewed stated that extensive livestock rearing is practiced in Somaliland. The below statements are quotes taken from some of the interviews.

A said *"Although Somali herders and farmers commonly practice free-range system (extensive system), there is a semi-intensive practice adopted by some camel farmers established around the large cities in recent years".* "The current livestock rearing practices are commonly nomadic pastoralists except view camel herders where camel freely grass in the wet season and confined during harsh periods" Interviewee B *"Our community rear their livestock in a traditional manner Where there is no sufficient input"* Interviewee C

3.3.2 Challenges hindering livestock production

Table 3-3 challenges hindering livestock production

What are the challenges hindering Livestock production?	Frequency	Percentage of cases	Rank
Knowledge gap	49	63.6	2
Lack of local livestock feed production	53	68.8	1
Shortage of water	36	46.8	5
Lack of genetically improved livestock	39	50.6	4
Lack of government support	43	55.8	3

As Table 3-3 indicates respondents were asked to mention challenges hindering livestock production in Somaliland. The largest group, 68.8 %, of the respondents stated a lack of locally produced feed, followed by those who mentioned a knowledge gap and lack of government support (63.6 % & and 55.8 % respectively). Moreover, 50.6 % pointed out the lack of genetically improved

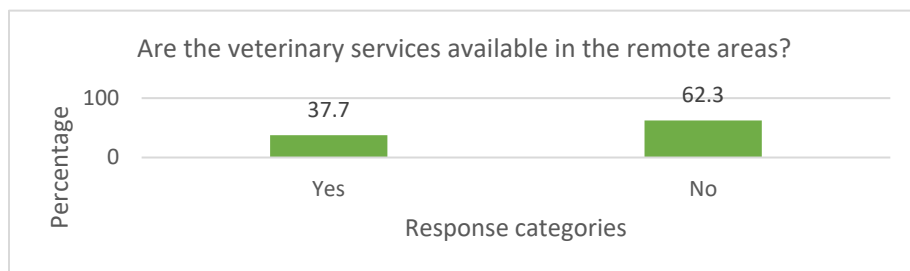
livestock, while 46.8 % of the respondents considered the shortage of water as a challenge facing livestock producers. Based on the % of the respondents who stated each challenge, the table also presents the ranks and the severity of these challenges. The above findings are incongruent with the results obtained from the interviews as can be seen from the below quotes.

"There is an increased drought due to the climate changes, the major problem is the lack of feed industry because livestock farmers and herds cannot handle both animals keeping and feed production simultaneously" Interview A *"Honestly, the biggest challenge is that traditional livestock rearing is facing climate change, the frequency of the drought is increased, apart from that there is no sufficient water, lastly, the indigenous breed seems to have lower performance"* Interview C. *"Here are the challenges confronting the way we rear livestock: In sufficient feed, recurrent droughts, disease outbreaks"* Interviewer D

Sources 2022

3.3.3 Availability of the Veterinary Services in the remote areas.

Figure 3-1: Availability of the Veterinary Services in the remote areas.



According to Figure 3-1, 37.7 % of the respondents stated that veterinary health services are available in the remote areas of their regions while the majority (62.3 %) reported that vet services are not available in the

remote areas. This indicates that livestock health services are either unavailable or inadequate in the areas far from the cities. The following quote from the interviews also indicates that there are poor health services.

"Feed and water as well as poor management and lack of health services" Interview B

3.3.4 Veterinary Services provided by the government

Table 3-4 Veterinary services provided the Somaliland government

What kind of Veterinary health services does the government provide?	Frequency	Percentage of cases
Annual treatment campaigns	30	40.0
Annual vaccination campaigns	18	24.0
Continuous treatment and disease surveillance	18	24.0
Immediate response to disease outbreaks	9	12.0

The respondents were asked to point out the types of livestock health services that the Somaliland government provides livestock producers in their districts. As Table 3-4 shows 40 % of the respondents mentioned annual treatment

campaigns, and equal percentages, 24 % and 24 %, stated Annual vaccination campaigns and continuous treatment and disease surveillance, while 12 % reported that immediate response to disease outbreaks was a service provided by the government. This information signifies that the most important veterinary services like continuous treatment and disease surveillance are not common in Somaliland.

3.4 Livestock Marketing and Challenges Involved

3.4.1 Middle persons within the livestock supply chain

Table 3-5 the number of middle persons in the livestock supply chain

Demographic profile	Frequency	Percent	Cumulative percent
Middle-persons in the livestock supply chain, from the producers to export/consumers			
1-3	13	16.9	16.9
3-5	16	20.8	37.7
5-7	8	10.4	48.1
7-9	6	7.8	55.8
More than 9	34	44.2	100
Total	77	100	

As indicated by Table 3-5, the largest group (44.2 %) of the participants in the survey indicated that more than 9 middle persons are involved in the livestock supply chain from producers to consumers, but the second largest group, 20.8 %, claimed that the middle persons are 3-5 in number, followed by

those who said that 3-5 middle persons are engaged in the supply chain (16.9 %). The two smallest groups (10.4 % and 7.8 %) mentioned 5-7 persons and 7-9 persons respectively. However, evidence from the qualitative data collected indicated that the number of middle persons is 2.

When it comes to livestock that is exported, there are two businesspeople within the supply chain between consumers and producers, the first businessperson buys livestock from herders either in the rural areas or at the livestock markets in the big cities and then sells them to other traders who will export" Interviewee D "Regarding locally consumed livestock, there is one business person(faashle) who buys animals from the herders at the big cities then Faashle sells livestock to either restaurant or to butchers who sell meat to consumers" Interviewee F. With regard to livestock that is processed by slaughterhouses, there are three middle people involved in the supply chain in Somaliland, for example, herders sell their livestock to traders who fatten up livestock and then sell them to slaughterhouses, then slaughterhouses process meat and sell it to foreign companies who sell in the foreign market" Interview F.

Table 3-6 function of the middle person's within the livestock supply chain

What are the functions of the middle person in the livestock supply chain?	Frequency	Percentage of cases
Fattening	43	58.9
Export	36	49.3
Processing	35	47.9
Retail/butchering	9	12.3

The respondents were asked to mention the types of business activities done by the people in the supply chain. Thus, Table 3-6 shows that the majority of the respondents (58.9 %) said that fattening is one of the

activities performed by the middle persons in the supply chain, followed by those who said export (49.3 %). The remaining two groups (47.9 % and 12.3 %) pointed out processing and retailing/butchering respectively. Quotes presented in the above section (section 3.4.1) indicate that middle persons involved in the supply chain do butchering, processing, and export activities, so this quantitative information is in line with the qualitative data collected.

3.4.3 Market Information Channels

Table 3-7 Market information channels used by the livestock producers

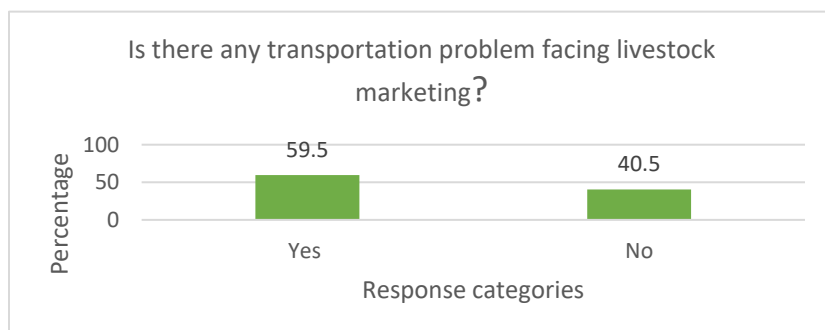
What kind of channels do livestock producers use to get market information?	Frequency	Percentage of cases
Actors in the supply chain	16	21.1
Industry associations	28	36.8
Government agencies	27	35.5
Social media	30	39.5
TV/Radio	6	7.9
Others such as the chamber of commerce and market visits.	72	94.7

The vast majority of the respondents (94.7%) indicated that livestock producers either visit markets or get market-relevant information from the regional chamber of commerce, followed by 39.5 % who stated that livestock producers use social media to get market information. Almost equal proportions (36.8 % and 35.5 %) mentioned industry associations and Government agencies respectively while 21.1 % considered actors in the supply chain as an information channel used by livestock producers. Finally, 7.9 % of the respondents pointed out that TV and Radio are the information channels that livestock producers use. See Table 3-7. However, this statistical data is partially in harmony with what was said by the interviewees as indicated by the following quote.

"In the past, when there was no technology, people brought their livestock to markets without having any market information, but now herders track market conditions through mobile phones, chamber of Commerce also distributes market information" interviewee D

3.4.4 Transportation challenges

Figure 3-2: Transportation challenges faced by the livestock trades and producers.



The participants were asked if they thought that the livestock producers and traders faced transportation problems, and as shown by Figure 3-5, 59.5 % of them stated that there were transportation challenges while 40.5 % mentioned that there were no transportation challenges.

3.4.4 Types of Transportation Challenges

Table 3-8 Types of transportation problems faced by livestock producers and traders

What kind of transportation challenges are encountered in the livestock industry?	Frequency	Percentage of cases
Lack of sufficient asphalt roads	47	65.3
Unsuitable tracks	58	80.6
Long distance between animal markets and production sites	29	40.3
Higher transportation costs	57	79.2

According to a survey, the most common transportation-related challenges facing the livestock industry in Somaliland are unsuitable tracks for transporting livestock (80.6% of respondents), high transportation costs (79.2% of respondents), and a lack of sufficient asphalt roads (65.3% of respondents). In addition, 40.3% of respondents considered long

distances between production sites and livestock markets to be a transportation problem. See Table 3-8. The below quotes from the interviews also indicate that the transportation challenges presented in Table 3-8 exist in Somaliland.

"There are challenges such as poor transportation; for example, there are no suitable vehicles for livestock transportation, and there are no good roads that connect the pastoral community to the livestock market" Interviewee E "The connection system between the market and the herder is not good, especially the transportation system" Interviewee D. There was one slaughterhouse opened in Burao which was closed in 2006 because it used very expensive airline transportation" Interviewee D

3.4.5 Effect of the Transportation Problems

As Table 3-9 shows, the respondents were also asked to tell the potential effects of the abovementioned transportation problems on the livestock. In this regard, 71.8 % claimed that these transportation problems cause a reduction in meat quality, 66.2 % argued that they cause animal death, and 62.0 % stated that these transportation problems cause disease predisposition.

Table3-9 the effect of the transportation problems on the livestock

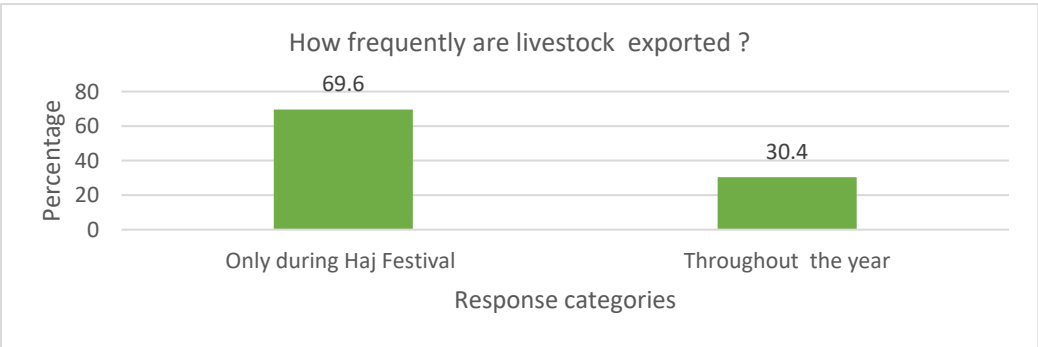
How do the above-mentioned transportation obstacles affect livestock transportation?	Frequency	Percentage of cases
Animal death before reaching the market	47	66.2
Reduction in meat quality	51	71.8
Disease predisposition	44	62.0

The interviews also stressed the effect of the transportation problems on the livestock.

"Due the transportation challenges, the animal may arrive at markets while some may die, and others become injured" Interviewee E "The transportation problems cause death and injury to livestock" Interviewee D

3.4.6 Livestock Export

Figure 3-3: Livestock Export



As can be seen from Figure 3-3, the vast majority of the respondents (69.6 %) argued that Somaliland exports livestock only during the Haj Festival while 30.4 % claimed that

livestock is exported throughout the year. However, as indicated by Figure 3-4, secondary data obtained from the MoLFD indicates that livestock is exported throughout the year. Although the figure shows regular exports in the whole year, the amount of livestock exported fluctuated, with a lower number in January, August, and October than in the other months.

Figure 3-4: Per month Livestock export in 2022



Figure 3-5 illustrates the livestock export data for a 12-year period from 2010 to 2021, and it shows that the export was highest in 2014 and lowest in 2021.

Figure 3-5: Livestock export in the last 12 years.



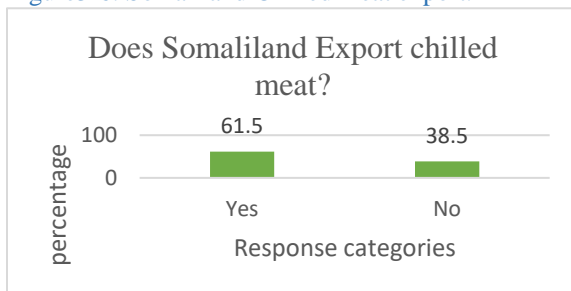
Table 3-10: 1 Livestock exported through country destination in 2022

MONTHS	Oman	Yemen	Bahrain	Dubai	Kuwait	Qatar	Saudi Arabia	Total
January	59,896	7,635	6,139	7,824	911	0	0	82,405
February	94,192	31,377	10,661	7,638	1,842	0	0	145,710
March	92,088	7,738	6,945	3,617	0	0	0	110,388
April	85,387	22,025	10,332	8,429	0	0	38,188	164,361
May	53,510	4,866	7,955	320	0	0	77,741	144,392
June	78,158	63,365	12,624	10,107	9,000	0	508,857	682,111
July	14,228	68,492	0	0	0	0	139,619	222,339
August	36,331	4,062	8,600	0	0	0	3,303	52,296
September	65,063	6,398	0	0	0	0	5,422	76,883
October	58,205	7,779	4,035	0	444	0	3,354	73,817
November	91,522	8,696	0	4,878	0	0	1,485	106,581
December	97,149	8,264	0	4,947	1,028	3,471	26,035	140,894
TOTAL	825,729	240,697	67,291	47,760	13,225	3,471	804,004	2,002,177

Table 3-10 reveals that 825,729 livestock were exported to Oman, the highest number, followed by Saudi Arabia (804,004) and Yemen (240,697). The least number of livestock were sent to Qatar (3,471) and Kuwait (13,225).

3.4.7 Somaliland's Export Chilled Meat

Figure3-6: Somaliland Chilled meat export.



As Figure 4-6 shows, the majority of respondents (61.5 %) said that Somaliland exports chilled meat while 38.5 % stated that chilled meat is not exported

Table 3-11 challenges facing meat processing industries

What are the constraints facing the meat processing industries?	Frequency	Percentage of cases
Lack of foreign markets	42	65.5
Lack of capital investment	21	32.8
Foreign consumers' Lower trust in Somaliland's processed meat	27	42.2
lack of regular livestock supply	27	42.2

The research participants were asked if they knew any challenges facing meat processing industries. Therefore 65.5 % of the participants pointed out that the industry has no foreign markets, 42.2 % said that foreign customers do not have higher trust in Somaliland's chilled meat, and 42.2 % mentioned that there is no regular livestock supply. In addition, 32.8 % stated that meat-processing industries are facing a lack of capital investment. See Table 3-11. The interviewees also supplemented this and stated several challenges facing processing slaughterhouses as presented in the quotes below.

This meat sector is not totally functioning in our country. We do not have a market because we are not a recognized country, so our people did not utilize this sector” Interviewee A “The drought is a big issue when it comes to the meat processing factories because you will lose your market during the drought due to lack of livestock supply” Interviewee D “There are two slaughterhouses, Almanar and Thayib, but there is no market due to that the foreign countries have not trust in our standard of meat processing” Interviewee E

3.5 Quarantines and Slaughterhouses

3.5.1 Slaughterhouses

In Somaliland, there are three slaughterhouses: Thayib slaughterhouse (Burao), Almanar slaughterhouse (Berbera), and Hargeisa slaughterhouse. Of the three slaughterhouses, only Burao’s one is currently working. However, the research team assessed all of the three slaughterhouses by observation method.

Appendix A presents the observation checklist with the results obtained from them; however, this section encompasses a summary of the main findings.

As shown in Table 1 in Appendix A, Hargeisa Slaughterhouse is only 44.4% compliant with the requirements for an ideal slaughterhouse. That means it lacks 55.6% of the facilities needed to be an ideal slaughterhouse. Thus, the Hargeisa Slaughterhouse needs to improve significantly. On the other hand, as Table 2 reveals, Thayib/Burao Slaughterhouse complied with 97.8% of the international criteria for slaughterhouses. Almanars/Berbera slaughterhouse has attained 28.9% of the international standards for slaughterhouses, indicating a considerable features need to enhance it as shown in table 3.

3.5.2 Quarantines

As depicted in table 4 and table 5 in appendix A, two quarantines in Berbera (Saudi-Emirate quarantine & Berbera union quarantine) were evaluated to make sure they could provide high-quality service to livestock that is shipped to other countries. The assessment focused on the following dimensions, which are presented in Table 3-12.

Table: 3-12: Quarantine assessment questions

Table 2.12 quarantine assessment questions

No	Are specific areas exist in Somaliland quarantines	Yes	No
1	Clean and dry for the animal to rest		
2	Do animal caretakers check animals often for signs of disease?		
3	Do you have a separate area to isolate sick animals?		
4	Are new or returning animals separated(quarantined) from all others for a period of time before mixing with your home herd/flock		
5	Is separate feed and water equipment used for new or returning animals?		
6	Health service units		

Both quarantines were effective across all six dimensions, as demonstrated by Tables 3 and 4 in Appendix 1.

3.6 Summary of the main findings

This study had three main objectives: To ascertain the current livestock production practices and challenges that exist in Somaliland, to discover the status of the quarantines and slaughterhouse capacity in Somaliland, and to identify the current situation of livestock markets and transportation facilities in Somaliland. This section summarizes the main findings of the study as per the objectives. In this section, the main discoveries of the research are outlined in accordance with the objectives.

3.6.1 Dominant Livestock Production Systems and the Difficulties Involved

This study identified that an extensive livestock production system is commonly practiced in Somaliland which is less productive compared to intensive and semi-intensive livestock production systems practiced in many parts of the world. In addition, the study discovered that there are several challenges facing Somaliland's livestock production, these factors include recurrent droughts, shortage of water, lack of locally produced livestock feed, absence of genetically improved livestock, nonexistence of government support, and inadequacy of veterinary health services in the rural areas.

3.6.2 Livestock Marketing

Regarding livestock marketing and transportation, this study found that Somaliland exports livestock to the six Gulf Cooperation Council countries (Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and the United Arab Emirates), Yemen, and Egypt. However, the livestock export to these countries is not regular, and the number of animals exported to them varies from month to month for several reasons. For example, Saudi Arabia has banned livestock imports from Somaliland multiple times in the past, most recently in September 2023.

When it comes to transportation, there are several challenges hampering livestock marketing such as lack of sufficient asphalt roads and suitable tracks that can be used in transporting livestock from the production sites to markets and seaports. Moreover, higher transportation cost is one of the obstacles faced in the sector. These transportation problems have several undesirable effects on the livestock such as reduction in meat quality and death.

The study also discovered numerous obstacles encountering the livestock meat processing industry such as lack of foreign markets, inadequacy of capital investment, foreign consumers' lower trust of foreign consumers in Somaliland's processed meat, and lack of regular livestock supply.

3.6.3 Quarantines and Slaughterhouses

The national livestock quarantine facilities in Berbera are well-equipped and follow all best practices, but their location is a disadvantage because the extreme weather conditions in Berbera can harm livestock or make them more susceptible to diseases. Thus, livestock may become sick during transportation and show symptoms when they arrive in foreign markets which could lead to the rejection of the shipment or a ban on all livestock imports from Somaliland. Slaughterhouses or meat-processing factories are in an infant stage, and there are a number of challenges that make

it difficult for them to export chilled meat to foreign markets, such as incomplete infrastructure and lack of access to foreign markets.

3.6 Recommendations

Based on the above findings, this study made the following recommendation:

1. The Somaliland government should develop and implement policies that encourage livestock producers to adopt intensive livestock-rearing systems in order to increase livestock productivity.
2. To reduce the impact of recurrent droughts and encourage livestock herders to adopt intensive rearing systems, the country's water infrastructure must be developed by building large-scale dams and drilling boreholes in regions with abundant livestock.
3. To maximize the milk and meat production of the indigenous livestock, the Somaliland government should start selective breeding programs.
4. To increase the productivity of indigenous livestock breeds, it is important to establish genetic improvement centers where these breeds can be bred with highly productive exotic breeds.
5. To reduce the risk of livestock dying from starvation during droughts, it is important for the Somaliland government to build more livestock-holding grounds where livestock can be kept and fed.
6. The Somaliland government must encourage and prepare a conducive environment for the livestock-feed-producing industries so that intensive livestock production systems can be adapted in the country.
7. The Ministry of Livestock and Fishery Development must extend veterinary health services to remote areas and provide continuous treatment and disease surveillance services.
8. Make it easier for livestock herders to get loans by either creating banks that specialize in lending to herders or by developing credit policies that are tailored to the needs of herders so that they can capitalize on the existing banks.
9. To boost livestock exports and gain access to overseas markets, the Ministry of Livestock, the Ministry of Trade, the Ministry of Finance, and other relevant institutions must work together to make livestock exports a top priority and develop effective marketing strategies.
10. To increase chilled meat export, slaughterhouses must be equipped with all necessary facilities, and the establishment of fattening farms must be encouraged.
11. To reduce the risk of livestock harm or disease due to Berbera's extreme weather conditions, quarantines, and livestock resting places should be relocated outside of the Berbera.
12. The government should ban the use of the current livestock transportation tracks, which are unsuitable for transporting animals, and encourage the importation of livestock-appropriate tracks.
13. Livestock productivity is affected by a wide range of technical, economic, and social issues; therefore, multi-dimensional experimental research which should be conducted.

References

- Abed, R., & Acosta, A. (n.d.). Give to AgEcon Search Assessing livestock total factor productivity: A Malmquist Index approach. In *African Journal of Agricultural and Resource Economics* (Vol. 13).
<http://ageconsearch.umn.edu>
- Aplocina, E., & Spruzs, J. (n.d.). INFLUENCE OF DIFFERENT FEEDSTUFFS ON QUALITY OF GOAT MILK. In *Lucrări Științifice-Seria Zootehnie* (Vol. 57).
- Ayalew, H., Chanie, D., & Lamesegn, D. (n.d.). REVIEW ON PRODUCTIVE AND REPRODUCTIVE PERFORMANCE OF INDIGENOUS DAIRY CATTLE BREEDS UNDER FARMER'S MANAGEMENT PRACTICES IN ETHIOPIA Sheep and Goat Production and Marketing systems, Productivity Improvement Options and Meat Export status and quality in Amhara Region, Ethiopia View project HUSBANDRY PRACTICES OF SHEEP IN HULET EJU ENESIE DISTRICT, EAST GOJJAM ZONE, ETHIOPIA View project.
<https://www.researchgate.net/publication/331382420>
- Ayantunde, A. A., & Amole, T. A. (2016). Improving livestock productivity: Assessment of feed resources and livestock management practices in Sudan-Savanna zones of West Africa. *African Journal of Agricultural Research*, 11(5), 422–440. <https://doi.org/10.5897/ajar2015.10460>
- Chilonda, P., & Otte, J. (n.d.). Indicators to monitor trends in livestock production at national, regional and international levels. In *Livestock Research for Rural Development* (Vol. 18, Issue 8).
<http://faostat.external.fao.org/default.jsp>
- Dawit, M., Asmelash, B., Ameha, N., & Tadesse, Y. (2022). Comparing Begait, Hararghe Highland and Somali Goat Pro-ductivity and Production for Better Utilization, Ethiopia. <https://doi.org/10.37421/2157-7579.2022.13.130>
- Gebremichael, B., Girmay, S., & Gebru, M. (2019). Camel milk production and marketing: Pastoral areas of Afar, Ethiopia. *Pastoralism*, 9(1). <https://doi.org/10.1186/s13570-019-0147-7>
- Kagucia, A. W., Kagira, J. M., Maina, N., Karanja, S. M., & Njonge, F. K. (2020). Characterisation of productivity and diseases affecting dairy goats in smallholder systems of greater thika region, Kenya. *Journal of Agriculture and Rural Development in the Tropics and Subtropics*, 121(2), 243–249.
<https://doi.org/10.17170/kobra-202010191972>
- Kahi, A. K., & Wasike, C. B. (2019). — Special Issue — Dairy goat production in sub-Saharan Africa: Current status, constraints and prospects for research and development. *Asian-Australasian Journal of Animal Sciences*, 32(8), 1266–1274. <https://doi.org/10.5713/ajas.19.0377>
- Kimindu, V. (2019). *Journal of Marketing and Consumer Research* www.iiste.org ISSN. 58.
<https://doi.org/10.7176/JMCR>
- K, Z., G, M., & K, S. (2016). Small Scale Dairy Production System Challenges and Prospects in Fafen Zone, Ethiopian Somali Regional State, Eastern Ethiopia. *Journal of Animal Production Advances*, 6(1), 860.
<https://doi.org/10.5455/japa.20160201120329>
- Ludena, C. E., Hertel, T., Preckel, P., & Foster, K. (2005). Disaggregate Productivity Growth in Livestock Production: A Directional Malmquist Index Approach Development of Green Climate Fund Proposals View project Data Envelopment Analysis View project. <https://www.researchgate.net/publication/23506135>

- Mtimet, N., Mugunieri, L. G., Wanyoike, F., Kiptoo, E., & Gulaid, I. (2018). An assessment of the livestock by-products value chains in Somaliland: The case of bones and tallow. *Pastoralism*, 8(1). <https://doi.org/10.1186/s13570-018-0130-8>
- Mudavadi, O. P., Emmanuel, M. A., Charles, G., Namasake, M. F., & Bernard, L. A. (2020). Effects of Season Variation on Water, Feed, Milk Yield and Reproductive Performance of Dairy Cows in Smallholder Farms in Eastern Africa. *Journal of Agriculture and Ecology Research International*, 1–15. <https://doi.org/10.9734/jaeri/2020/v21i830157>
- Muhamed, D. D., & of Nairobi, U. (n.d.). *FACTORS INFLUENCING CAMEL MILK PRODUCTION IN CENTRAL DIVISION OF ISIOLO DISTRICT: A CASE OF THREE CAMEL MILK WOMEN SELF HELP GROUPS IN ISIOLO COUNTY, KENYA. BY MOHAMED DIBA DOKATA A Research Project Report Submitted in Partial Fulfillment for the Requirements of the Award of the Degree of Masters of Arts in Project Planning and Management of.*
- Muluye, M., Alemayehu, K., & Gizaw, S. (2017). Milk Production Performances of Local and Crossbred Dairy Cows in WestGojam Zone, Amhara Region, Ethiopia. In *Research Articles 36 Journal of Applied Animal Science* (Vol. 10, Issue 1).
- Muraya, J., Vanleeuwen, J. A., Gitau, G. K., & Wichtel, J. J. (n.d.). *Cross-sectional study of productive and reproductive traits of dairy cattle in smallholder farms in Meru, Kenya Evolutionary and transmission dynamics of viral diseases in swine View project Reproductive Performance of the Galla and Toggenburg Goats and their Crosses in Mwingi Sub-county of Kenya View project.* <https://www.researchgate.net/publication/331331715>
- Ruvuga, P. R., & Maleko, D. D. (2023). Dairy goats' management and performance under smallholder farming systems in Eastern Africa: the systematic review and meta-analysis. In *Tropical Animal Health and Production* (Vol. 55, Issue 4). Springer Science and Business Media B.V. <https://doi.org/10.1007/s11250-023-03661-w>
- Wilson, R. T. (2018). Livestock in the Republic of the Sudan: Policies, production, problems and possibilities. *Animal Husbandry, Dairy and Veterinary Science*, 2(3). <https://doi.org/10.15761/ahdvs.1000142>

Appendix A

Table 1: Hargeisa slaughterhouse observation

No	Slaughterhouse observation checklist	Yes *	No *
1	Suspected animal pen	Yes	
2	Livestock slaughtering pen	Yes	
3	Lairange	Yes	
4	Slaughtering hall		No
5	Per-cooling hall		No
6	Packing hall		No
7	Packaging hall		No
8	Cold storage		No
9	Loading hall		No
10	Laboratory		No
11	Skin preparation hall		No
12	Casing preparation hall		No
13	Head and hoof preparation Hall		No
14	Heart and liver preparation hall		No
15	Edible offal Packing Hall:		No
16	Skin store room.		No
17	Waste discharging area	Yes	
18	Waste rendering unit		No
19	Hot water boiler		No
20	Waste treatment system		No
21	Production process		No
22	Edible offal Packing Hall	Yes	

23	Entry and inspection of live animals	Yes	
24	Sanitary Facilities conditions	Yes	
25	Light (natural or artificial)		No
26	Waste disposal		No
27	Wastewater disposal and treatment system		No
28	HACCP system application		No
Site of buildings for slaughtering and processing			
29	Is the slaughterhouse suited away from the residential area		No
30	Is the access for animals assured		No
31	Is there an abundant supply of potable water	Yes	
32	Are there adequate facilities	Yes	
33	Are there adequate facilities for treatment and disposal	Yes	
34	Is the building/facilities constructed that clean and unclean processes and product mix	Yes	
35	Roof(properly sealed with no holes at it	Yes	
36	Walls(smooth and cleaned)	Yes	
37	Is the equipment easily to remove to facilitate cleaning	Yes	
38	Is the equipment made of non-corrosive material	Yes	
39	Is the equipment properly washed, cleaned and stored	Yes	
40	Are they performing all the work needed in a slaughterhouse	Yes	
41	Are they equipped with the process of hygiene personal hygiene, cleaning and disinfection	Yes	
42	Are they active in cleaning before and after the slaughtering process	Yes	
Sanitary facilities			
43	Are the water points, hoses, sterilizers for hand tools etc. and cleaning equipment provided in sufficient numbers		No
44	Are these facilities kept clean and well maintained		No

45	Are there areas for resting/eating for the assurance that personnel's food and carcass can be mixed		No
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*Yes presents a particular required section exists in the slaughterhouse

*No means the a particular required area is absent

*this means 55.6% of the required standards is missing from Hargeisa slaughterhouse as 44.4% of the required standards is equipped with Hargeisa slaughterhouse.

Table 2: Thayib slaughterhouse observation checklist

No	Observation	Yes	No
1	Suspected animal pen	Yes	
2	Livestock slaughtering pen	Yes	
3	Lairange	Yes	
4	Slaughtering hall	Yes	
5	Per-cooling hall	Yes	
6	Packing hall	Yes	
7	Packaging hall	Yes	
8	Cold storage	Yes	
9	Loading hall	Yes	
10	Laboratory	Yes	
11	Skin preparation hall	Yes	
12	Casing preparation hall	Yes	
13	Head and hoof preparation Hall	Yes	

14	Heart and liver preparation hall	Yes	
15	Edible offal Packing Hall:	Yes	
16	Skin store room.	Yes	
17	Waste discharging area	Yes	
18	Waste rendering unit	Yes	
19	Hot water boiler	Yes	
20	Waste treatment system	Yes	
21	Production process	Yes	
22	Edible offal Packing Hall	Yes	
23	Entry and inspection of live animals	Yes	
24	Sanitary Facilities conditions	Yes	
25	Light (natural or artificial)	Yes	
26	Waste disposal	Yes	
27	Wastewater disposal and treatment system	Yes	
28	HACCP system application	Yes	
29	Is the slaughterhouse suited away from the residential area		No
30	Is the access for animals assured	Yes	
31	Is there an abundant supply of potable water	Yes	
32	Are there adequate facilities	Yes	
33	Are there adequate facilities for treatment and disposal	Yes	
34	Is the building/facilities constructed that clean and unclean processes and product mix	Yes	
35	Roof(properly sealed with no holes at it	Yes	
36	Walls(smooth and cleaned)	Yes	
37	Is the equipment easily to remove to facilitate cleaning	Yes	
38	Is the equipment made of non-corrosive material	Yes	

39	Is the equipment properly washed, cleaned and stored	Yes	
40	Are they performing all the work needed in a slaughterhouse	Yes	
41	Are they equipped with the process of hygiene personal hygiene, cleaning and disinfection	Yes	
42	Are they active in cleaning before and after the slaughtering process	Yes	
43	Are the water points, hoses, sterilizers for hand tools etc. and cleaning equipment provided in sufficient numbers	Yes	
44	Are these facilities kept clean and well maintained	Yes	
45	Are there areas for resting/eating for the assurance that personnel's food and carcass can be mixed	Yes	

*Yes stands for the existing the required standards

*No stands for the absence of required standards

This means 97.8% of the required standards exists in Thayib slaughterhouse, as only 2.2% is absent

Table 3: Almanar slaughterhouse evaluation

No	Observation checklist	Yes	No
1	Suspected animal pen		No
2	Livestock slaughtering pen		No
3	Lairange	Yes	
4	Slaughtering hall		No
5	Per-cooling hall		No

6	Packing hall		No
7	Packaging hall		No
8	Cold storage		No
9	Loading hall	Yes	
10	Laboratory		No
11	Skin preparation hall		No
12	Casing preparation hall		No
13	Head and hoof preparation Hall		No
14	Heart and liver preparation hall		No
15	Edible offal Packing Hall:		No
16	Skin store room.	Yes	
17	Waste discharging area	Yes	
18	Waste rendering unit	Yes	
19	Hot water boiler	Yes	
20	Waste treatment system	Yes	
21	Production process		No
22	Edible offal Packing Hall		No
23	Entry and inspection of live animals		No
24	Sanitary Facilities conditions	Yes	
25	Light (natural or artificial)	Yes	
26	Waste disposal	Yes	
27	Wastewater disposal and treatment system	Yes	
28	HACCP system application		No
Site of buildings for slaughtering and processing			
29	Is the slaughterhouse suited away from the residential area		No
30	Is the access for animals assured		No

31	Is there an abundant supply of potable water		No
32	Are there adequate facilities		No
33	Are there adequate facilities for treatment and disposal		No
34	Is the building/facilities constructed that clean and unclean processes and product mix		No
35	Roof(properly sealed with no holes at it		No
36	Walls(smooth and cleaned)		No
37	Is the equipment easily to remove to facilitate cleaning		No
38	Is the equipment made of non-corrosive material		No
39	Is the equipment properly washed, cleaned and stored	Yes	
40	Are they performing all the work needed in a slaughterhouse		No
41	Are they equipped with the process of hygiene personal hygiene, cleaning and disinfection		No
42	Are they active in cleaning before and after the slaughtering process		No
Sanitary facilities			
43	Are the water points, hoses, sterilizers for hand tools etc. and cleaning equipment provided in sufficient numbers	Yes	
44	Are these facilities kept clean and well maintained		No
45	Are there areas for resting/eating for the assurance that personnel's food and carcass can be mixed		No

*Yes stands of the presence of the required standards

*No stands of the absence of the required standards

This means that 28.9% of the required standards while 71.1% is absent

Table 4: Union quarantine infrastructure

No	Are specific areas exist in Somaliland quarantines	Yes	No
1	Clean and dry for animal to rest	Yes	
2	Do animal caretakers check animals often for signs or disease	Yes	
3	Do you have a separate area to isolate sick animals	Yes	
4	Are new or returning animals separated(quarantined) from all other for a period of time before mixing with your home herd/flock	Yes	
5	Is separate feed and water equipment used for new or returning animals	Yes	
6	Health service units	Yes	

*Yes stands for the existences of the required infrastructure

*No stands for the absence of the required standards

This shows that all required features are equipped with Berbera Union quarantine

Table 5: Saudi/emirate quarantine

No	Are specific areas exist in Somaliland quarantines	Yes	No
1	Clean and dry for animal to rest	Yes	
2	Do animal caretakers check animals often for signs or disease	Yes	
3	Do you have a separate area to isolate sick animals	Yes	
4	Are new or returning animals separated(quarantined) from all other for a period of time before mixing with your home herd/flock	Yes	
5	Is separate feed and water equipment used for new or returning animals	Yes	
6	Health service units	Yes	

*Yes stands for presence of the required structures

*No stands for the absence of the required structures

This means the Saudi/Emirate quarantine is equipped with all required