
Informal Cross-Border Trade Future Outlooks in Ethiopia: The Case of Live Animal Export

Rehima Mussema Hassen

Agricultural Economics Research, Ethiopian Institute of Agricultural Research, Addis Ababa, Ethiopia

Email address:

rehimamussema@gmail.com

To cite this article:

Rehima Mussema Hassen. (2024). Future Export Outlooks of Informal Cross-Border Trade in Ethiopia: The Case of Live Animal. *International Journal of Business and Economics Research*, 13(1), 1-12. <https://doi.org/10.11648/ijber.20241301.11>

Received: January 13, 2024; **Accepted:** January 30, 2024; **Published:** February 5, 2024

Abstract: Cross-border trade (CBT) has existed for centuries and plays an important economic, political, and social role for pastoralists, and it serves as a source of employment for most population in most African countries. The CBT has strong historical ties between Ethiopia and its neighboring countries that offer significant opportunities for economic development. The CBT contains formal CBT and informal cross-border trade (ICBT). The ICBT's contribution is estimated at 43% of the official GDP, over half of the population employment, and providing income to 43% of Africans in border areas. The formal livestock and its product export accounted for few percent of the total export compared with other agricultural output: coffee, Chat, oil crops, and pules in 2021/22, however ICBT for livestock takes place that not included in the national account, and different studies have been done on livestock ICBT so far, but most of them are not comprehensive, concentrate on specific border regions, and have limited outlook research. The purpose of the study was to examine the state and prospects of Ethiopia's livestock ICBT. The study made a literature review, used data from National Bank of Ethiopia, Ethiopian Custom Commission, and Eastern African Quarterly Bulletin, and made FGDs, KIIs. The Naive, Linear Trend, and Simple Moving Average methods are used for quantitative analysis. The best model selected using MAD, MSE, and MAPE smallest error values. The study found formal live animal export showed a decreasing trend, while ICBT took place in border areas. The ECC seized 28,410 livestock and 455 donkeys attempted to smuggle to neighboring countries; Somalia was the highest expected livestock destination. The seized livestock decreased due to traders' different strategies led to cross more animals. Ethiopia's informal livestock exports accounted for 86% of the East African regions to Middle Eastern countries through Somalia; therefore, the ICBT is heavily concentrated during the annual Ramadan and Hajj seasons; therefore, ICBT integrated with Somalia ICBT and formal Saudi Arabia markets. If the Government does not take any action, the formal live animal export will never increase until 2026/27, and held livestock will reduce in ICBT for the coming five years. The ICBT for livestock to Somalia will continue and follow seasonal variations for Ramadan and Haj festivities. Therefore, policymakers should formalize ICBT by easing the formal marketing system, establishing alternative markets and facilities, revising policies, automating border trade systems, community sensitization campaigns, etc. may be the solution.

Keywords: Ethiopia, ICBT, Livestock, Jigjiga, Future Outlooks

1. Introduction

1.1. Background

Cross-border trade (CBT) has existed for centuries and plays an important economic, political, and social role for pastoralists in Africa. It is a source of income and employment for a large number of people in border areas and it is known to play an important role in poverty eradication. The evidence indicates that it is a means of a source of

employment for 75% of the population in most African countries [18]. The CBT has strong historical ties between Ethiopia and its neighboring countries that offer significant opportunities for economic development [27].

Most CBT takes place at border towns or border posts, often taken place by registered and unregistered traders, that contains formal CBT and informal cross-border trade. Formal CBT is international trade in goods and services that is registered in national statistics. The ICBT refers to the trade of goods and services illegally imported/exported, directly or

indirectly escaping the regulations and procedures that are, set by a government. Items in ICBT are usually not registered in national statistics. The ICBT's contribution is estimated at 43% of the official GDP, over half of the population employment, and providing income to 43% of Africans in border areas [2, 3, 19].

The ICBT comprises both agricultural and non-agricultural products. Livestock export allows, predominantly pastoralists in Ethiopia, to get income, and have access to employment, and basic consumer goods. Agricultural ICBT is defined as the informal movement of livestock and other agricultural commodities at border towns or points in the countries. ICBT transactions are particularly strong in Ethiopia where ethnic or kinship ties with Oromo, Somali, and Nuer peoples live in Kenya, Somalia, and South Sudan, respectively. These relations play a key role in regulating and facilitating CBT activities, managing conflict, securing transactions, and contributing to regional relations, and economic integration in border areas [33, 10] therefore for pastoralists' border areas, cross-border trade, most is informal, plays a significant economic, political, and social role. The [13, 33] report indicated that informal trade is more important than formal trade along the Somaliland border with Ethiopia, with an estimated value between US\$200–300 million, which is four to five times the formal trade.

Despite Ethiopia ranking first in livestock population in Africa, the [24] report indicated that the revenue from the formal export of live animals and livestock products (meat, and leather and leather product) was 4.2% of the total export earnings in 2021/22; which is the lowest compared to coffee accounted for 34.9%, Chat (11.1%), oil crops (6.5%), and pulses (5.3%).

Despite its socio-economic contribution, ICBT is not included in the national account and it is invisible due to limited assessments of the ICBT of livestock contribution to the overall national economic activities. Many studies have been done on livestock ICBT so far, but most of them are not comprehensive, concentrate on specific border regions, and outdated, and have limited outlook research. For these reasons, this study aims to know the past and current status and forecaster informal and formal livestock export that is critical to adjusting, improving, or establishing new working modalities for Ethiopian ICBT of livestock.

1.2. Objectives

General objective: To analyze the status, and future outlooks of ICBT of livestock and provide socio-economic information to stakeholders and policymakers to maximize the potential economic contribution of ICBT and improve formal livestock CBT.

Specific objectives:

- 1) To identify the status and trend of formal and informal livestock export,
- 2) To identify the opportunities, challenges, and driving factors of ICBT, and
- 3) To provide future outlooks of volume and value of outflow of livestock.

1.3. Methodology

1.3.1. Data Source

The study used data from FAOSTAT, the Ethiopian Revenue and Custom Authority/ Ethiopian Custom Commission (ERCA/ ECC), the National Bank of Ethiopia [27], and [23] ICBT livestock export. Supplementary data was also collected through focus group discussions (FGDs) and key informant interviews (KIIs) with experts from intelligence and Contraband Prevention Process Coordinators in customs offices from Bahir Dar, Gambela, Jigjiga, Togo Wuchal, Harsheek, Jima, and Assosa. KII also conducted with the MoT, and livestock marketing research in Jigjiga.

1.3.2. Study Locations

The study focused on all the cross-border routes from Ethiopia to neighboring countries including, Eastern, Northwestern, Eastern, and Southern Ethiopia (Figure 1).

1.3.3. Methods of Data Analysis

To address the objectives of the study, a combination of descriptive and quantitative analysis methods was used. The descriptive statistics include mean, percentage, and graphical tools used to describe the characteristics, status, and trends of ICBT of livestock in Ethiopia. The quantitative models are used for time series forecasting. An ARIMA model is one of the best techniques for predicting the level of any time series data with any pattern of change and is suitable for at least 50 observations [24, 26, 29, 9]. Therefore, based on the available data, the study used a combination of the following models:

Empirical Econometric models

- 1) The Naive Methods

$$F_{t+1} = Y_t$$

where F is the forecast and Y is the observed value. The subscript t is an index for the time. The current period is t + 1.

- 2) Linear Trend Projections

The trend model simply extrapolates the historical trend line into the future to make the forecast. The basic model is as follows:

$$F = a + b_t$$

Where t represents the values on the horizontal axis (time), and Y represents the values on the vertical axis (production, consumption, demand, export, etc)

- 3) Simple Moving-Average

The general formula for a moving-average forecast is as follows:

$$F_{t+1} = (Y_{t-1} + Y_{t-2} \dots + Y_{t-n+1}) / n$$

Where F_{t+1} = the forecast value for the next period, Y_t = the actual value at period t, n = the number of terms in the moving average.

- 4) Weighted Moving Average Method

$$F_{t+1} = (w_1 D_{t-1}) + (w_2 D_{t-2}) + (w_n D_{t-n})$$

Where F_{t+1} is the forecast for the coming period, t is the current period, n is the total number of periods in the forecast, D is the actual occurrence for the period $t-i$, and w is the weight to be given to the actual occurrence for the period $t-i$. The sum of the weighting should add up to 1 (or 100%) which ranges from 0 to 1.

5) Exponential Smoothing (ES)

$$F_t = F_{t-1} + \rho(Y_{t-1} - F_{t-1})$$

Where: F_t = The exponentially smoothed forecast for period t , F_{t-1} = The exponentially smoothed forecast made for the prior period, Y_{t-1} = the actual value at period t , ρ = The desired response rate, or smoothing constant/a smoothing coefficient that its value falls between 0 and 1.

Evaluating the forecast accuracy: Accuracy is the criterion that determines the best forecasting method with minimized error. Some of the common indicators used to evaluate accuracy are mean forecast error (MSE), mean absolute deviation (MAD), and mean absolute percentage error

(MAPE). So, the study compared the accuracy of the five forecasting methods mentioned above.

6) Mean Absolute Deviation, MAD

i. Mean sum of error (MSE) = the average of the squared errors

$$MSE = \sum_{t=1}^n \frac{(E_t)^2}{n} = MSE = \frac{\sum (\text{Actual} - \text{forecast})^2}{n}$$

Where MSE estimates the variance of the forecast error, n is the number of observations

ii. MAD clarifies the average of the absolute deviation over all periods and is given by:

$$MAD = \sum_{t=1}^n \frac{|E_t|}{n} \text{ or } MAD = \frac{\sum \text{Absolute variance}}{\text{Number of observations}}$$

iii. $MAPE = \frac{1}{n} \sum_{t=1}^n \frac{|E_t|}{D_t}$ or $MAPE = (\text{Absolute Value} (\text{Actual} - \text{Forecast}) / \text{Actual}) \times 100$



Source: MAS-FSNWG 2023

Figure 1. The ICBT routes.

2. Results and Discussion

2.1. Overview of Informal Cross Border Trade (ICBT) in Ethiopia

Most trade involves agricultural products such as livestock, crops, and livestock products (milk, hide, and skin) in the border areas of Ethiopia. ICBT is not a new phenomenon in Ethiopia; it has more importance for economic integration than formal trade because most traders operate informally [12]. Even if the difficulty was there to get the real figure, several studies provide statistical evaluation and estimations of ICBT; and conclude that its value is quite large as compared with formal trade in Ethiopia.

Ethiopia’s formal live animal export consists of cattle, sheep, goats, and camels, mainly sourced from pastoral areas [14]. About 90% of animals for the official export are coming from pastoral and agro-pastoral production systems in Ethiopia [11]. Ethiopia is first in Africa and the 5th largest livestock producer in the world and thus has the potential to claim a share of the market opportunity created by an estimated 7% projected deficit in global beef supply by 2024 [33]. At the same time, it is also the pastoral areas that are subjected to the ICBT of livestock. The ICBT of livestock to neighboring countries shared a huge amount of total trade; this trade facilitates regional integration, reduces border tensions, raises food security, and lowers food prices; the fact that this trade is unregulated and undocumented. The Economy of Ethiopia-Wikipedia estimated that over 95% of cross-border trade in East Africa occurs through unofficial channels, and the annual value of the unofficial trade of cattle, camels, sheep, and goats from Ethiopia sold to Somalia, Kenya, and Djibouti is estimated to be between USD 250 and USD 300 million annually (100 times more than the official figure).

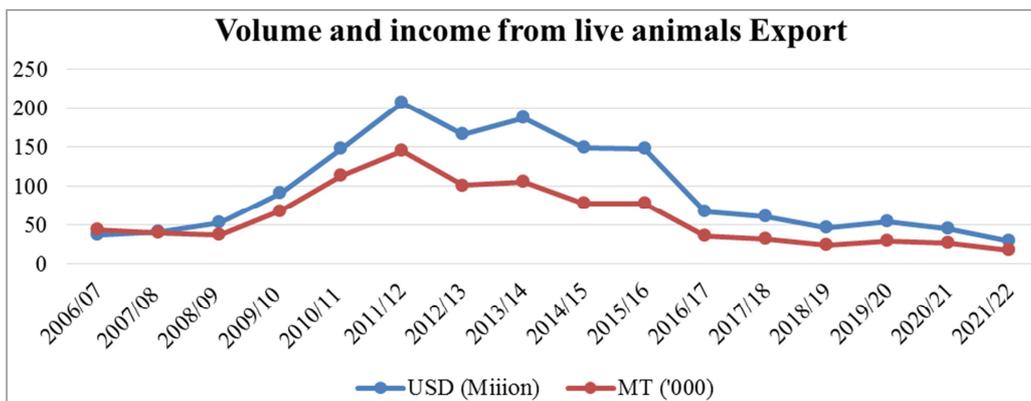
The annual informal livestock export from Ethiopia is significant; [31] estimate that informal cattle export is more than 25 times the official annual cattle export. The study [30]

also estimated the ICBT in Ethiopia is about four to six times of volume and twice the value of formal livestock exports. Moreover, the ICBT from Ethiopia estimated between 71%-90% of all live animal trade [1, 32, 15]. The study also emphasizes the significant figure of the ICBT in Ethiopia, which was estimated more than two times the official export [28]. The report [11] quantified that the Ethiopian government loses about USD 300 million per annum from illegal marketing. The study [5] reported how the number of livestock exported was high, with 575,000 cattle, 1,150,000 shoats, and 126,500 heads of camel informally exported between 2010 and 2011.

Ethiopia shares the largest border area and has CBT with Somalia of all its neighboring countries. Somalia is one of the largest exporters of live animals in the world, and much of this came from ICBT from Ethiopia [21, 22]. The studies [10, 20, 21] indicated that both Somaliland and Puntland's (Somalia’s) economies significantly rely on traditional cattle trading, of which it estimated between 50 and 60% informally sourced across Ethiopia’s borders. All the above findings verified that livestock ICBT has a very significant impact on the national economy, in terms of loss of foreign exchange earnings and tax from live animal export.

Despite Ethiopia having the largest share of ICBT and it serves as a source of income, creating employment opportunities, and immediate livelihood for millions of people living in the border areas of Ethiopia, ICBT has remained undermined in the national account because it is regarded as illegal commercialization of cross-border activities. However, the Inter-Governmental Authority on Development (IGAD) policy framework underlines the importance of ICBT that the policy framework proposes key shifts in the conduct of ICBT in the IGAD region to promote human security and cross-border security governance. Hence, Ethiopia emphasized the significance of ICBT in IGAD borderland regions.

2.2. Status of Ethiopian Formal Livestock



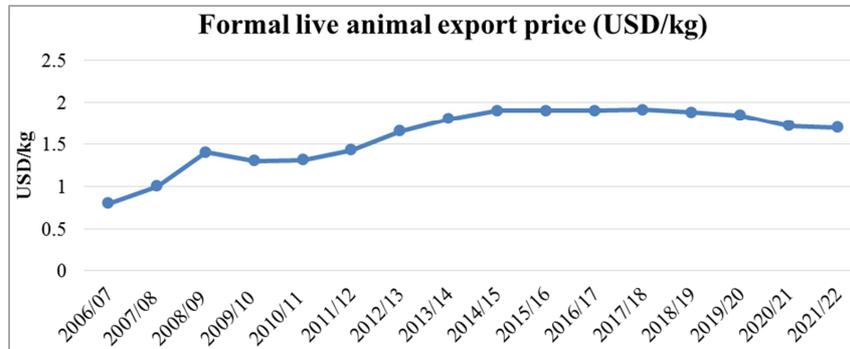
Source: NBE

Figure 1. Trends of income, and volume of live animal export.

The country recorded formal live animal exports, valued at about 1.528. billion USD between 2006/07 and 2021/22.

Figure 2 shows the country's continual increase in the volume and value of foreign revenues from formal live animal exports between 2006/2007 and 2011/12; the yearly volume and income of formal live animal exports increased by 32.58% and 43.04%, respectively. However, the export continuously decreased between 2012/13 and 2021/22; the annual average volume and value of livestock reduction were 16.5% and

15.12%, respectively while ICBT of livestock took place regularly in the Ethiopian borders. This might be because importing nations can obtain enough quantity of animals from the informal market. Similar findings indicated that illegal livestock export adversely affected formal live animal export in Ethiopia [15, 16].



Source: NBE

Figure 3. Trends of livestock price.

As indicated in (Figure 3) the price of live animal export price increased from USD 0.80 to 1.91/kg between 2006/07 and 2017/18. The actual price of live animals' exports has been increasing and stagnant between 2012/13 and 2017/18, while live formal animal export trade has been declining; this might be due to the low supply of the formal market and informal export of livestock. Since 2018/19 price of live animals has shown a continuous reduction, together with the formal export this might be because the regular importing countries got enough livestock from ICBT and reduced imports from the formal market.

2.3. Status of Seized Livestock from Illegal Traders' Movement

Getting full information on smuggled livestock is a problem, therefore the study used a proxy of ICBT, seized illegal livestock export, that can give appropriate information that how the number of ICBT of livestock is significant in Ethiopia. The seized livestock between 2013/14 and 2020/21 indicated in (Table 1) had no state-issued permits, documents,

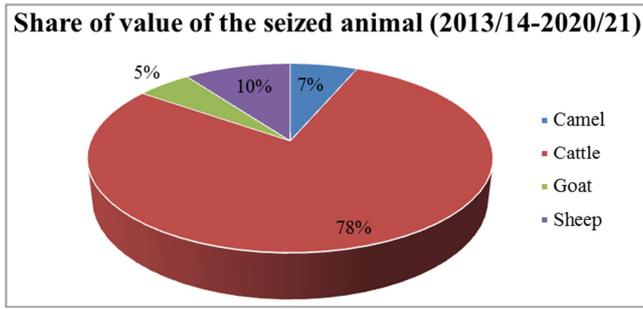
official entry point, license, registration, customs, or prior approval to leave the country. The study [25] reported that the Ethiopian government has more straightforward regulations, such as severe penalties, seizures, and arrests, to stop the illegal livestock trade. As a result, the study finds the seized animals by ECC were 28,410 (899 camels, 11,023 cattle, 5,549 goats, and 10,939 sheep) heads while trying to export informally from Ethiopia to its neighboring countries during the period.

As indicated in (Table 1) 71% of all seized animals that attempted to be smuggled to Somalia were held by Jigjiga customs while 15.34% and 7.18% of all seized livestock were held by the customs branch offices in Bahirdar and Mekele, respectively attempted to export to Sudan. The study verified that the seized animals were only 10% of the total illegally exported live animals from the Eastern part of Ethiopia. Similar research [4,17] showed that Ethiopia's contribution to the informal livestock export to Somalia via the Somali region is highest.

Table 1. Number of seized livestock in 2013/14 and 2020/21.

| Branch office | Camel | Cattle | Goat | Sheep | Total | Share |
|---------------|-------|--------|-------|--------|--------|-------|
| Jigjiga | 758 | 5,166 | 4411 | 10,069 | 20404 | 71.18 |
| Bahirdar | - | 3395 | 371 | 592 | 4358 | 15.34 |
| Mekele | 141 | 1710 | 32 | 158 | 2041 | 7.18 |
| Moyale | - | 64 | - | - | 64 | 0.23 |
| Jima | - | 200 | 1 | 88 | 289 | 1.02 |
| Assosa | - | 5 | - | - | 5 | 0.02 |
| Mille | - | - | 276 | - | 276 | 0.97 |
| Galafi | - | 187 | 458 | - | 645 | 2.27 |
| D/Dawa | - | 296 | 0 | 32 | 328 | 1.15 |
| Total | 899 | 11,023 | 5,549 | 10,939 | 28,410 | |

Source: Own analysis from ERCA/ECC, 2020/21 data



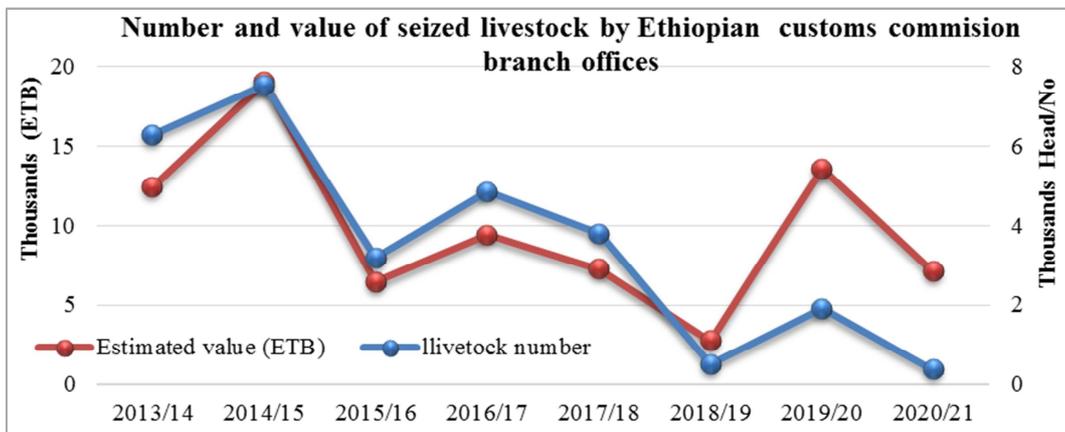
Source: ERCA/ECC 2021

Figure 4. Share of the value of sized animal by type.

The estimated value of seized livestock was 77.946 million Ethiopian Birr (ETB), cattle accounted for 78% of the total estimated value of seized livestock followed by sheep 10%, camels 7%, and goats 5% between 2013/14 and 2020/21 (Figure 4).

2.4. Trends of Seized Livestock in Ethiopia

There was a volatile trend in the number and value of seized livestock; and reduced by 95% and 43%, respectively between 2013/14 and 2020/21 (Figure 5). This does not mean the illegal cross-border movement of livestock is decreasing, rather informal traders change their smuggling strategies and avoid custom checkpoint control including avoiding using street routes and crossing via rural routes, trucking animals at night, using off-time (lunch break, early in the morning, late night), use evidence from information providers, etc. The study found that until animals approach border areas traders mix their livestock with farmers' and pastoralists' animal flocks when customs checkpoints confront them. Hence it is difficult to put customs checkpoints on every rural road, and know traders' strategies of smuggling that lead to reducing the seized animals.

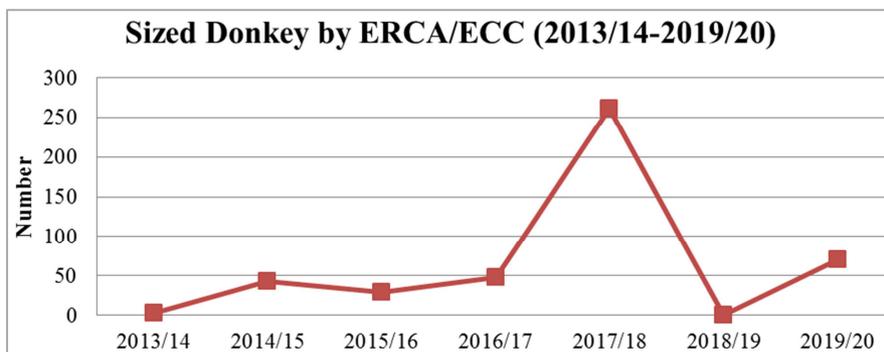


Source: Own analysis from ERCA/ECC data 2021

Figure 2. Trend of live animals seized to be exported to Somalia, Djibouti, Sudan, and Kenya.

In addition, 455 donkeys were seized between 2013/14 and 2019/20; the estimated value was 1.757 million ETB. The number of seized donkeys varied over the years (Figure 6) and among customs offices; the Mekele customs office held the highest number of donkeys (71% of the total), which attempted to export to Sudan along the Humera route, followed by Jima (23.7%) to Sudan and South Sudan through

Kumruk and Lare routes, and Jigjiga (4.69%) to Somalia, during the same period. A similar study [8] indicated, that there is an increase in the ICBT of donkeys from Ethiopia to Kenya as a result of the growing demand for donkeys on a global scale, and they warn to give attention to Ethiopia's 7.4 million donkeys have drawn more because of the growing demand for donkey products, particularly in China.



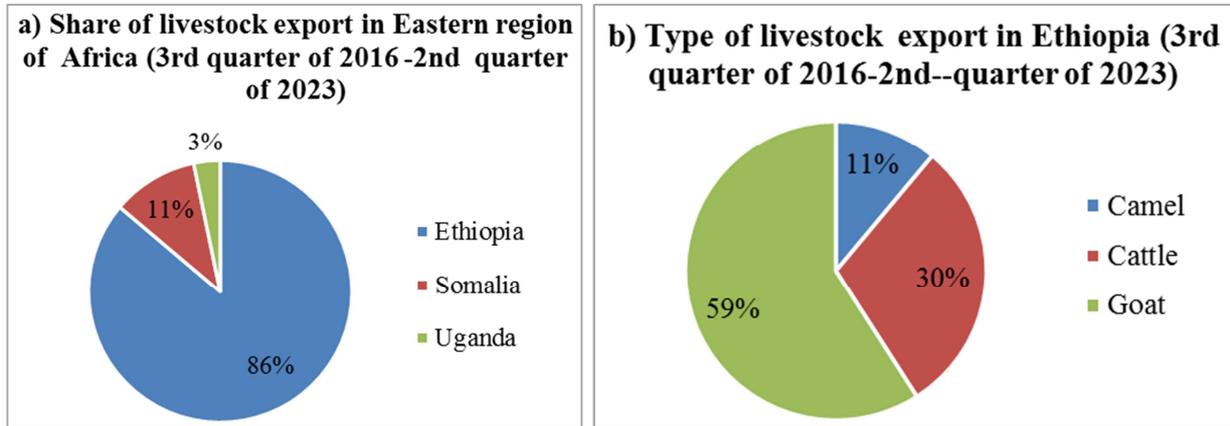
Source: Own analysis from ERCA/ECC, 2019/20 data

Figure 3. Trend of the number of donkeys seized to be exported to neighboring countries.

2.5. Status of Livestock Outflow from the Eastern Part of Ethiopia

Ethiopia is the major source of goats, camel, and cattle exported to the Middle Eastern countries via Somalia much of which is unrecorded in official statistics. The total number of informal livestock exports from Ethiopia to Somalia between the 3rd quarter of 2016 and the 2nd quarter of 2023

(28 quarters) was 2,980,689, accounting for 86% of the East African region, while the percentages for Somalia to Kenya and Uganda to South Sudan were 11% and 3%, respectively (Figure 7a). From these exports; goat accounted for 59%, followed by cattle 30% and camel 11% over the 28 quarters (Figure 7b).



Source: Own analysis from MAS-FSNWG data

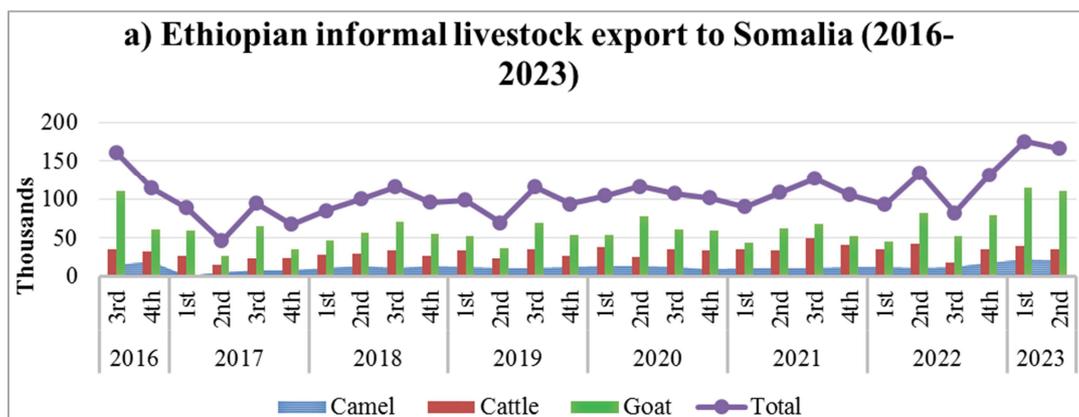
Figure 4. Share and types of live animals exported during 28 quarters.

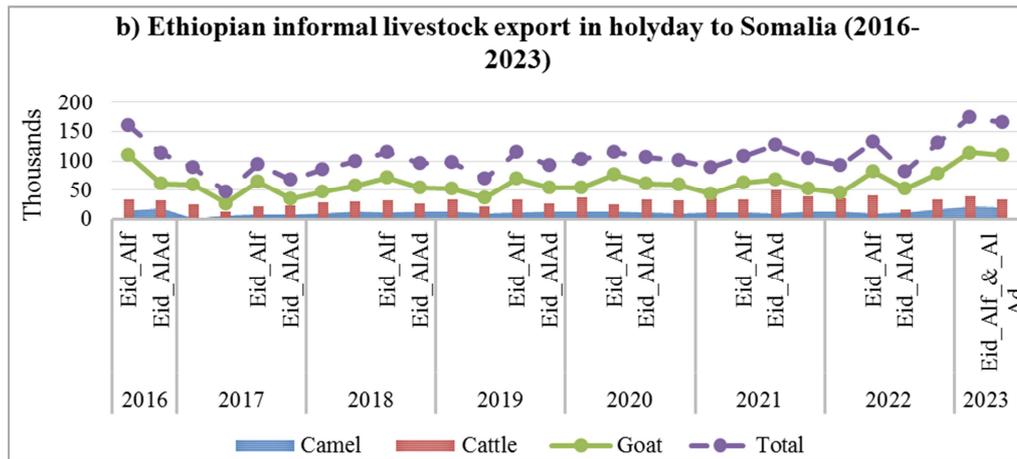
2.6. Trends of Informal Livestock Outflow from the Eastern Part of Ethiopia (MAS-FSNWG)

Ethiopian livestock quarterly informal out-flow trend analysis shows a seasonal variation (Figure 8a); the average quarterly ICBT of livestock to Somalia was 106,260 animals between the 2nd quarter of 2016 and the 2nd quarter of 2023 (in 28 quarters). The final destination of Ethiopian livestock was the Middle Eastern countries, Saudi Arabia during the period. For the yearly Muslim pilgrimage to the holy city of Mecca, Somalia exports millions of animals to Saudi Arabia over many years to feed millions of travelers from around the world. Therefore, exports concentrated during the annual

Ramadan and Eid Al-Fitr seasons, indicate the Ethiopian livestock export to Somalia concentrated and reached its maximum during Ramadan and Eid Al-Fitr festivity in 2016, 2017, 2018, 2019, and 2020 (Figure 8b).

Off - take volumes during the days between the end of Ramadan (Eid Al-Fitr) and the start of the Eid Al - Adha (Hajj) festivities, which is the highest quarterly peak of livestock exports from the eastern part of Ethiopia (Figure 8b) due to extended high demand both in Somalia and in Middle East country, Saudi Arabia. Starting Ramadan, especially exports from Ethiopia to Somalia are expected to increase because of fattening and preparations for re-exports for Eid Al - Adha.





Source: Own analysis from MAS-FSNWG data

Figure 5. Trends of ICBT of livestock export from Ethiopia to Somalia.

For example, in the 3rd quarter of 2017, 2018, and 2019 (Figure 8a & 8b) livestock exports from Ethiopia to Somalia are expected to increase because of fattening and preparations for re-exports to Saudi Arabia for Ramadan, Eid Al-Fitr and starting Hajj religious festivities, therefore livestock export starts picking up and reached its highest pick in 3rd quarter (Eid Al Fitr) and start to reduce in the 4th quarter of the respective years, that after Hajj religious festivities season, and traders started restocking for the next Ramadan season and Eid Aladha (Hajj) season. Similar findings [2] indicated that large number of live animals are traded informally along the Ethiopia-Somaliland border. For instance, an average of 42 trucks per day transport livestock to Somaliland through the four-micro cross-border routes in the Gaashamo trade corridor; during the Hajj and Eid Al Adha seasons.

Before the incidence of COVID-19, usually, livestock exports to the Middle East usually started earlier preparation for Ramadan and Hajj festivities that enhanced cross-border purchases, fattening, and exports. However, due to COVID-19-related measures, that the Saudi Arabia livestock import ban for the festivity, the trend of informal export to Somalia did not reach its peak in Ramadan and Eid Alitr, rather it reached its pick during Eid Al-Adha in 2021 (Figure 8b). Even if the COVID-19 measure reduced exports, Somalia’s imports from Ethiopia increased and reached their peak in 3rd quarter of 2021 (Eid Al-Adha) because Somalia altered its markets, and re-exported to Egypt and other Middle East countries.

After the ease of COVID-19-related measures, and the demand for export to Middle East countries, the seasonal variation of export back to its original position, and livestock export was highest during Ramadan and Eid Al-Fitr, 2nd quarter of 2022, (Figure 8a & b). The export reached its maximum in 1st quarter of 2023 before to start of the Ramadan and Hajj festivities preparation that enhances cross-border purchases, because Eid Al-Fitr and Eid Al-Adha occurred in the same quarter, 1st quarter. The exports from Ethiopia declined in 2nd quarter of 2023 because herdsmen

and traders held to restock for the next Ramadan and Haj seasons.

The result of the study verified that the informal livestock market in Ethiopia integrates with the formal export market to the Middle East markets where high demand for livestock during Ramadan and Eid Al-Fitr and low demand after Eid Al-Adha/Hajj festivity (Figure 8b). This result is supported by the theory, that positive trade flows are sufficient to demonstrate spatial market integration under the traceability standard [6], and if two markets are integrated; the supply and demand conditions in one market will influence transaction volume in the other market [7].

2.7. Opportunities, Challenges, Push and Pull Factors for ICBT

Opportunities

The study found that 1) ICBT serves as an employment opportunity and reduces poverty for border communities, and 2) it enhances food security because people in border areas can access commodities at a lower price from ICBT in border areas than the central market distribution system in Ethiopia.

Challenges for custom checkpoints

- 1) Lack of collaboration by peace societies, district leaders, and the community to avoid the ICBT.
- 2) The border is quite large, covering between 300 and 800 km; as a result, it is difficult to regulate the export of unofficial livestock due to a lack of vehicles, labor, and diverse smuggler tactics.
- 3) Customs checkpoints were obliged to sell the seized animals to formal traders in the auction market at less than market price because of limited access to water, food, and shelter.
- 4) A poor incentive payment system is another challenge in that the customs commission usually pays the incentive after the seized livestock is sold in the local market. Information providers need money immediately when animals are sized, however, they are discouraged and refuse to work with custom checkpoints since the incentive payment method takes a long time.

Pulling and pushing factors to ICBT

The cross-border has long been viewed as illegal by the Ethiopian government; nonetheless, it has been very challenging for the Ethiopian Customs and Revenue Authority/Ethiopian Custom Commission (ECRA/ECC) to strictly regulate and supervise this trade because traders in border areas have moved to informal trade for a variety of reasons. The study finds the following summary of the main factors for ICBT for traders, pastoralists, and the communities:

- 1) Limited technical support on livestock production (feeding, management health) to pastoralists or livestock producers and absence of support to traders during animal purchasing and sanitation to keep the quality of livestock for the export market;
- 2) Proximity to the export market, and absence of alternative market access;
- 3) Better price offers than the local markets and access to informal import of different food and nonfood items at lower prices in border areas;
- 4) Poor infrastructure and services (road, car, feedlot, health facilities, quarantine) in border areas;
- 5) Formal trade has complicated administrative procedures

and transaction expenses, making it a tedious, slow, and corrupt system;

- 6) Limited access to credit and forging exchange to run formal livestock export, because the trade requires starting capital and a statement of funding sources should be declared by traders;
- 7) Limited knowledge and understanding of farmers, pastoralists, and traders on the livestock market process, custom rules and regulations, export market requirements, proclamation, bank procedures, etc.

2.8. Future Outlooks of ICBT of Livestock

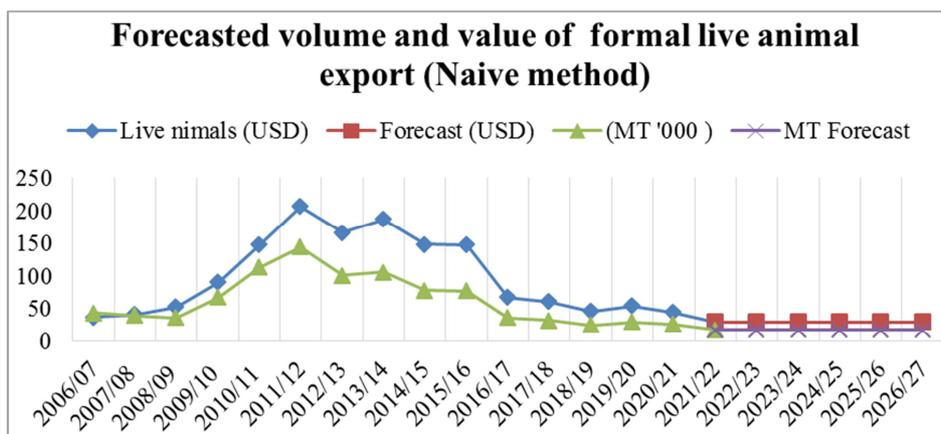
Table 2 infers the best scenario to predict Ethiopia’s future volume and value of formal and informal live animal export by using the best model with the smallest error values of MAD, MSE, and MAPE forecast among five methods. The Naïve method is best for formal livestock export forecasting. The linear trend method is top for seized livestock, and the four-quarter simple moving average (4QMA) was good for the total Ethiopian livestock export forecast from the East African region.

Table 1. Models comparison for volume and value of live animal export.

| Methods | MAD/MAE | MSE | MAPE | Remark |
|-------------------------|---------|-------------|--------|-------------------------------------|
| 1. Naive Method | | | | |
| Income (Mil USD) | 28 | 1,340 | 29% | For formal export |
| Volume (MT) | 18,121 | 616,621,806 | 29% | For formal export |
| 2. Linear Trend | | | | |
| Livestock | 3,419 | 18,116,278 | 49.62% | Seized livestock |
| 3 Simple Moving Average | | | | |
| Total livestock | 15,161 | 350,497,032 | 15.5% | 4QMA- East African informal outflow |

Based on the past history and if there is no shock in the export, the outlook of the volume of formal livestock exports will continue with a fixed amount (Figure 9) of 17.27

thousand MT in the following five years (until 2026/27). Similarly, the income from formal exports will continue with a fixed value of 29.2 million USD until 2026/27.



Source: Own compilation from NBE Data

Figure 6. Ethiopian Forecasted formal live animal.

The forecasted estimated values of seized livestock are indicated in (Figure 10); if the Ethiopian Government does not take any corrective measures, and informal traders

continue smuggling, the value of seized livestock will decrease from 7.08 million in 2020/21 (base year) to 1.857 million ETB in 2026/27.

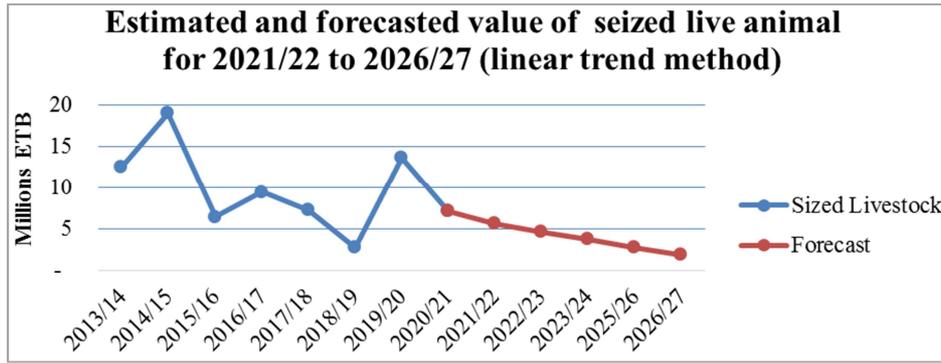
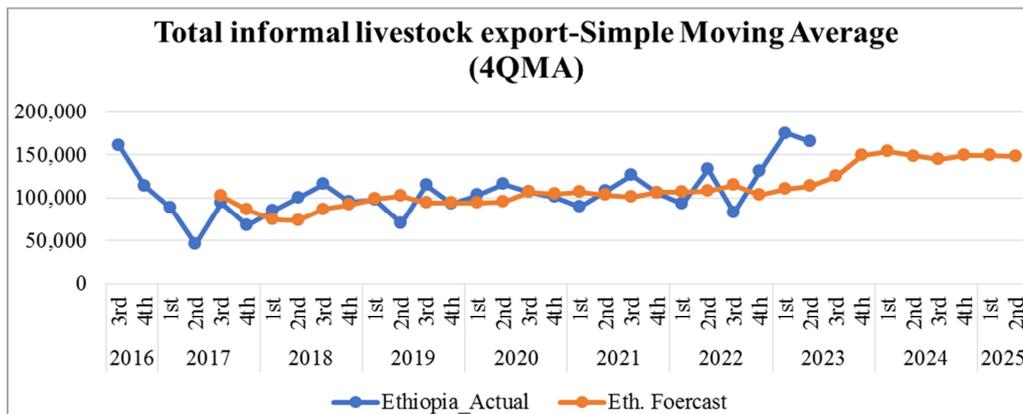


Figure 7. Forecasted estimated value of seized livestock.

The graphical representation of the actual and forecasted number of total informal livestock exports is indicated in (Figure 11). Without any intervention for the informal export, somewhat the total informal livestock export will have seasonal variation and the number of livestock exports will

increase from 125,551 to 147,674 in the 3rd quarter of 2023 and 2nd quarter of 2025, respectively. This might be due to the sustainable demand, well-established and integrated ICBT with Saudi Arabia's demand for livestock during Ramadan and Haj festivities every year.



Source: Own compilation from MAS-FSNWG Data

Figure 8. Forecasted total livestock export.

3. Conclusion and Recommendations

Conclusion

Cross-border trade (CBT) plays an economic, political, and social role and provides employment opportunities, and food security and eradicates poverty for border communities in most African countries including Ethiopia; the CBT trade comprises formal and ICBT. Similarly, ICBT contributes to official GDP and socioeconomic growth in Africa and it serves as a means of employment, and access to basic consumer goods and contributes to food security in Ethiopia. Sharing the same ethnicity, religion, and language in border areas of Ethiopia and its neighbors plays a key role in regulating and facilitating trade activities, managing conflict, and securing trade transactions in border areas. Live animal trade is dominant and characterized by ICBT, it is estimated four to 100 times the official annual livestock export.

There is a paradox in Ethiopian live animal export that the formal livestock export showed a decreasing trend between

2011/12 and 2021/22, while ICBT for livestock took place in border areas. The ICBT is considered an illegal trade activity in Ethiopia and the Government put regulations to stop the ICBT. Therefore, the Ethiopian Customs Commission seized 28,410 livestock including, camel, cattle, goats, and sheep attempted to export to different neighboring countries. Somalia was the highest expected destination for these animals. The trend of value and volume of seized livestock decreased over the 8 years due to traders' different smuggling strategies that enabled them to export more through the informal trade routes.

Ethiopia's informal livestock exports to Somalia accounted for 86% of the total ICBT in the East African regions over 28 quarters, the destination of these livestock is the Middle Eastern countries; through Somalia, the country imports from Ethiopia from informal border markets for local consumption and to re-export to Arab countries. The ICBT shows seasonal variation and is heavily concentrated during Ramadan, Id Al Fitr, and the start of the Hajj season in a year. These indicate the ICBT of livestock integrated formal market in Saudi

Arabia.

Lots of action has been taken by ECC and other stakeholders, however, stopping ICBT was not successful due to different pushing and pulling factors that are usually mentioned as major factors to derive to ICBT and refuse for formal export. Therefore, if the Government does not take any strategic action, the formal live animal export will never increase, seized live animals will reduce means more animals will be exported, and ICBT of livestock will continue and follow similar seasonal variation in Eastern Ethiopia because the informal markets well integrate with the formal Middle Eastern countries for Ramadan and Haj festivities.

Recommendation

Ethiopian government tried to stop ICBT, however, the trade takes place in border areas, therefore, the study forwarded the following short-term and long-term recommendations that policymakers should consider to formalize the ICBT without increasing the cost of informal trade or offer incentives, by facilitating and easing the formal marketing system through:

Short-Term recommendation

- 1) Revision of trade policies that limit formal trade, including removing or minimizing unnecessary rules and regulations will encourage traders to choose the formal markets.
- 2) Create market linkage (provide information on price, and potential buyers) that helps to improve the formal export.
- 3) Establish one window service and automate (using IT-based systems) the trading system to reduce transaction costs, and avoid contact with trade facilitators.
- 4) empower border communities including local traders with basic knowledge of the formal trade procedure, formal export requirements, custom rules, and regulations, and promote attitudinal change among customs officials and other border officials who continue to collect tax and those seeking rent from ICBT, and check compliance.
- 5) Fighting ICBT should not be left alone to ECC due to its complex nature, and requires collaborative efforts to maximize the potential income from ICBT, therefore the government should conduct border community sensitization campaigns and start to create a platform and promote trade fairs and workshops by involving actors in the informal trade.
- 6) Use media to aware about ICBT to the community and other actors in the ICBT.

Long-Term recommendation

- 1) Establishing alternative central markets in border areas can play a vital role in improving the formal export market and decreasing illegal trade.
- 2) Strengthen/establish physical livestock market facilities: quarantine, veterinary inspection, feedlot compounds, etc. will incentivize informal traders to come to the formal market.
- 3) Create a platform, and promote trade exhibitions and workshops involving actors in ICBT, as well as officials

from checkpoints.

- 4) Social ties between countries contribute to maintaining peace and regional integration; therefore harmonization/participation and awareness creation among border communities on policies and practices might be also a solution.
- 5) The absence of data about ICBT causes the national account to be incomplete, which understates the contribution of livestock to the export market and makes it difficult to formulate policies. As a result, ICBT should be considered in designing policy and strategy since the trend of ICBT of live animals is highly sensitive to Ramadan & Haji in Middle East countries and the informal exports coexists for centuries in border areas.

Abbreviations

CBT: Cross-Border Trade

ETB: Ethiopian Birr

ECC: Ethiopian Custom Commission

ERCA: Ethiopian Revenue and Custom Authority

FGDs: Focus Group Discussion

ICBT: Informal Cross-Border Trade

KIIs: Key Informal Interview

MAD: Mean Absolute Deviation

MAS-FSNWG: Market Analysis Sub-group of the Food Security and Nutrition Working Group

MAPE: Mean Absolute Percentage Error

MSE: Mean Sum of Error

ORCID

0000-0003-4291-1438 (Rehima Mussema Hassen)

Conflicts of Interest

The authors declare no conflicts of interest.

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