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Sheep and Goat Value Chain Analysis in Tahtay Adyabo District, Tigray, Ethiopia

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Authors' contributions

This work was carried out in collaboration among all authors. Author ZD designed the study, performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Authors LZ and BT managed the analyses of the study. All authors read and approved the final manuscript.

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ABSTRACT

This study was aimed at evaluating the value chain of the small ruminant in Tahtay Adyabo District of Tigray Region. The data were collected from 138 sample households, 26 traders, 5 butchers, 7 hotels/restaurants and 11 consumers interviewed through a semi-structured questionnaire and from key informant interview. The value chain analysis revealed that the major actors in the district being input suppliers, small ruminant producers, farmers, collectors, small traders, large traders, hotels/restaurants, butchers and consumers. Office of Agriculture and Rural Development, Dedebit Credit and Saving Institution, NGO (Save the Children) and Shire-Maitsebri Agricultural Research Center are main supporting institutions. Nine main alternative channels were identified for goat and sheep marketing. Small ruminant market participant of sample respondents were supplied 137.28 TLU of goats and 107.25 TLU of sheep to the market. In the study area, the governance of the sheep and goat value chain is buyer driven, and there are no producers and buyers cooperatives. Therefore effort should be made to establish farmers' cooperative and collective action of farmers to lower transaction costs to access inputs.

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1. INTRODUCTION

Ethiopia is highly potential in diverse agro-ecological zones, natural and livestock resource. These potentials are suitable for livestock production [1]. The country has 29.11 million goats and 29.33 million sheep population. From the total population, nearly all goat and 99.8% of the sheep population are local breeds [2].

Sheep and goats are important sources of manure, cash income milk, meat, wool and for saving in different farming system of Ethiopia. They are also considered as investment and insurance due to their short generation interval, ability to produce in limited feed resource, high fertility and adaptation in the harsh environment. [3,4,5,6,7].

After market promotion by development projects in close collaboration with the government of Ethiopian, demand for sheep and goat meat has dramatically increased. This has created an opportunity for sheep and goat producers to sell more animals at better prices [8]. High demand for sheep and goat meat in the Middle East and increase in international demand for meat are also another incentive for sheep and goat production in the country [9]. As the country development is characterised by the rise in income, combined with the rapid population growth of major cities in general, the demand for meat products with quality as well as value-added products such as special meat cuts is increasing as ever [10].

Due to limited value addition in the livestock sector, exports remain dominated by live animals, thus hampering the sector's potential to ease high unemployment in rural and urban areas [10]. Value chain analysis is essential to explain the connection between all the actors in a particular chain of production and distribution, and it shows who add value and where, along the chain. It helps to identify pressure points and make improvements in weaker links where returns are low [11].

Tigray region has about 4.2 million goats and 1.8 million sheep population [2]. Tahtay Adyabo District is one of the potential areas for sheep and goats production and marketing. The District has 158,418 goat and 32,433 sheep population [12]. Different actors are participating along the chain of sheep and goats in the district. Even though the study area is the centre of production of sheep and goats and have access to domestic markets, research regarding evaluation of sheep and goats value chain has not been conducted which can guide stakeholders to be able to use the potential of the resource optimally. Therefore objective of the study is to analyse the value chain of sheep and goats in the study area.

2. METHODOLOGY

2.1 Study Area

Tahtay Adyabo District is one of the eight district found in north western Zone of Tigray Regional State. The district is composed of 17 rural kebeles and 1 urban kebele. Tahtay Adyabo District is located about 405 kilometers from Mekelle and 95 kilometer from Shire-Endaslase Town, the capital of North Western Zone of Tigray Region. It is bounded by the District of Laelay Adyabo to the east, Kafta Humera and Eritrea to the west and, Asgede Tsimbla to the south and Eritrea to the north. Geographically, it is located between 37°21'13"E to 38°10'33"E longitude and 14°31'34"N to 14°51'42"N latitude [13].

The district has total population of about 100,958, of which 50,924 and 50,034 were males and females respectively [14]. The district has area coverage of 253,655 hectare out of which 60,017 hectare is crop land, 42,778 hectare is covered by forest and the rest is homestead and wasteland. The average annual temperature of the district is 31°C and found at an elevation of 800-1500 meter above sea level [12].

2.2 Sampling Procedure and Sample Size

Multi-stage random sampling technique was used to select representative small ruminant producer kebeles and sample households. In the first stage, out of 18 kebeles of the district 10 small ruminant producer kebeles were purposively selected based on the level of production. In the second stage, from the 10 small ruminant producer rural kebeles, four sample kebeles namely Adi-Aser, Gemhalo, Mentebteb and Zban-Gedena were selected randomly. In the third stage, total of 138 sample households were selected randomly using probability proportional to population size-sampling technique based on [15] formula:

$$n = \frac{z^2 p(1-p)}{e^2}$$

where,

n is the sample size
p is the estimated proportion of small ruminant producers from the total population
z =1.96 and e = 0.05

$$n = \frac{1.96^2 \times 0.9(0.1)}{0.05^2} = 138$$

For this study, data from traders were also collected. The sites for the trader surveys were market towns in which a good sample of small ruminant traders are available. A total of 6 large traders, 12 small traders and 8 collectors were randomly selected constituting a total of 26 traders from Sheraro, Tekeze, Adi- Hageray and Shmelba markets. Furthermore, 5 butchers, 7 hotels/restaurants and 11 consumers were interviewed from the district by selecting randomly.

2.3 Data Collection

The study used primary and secondary data. Primary data were collected using informal and formal surveys. The formal survey was undertaken through formal interviews with randomly selected farmers using a pre-tested semi-structured questionnaire The informal survey used key informants interview and visual observations. Specific checklists were used to guide key informants interviews. The secondary data were collected from Central Statistical Authority (CSA), Office of Agriculture and Rural Development (OoARD), and other sources.

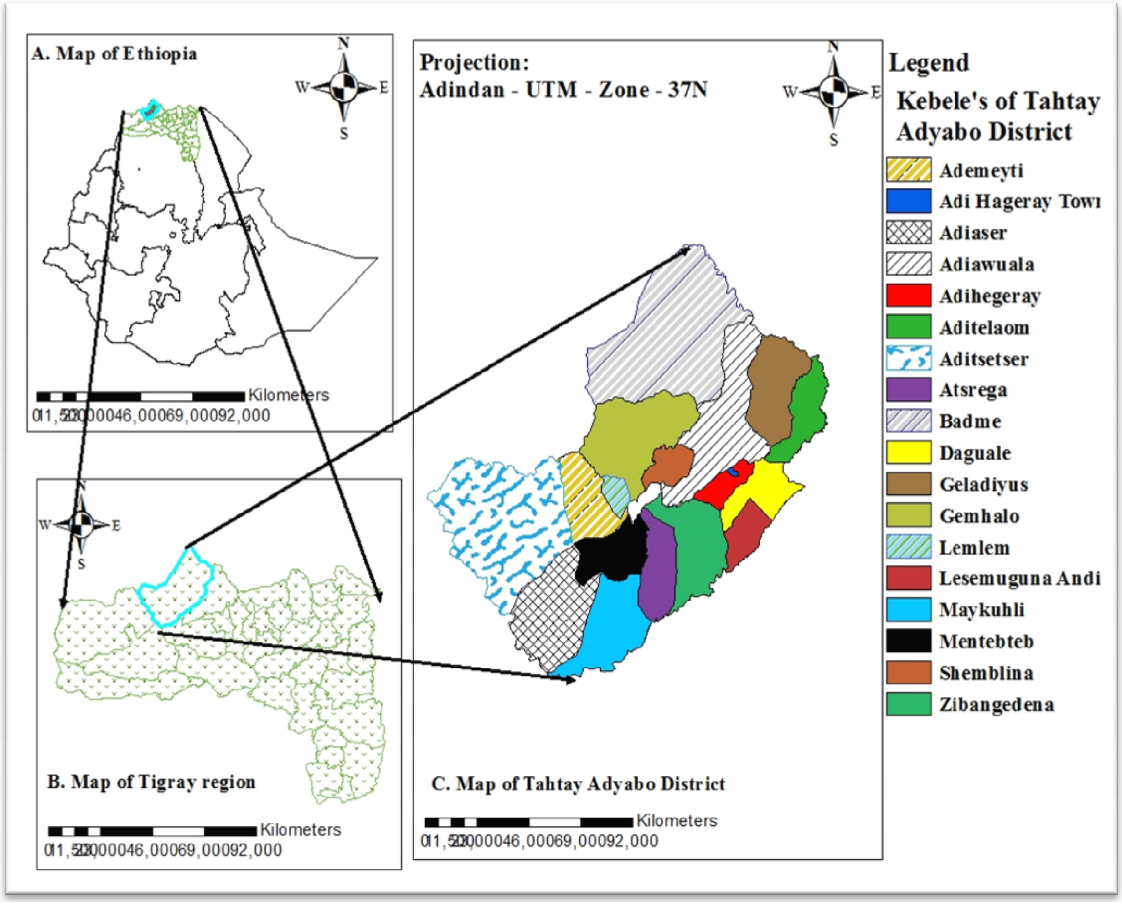

Fig. 1. Map of Tahtay Adyabo District (Arc GIS)

2.4 Data Analysis

The following steps of value chain analysis were applied to this study.

Mapping the value chain:- Involves understanding the characteristics of the chain actors and the relationships among them including the study of all actors in the chain, the flow of small ruminants through the chain, the destination of domestic sales. This information was obtained by conducting surveys, and key informant interviews as well as by collecting secondary data from various sources.

Emphasising the governance role:- Within the concept of the value chain; governance is the structure of relationships and coordination mechanisms that exist among chain actors. By focusing on governance, the analysis identified actors that may require support to improve capabilities in the value chain, increase value added in the sector and correct distributional distortions. Analyses of vertical and horizontal linkage of smallholder small ruminant producers with each other and with other actors were identified.

Following the above procedure, the main aspects of small ruminant value chain analysis was done by applying qualitative analysis. First, value chain actors were identified, and then value chain map of small ruminant was drawn which depicts the structure and flow of the chain in logical clusters. This exercise was carried out in qualitative terms through graphs presenting the various actors of the chain, their linkages and all operations of the chain from supply of inputs to consumption.

3. RESULTS AND DISCUSSION

Results of demographic and socio-economic characteristics of sample households: Results of demographic and socioeconomic characteristics of the sample respondents are present in Tables 1 and 2.

Discussions of demographic and socio-economic characteristics of sample households: Demographic and socioeconomic characteristics of the sample respondents are present in Tables 1 and 2. The total sample size of farm respondents handled during the survey was 138. Of the total sample respondents, 81.2% were male-headed households, and 18.8% were female-headed. With regards to the educational status of sample respondents, 60.9% of the total sample households were literate. Regarding their marital status, 2.2% of the total sample households were single, 88.4% were married, 7.2% were divorced and 2.2% were widows. In addition to the farming activities, 64.5% of the total sample households have also engaged in off/non-farm activities like in petty trading activities and daily labour.

The average age of sampled respondents was 44 years. The average family size of the total sample respondents was found to be 6 persons. The average years of experience related to sheep and goat production was 10.7 years. The survey result with respect to land holding of the respondents reveals that an average size of land holding per household was 2.3 hectare.

Table 1. Demographic and socioeconomic characteristics of samples (categorical variables)

Variables	Items	Total sample (n=138)	
		n	%
Sex	Male	112	81.2
	Female	26	18.8
Education	Literate	84	60.9
	Illiterate	54	39.1
Marital Status	Single	3	2.2
	Married	122	88.4
	Divorce	10	7.2
	Widowed	3	2.2
Off/non farm income	Involved	89	64.5
	Not involved	49	35.5

n is number of respondents.

Source: Self computation from survey result, 2015

Small Ruminant Value Chain Actors: In the study area, small ruminant value chain actors are those individuals who exchange money as well as animals or product, which generally increases in value with each transaction. The primary actors in the small ruminant value chain in the study area were input suppliers, farmers, collectors, small traders, large traders, hotels and restaurants, butchers and individual consumers. Small ruminant producers, OoARD, private veterinary pharmacies and NGO (Save the Children) were the main actors and institutions involved in the small ruminant production and input supply activities. Collectors are engaged in buying small ruminant from village markets and sell to small and large traders. Small traders buy small ruminant from producers and collectors and sell to hotels/restaurants, butchers and consumers. Large traders buy small ruminant mainly from collectors and sell to hotels/restaurants and butchers.

Table 2. Demographic and socioeconomic characteristics of sample households (continuous variables)

Variables	Total sample (n =138)	
	Mean	Sd
Age	44.18	10.39
Family size	5.84	2.08
Experience	10.72	8.56
Land size	2.3	2.16

n is number of respondents. Sd is standard deviation. Source: Self computation from survey result, 2015

There are also governmental and nongovernmental supportive institutions that support small ruminant value chain directly or indirectly. Value chain supporters or enablers provide facilitation tasks like creating awareness; provide credit, facilitating building strategy and the coordination of support. The main supporters of the small ruminant value chain in the study area are the office of agricultural and rural development (OoARD), Office of Trade and Industry (OoTI), District administrations, Dedebit Saving and Credit Institution (DSCI), Shire- Maitsebri Agricultural Research Center (SMARC) and informal credit suppliers.

Value chain map of the small ruminant in Tahtay Adyabo District: The value chain map of small ruminants in Tahtay Adyabo District is depicted in Fig. 2.

Value chain governance: Value chain actors determine the flow of small ruminant and level of prices. In effect, they govern the value chain and most other chain actors subscribe to the rules set in the marketing process. In most cases, the business relations between the various operational actors are of free market exchange and uncoordinated.

In the study area, the general pattern in a small ruminant market is for producers to sell to different traders each time they go to the market. Producers do not have any longstanding customer relationship with any of these buyers, and they sell their products to anyone they can. Even the most frequent buyers of small ruminant in the markets do not have any contractual supply agreement with producers. This indicates the absence of vertical linkage between producers and any buyer in the small ruminant value chain in the district. This is mainly because the production system is not market-oriented and producers are not following demand or the quality requirements of important market actors. As a result, there is low level of transfer of skills and knowledge from the buyers to producers. Overall, the governance of the small ruminant value chain is buyer driven.

The relationship between collectors and small traders, collectors and large traders, small traders and large traders, small traders and hotels/restaurants/butchers, large traders and hotels/restaurants/butchers, small traders and bulk consumers (defence forces) has complementarily of sorts since there is a long-standing mutual relationship between them. These relations are based on trust, without any formal contract. Those actors can sell sheep and goats on credit and also take advance payments without any formal signature. This strengthens their relationship and also provides an opportunity for all actors to expand their business activity.

In the study area, there are no producers and buyers cooperatives. Farmers lack strong horizontal linkages with each other and cause their poor bargaining power in the market. The horizontal linkages among traders are primarily by the use of common trucks for transportation of sheep and goats to the next level of the market. Since they collect a small number of sheep and goats from different markets, it is not economical to hire a truck on an individual basis.

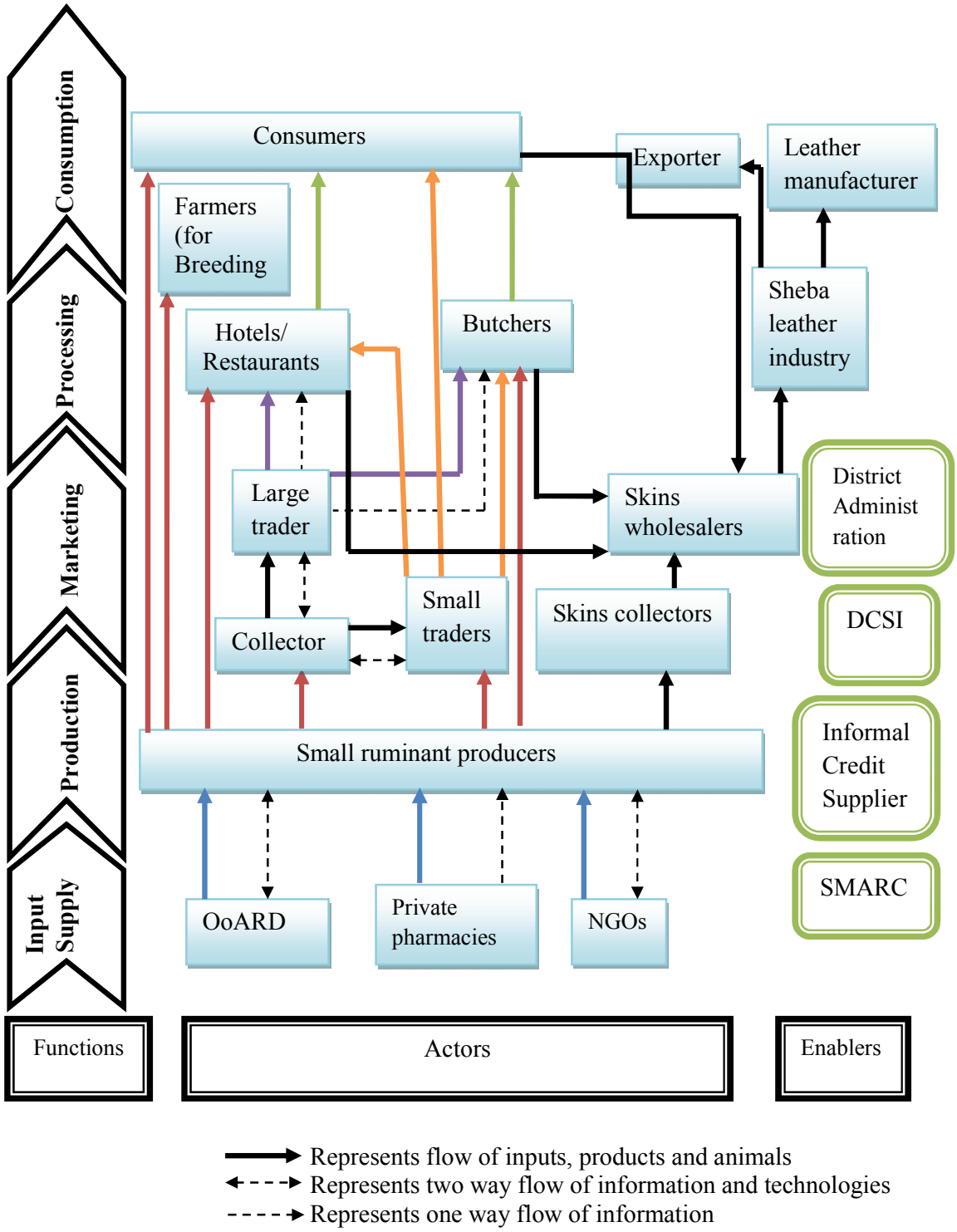

Fig. 2. Value chain map of small ruminant
Source: Self sketch from survey result, 2015

Goat marketing channels: Nine main alternative channels were identified for goat marketing. Small ruminant market participant of sample respondents were supplied 137.28 TLU of goats to the market. The main receivers from producers were collectors and small traders with an estimated percentage share of 34.8% and 20.9%, respectively (Fig. 3).

Sheep marketing channels: Nine main alternative channels were identified for sheep marketing. Small ruminant market participant of sample respondents were supplied 107.25 TLU of sheep to the market. The main receivers from producers were collectors and small traders with an estimated percentage share of 46.2% and 23.2%, respectively (Fig. 4).

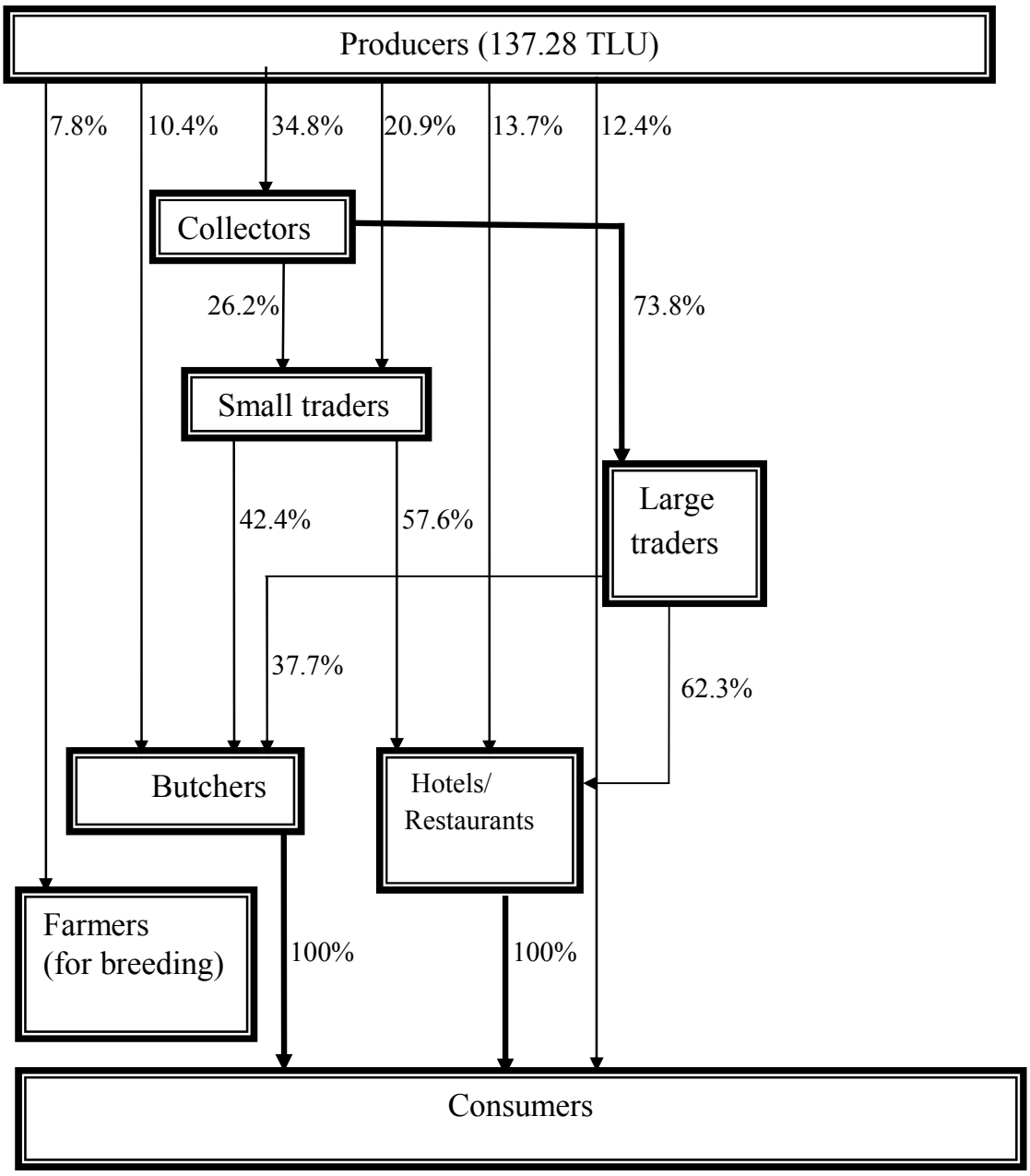

Fig. 3. Goat market channel
Source: Own sketch from survey result, 2015

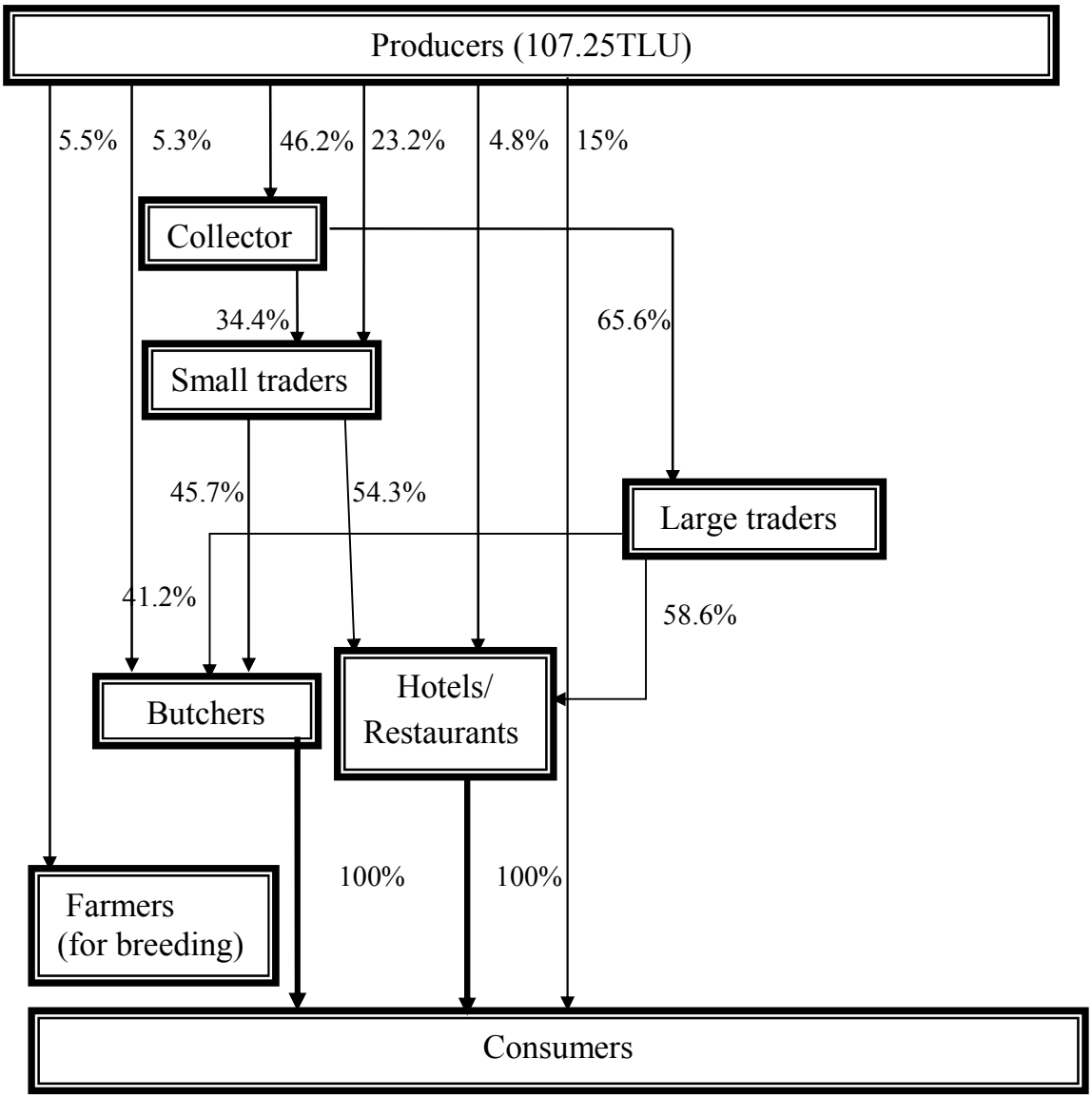

Fig. 4. Sheep market channel
Source: Own sketch from survey result, 2015

4. CONCLUSIONS

Small ruminant value chain analysis of the study areas revealed that the main value chain actors being input suppliers, small ruminant producing farmers, collectors, small traders, large traders farmers (for breeding purposes), hotels/restaurants, butchers and consumers. Office of Agriculture and Rural Development, Dedebit Credit and Saving Institution, NGO (Save the Children) and Shire-Maitsebri Agricultural Research Center are main supporting institutions. The research result indicated the absence of organised institution and group marketing for small ruminant, have made other actors in a better position to dominate the pricing. This hands the power to buyers and due to this its governance is buyer driven. Therefore effort should be made to establish farmers' cooperative and collective action of farmers to lower transaction costs to access inputs.

ETHICAL APPROVAL

At the time of the study there was no considered the ethical practices. The study mainly focused on the value chain of live small ruminant.

Moreover at farmers (producers) level, any ethical practices are not considered in to account.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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