

Small Ruminant Value Chain Analysis in Fentale Districts of East Shoa Zone, Ethiopia

Shimelis Gizachew Desalegn

Adami Tulu Agricultural Research Center, Adami Tulu, Ethiopia

Email address:

Shimegiz2006@gmail.com

To cite this article:

Shimelis Gizachew Desalegn. Small Ruminant Value Chain Analysis in Fentale Districts of East Shoa Zone, Ethiopia. *American Journal of Modern Energy*. Vol. 6, No. 1, 2020, pp. 1-8. doi: 10.11648/j.ajme.20200601.12

Received: December 4, 2019; **Accepted:** December 31, 2019; **Published:** January 9, 2020

Abstract: The study was conducted in four kebele of Fentale districts of Pastoral and Agro-pastoral Area to map out small ruminant value chain actors and their roles, identify the major constraints and suggest the specific areas of intervention for better performance of small ruminant value chain. Both qualitative and quantitative data were collected from primary and secondary sources a total of 98 producers, 12 traders, 20 consumers and 4 exporters were interviewed with separate semi-structured questionnaires. The result of study indicated that small ruminant made by far the greatest contribution to livestock-based livelihoods in study districts. About 98% of pastoralist offers small ruminant for sale to meet their crucial needs at any time during the year. The result of this study revealed that even if small ruminants supplied to the markets by pastoralist more or less meet the quality attributes required by export markets still the majority of producers (72.4%) backyard production type, followed by small scale (23.5%), medium scale (2%) and commercial scale (2%) respectively. Appropriate extension service that will respond to the peculiar needs of export markets, especially on the aspect of providing information and knowledge on the desired small ruminant characteristics and quality requirements of importing countries should be provided for the producers.

Keywords: Small Ruminant, Value Chain, Fentale

1. Introduction

1.1. Background and Justification

Livestock production systems in Ethiopia are generally subsistence oriented and productivity is very low [1]. The total livestock population in Ethiopia in 2012 was estimated at 54 million cattle, 25.5 million sheep and 24.1 million goats [2], Ethiopia's annual exports of cattle and sheep meat were valued at USD 79.13 million in 2012 [3], while Botswana with a much lower stock number was able to reach USD 150 million export earnings from beef alone [4]. Sheep and goats are reared in almost all farming systems and agro-ecological zones of Ethiopia. Sheep and goat keeping is a traditional way of life which for centuries has shaped farmers thoughts, outlook and culture. In various areas of Ethiopia, sheep and goats play significant social and cultural functions including food security, poverty alleviation, ensuring gender equity, weed control and income generation. Ethiopia harbours huge and diverse small ruminant populations and this genetic

diversity is a requisite for the present and future livelihoods of a large number of poor farmers [5].

Small ruminant serve as living bank for their owners and serve as source of immediate cash need and insurance against crop failure especially where land productivity is low and unreliable due to erratic rainfall, severe erosion, frost, and water logging problems [6]. Approximately 1.5 billion people are engaged in smallholder agriculture across the world. They include 75% of the world's poorest people whose food, income, and livelihood prospects depend on agriculture. They mainly live in rural communities. Despite their important role as food producers and rural stewards, the commercial prospects for millions of poor smallholders remain challenging. Income opportunities have improved since the long period of depressed commodity prices, from the 1980s until the mid-2000s; as commodity prices have recovered, the agricultural sector has shown signs of revitalization.

Several global agencies have also renewed their investments in agriculture due to the realization that

enterprise continues to be the best hope of improving the livelihood prospects for millions of rural families. Agriculture remains the best opportunity for the estimated 1.5 to 2 billion people living in smallholder households to escape poverty. Studies show that income growth generated by agriculture is up to four times more effective in reducing poverty than growth in other sectors [7].

The livestock production systems in Ethiopia have evolved largely as a result of the influence of the natural production environments and socio-economic circumstances of farmers/pastoralists rather than market forces. Sheep and goat in Ethiopia and most developing regions are kept under traditional extensive systems. Sheep and goats are largely produced in mixed crop–livestock, specialized pastoral and agro pastoral systems. Livestock production is of subsistence nature. Market-oriented or commercial production is almost non-existent. In various areas of Ethiopia, sheep and goats play significant social and cultural functions including food security, poverty alleviation, ensuring gender equity, weed control and income generation.

Ethiopia is home for diverse indigenous sheep and goat populations, numbering 25,017,218 and 21,884,222 heads [8], respectively, parallel to its diverse ecology, production systems and ethnic communities. According to [9], the total annual meat production comes from cattle (63%), sheep (25%) and goats (12%). At the national level, sheep and goat account for about 90% of the live animal/meat and 92% of skin and hide [10], export trade value. In the lowlands, sheep with other livestock are the mainstay of the pastoral livelihoods. Most of Ethiopia's estimated 48 million sheep and goats are raised by small farmers who used them as a major source of meat and cash income. About three-quarters of the total sheep flock is in the highland, whereas lowland pastoralists maintain about three-quarters of the total sheep and goat herd. Small ruminant population in the continent containing about 27.35 million sheep and 28.16 million goats in the country [11].

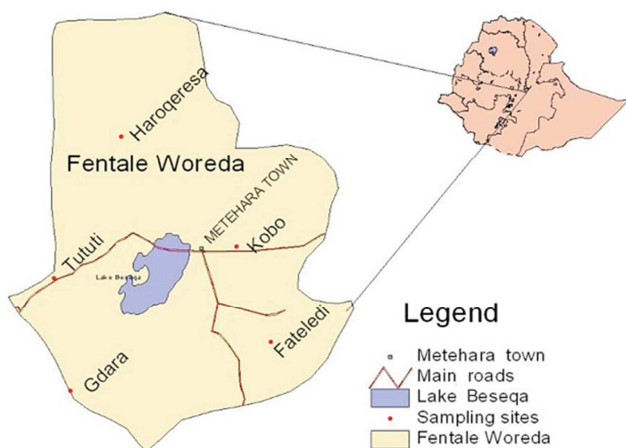


Figure 1. Map of Fentale district.

Indeed, many development interventions now utilize the value chain approach as an important entry point for engaging small farmers, individually or collectively, in high

value export markets [12].

Despite such significant contribution to the national economy of the country, the sector has received less than 3% of the recurrent agricultural expenditures in Ethiopia. Livestock markets in Ethiopia function at three levels consisting of primary, secondary, and terminal markets. [13] Also include a nominal forth tier at the farm gate level, which could hardly be considered to function as a market.

Statement of Problem

Small ruminant production regarded as the handy source of money in need and is considered to be attractive for poverty reduction and improvement of family food security and livelihood of the poor. Creating competitive market for goat can have an opportunity to fetch good price which will have an impact on purchasing power of pastoral households to convert cash income for nutritional food needed for consumption and other amenities [14]. Introduction of value adding management practices (market oriented fattening scheme) and market linkage is the most important aspect of enhancing the livelihood and source of income for smallholder farmers [15].

Limited public institution in supporting small ruminant chain.

High inputs costs (feeds, and vet drug).

Limited contact with input sellers and output buyers.

Low marketing capacity, lack of transport service especially from rural to market place.

Inadequate market infrastructure.

Weak linkage both horizontal and vertical linkage among stakeholders;

Lack of value addition practices.

Less timely available market information;

Therefore, this study is proposed to analysis Small ruminant value chain and design Strategies to link small scale small Ruminant producers farmers to better market t and Improved Income which suggest possible solutions to different stakeholders with the following objectives.

1.2. Objectives of the Study

1.2.1. General Objective

To analyse the small scale sheep and goat producers value chain in order to identify strategies for farmers to increase income.

1.2.2. Specific Objectives

To identify and analysis of the major Actors and supporters involved in small ruminant value chain.

To identify the most profitable market channel.

To map small ruminant value chain map.

To identify the bottleneck of small ruminant along value chain.

1.3. Significance of the Study

This research work used for the farmers to improve small ruminant marketing and improve their income by linking farmers to better market. The information generated also used for different institutions, policy implementation and

someone who want to conduct similar studies used as reference as well as used as input for the intervention in similar problem encountered areas.

2. Methodology

2.1. Discription of the Study Area

The study was conducted in Fentale district, which is located in the eastern dry lowlands of the Rift Valley, situated 200 km east of Addis Ababa.

Fentale District

Fentale district extends between 8°42'–8°09' AND latitudes and 39°39'–40°04'E longitudes. It is located in the northeast part of East Shewa zone. It is bordered with Amhara Regional State in the west and northwest; with Afar Regional State in the north and northeast; with West Hararghe and Arsi zones in east; and with Boset district and Arsi zone (Merti district) in south and southeast. Because of geographical location i.e. crossed by road that leading east part of the country & coming to Finfinnee do passed through this district has a great advantage for accessing the local products to the market and creates ideal condition for provision of the demanded commodities to the local communities.

Agro-ecology: 100% of the district is low land, Altitude: 900 m. a. s. l. – 1000 m. a. s. l (meters above sea level., Annual Temperature: min 18°C. Max 39°C, Annual Rain fall: 350mm-450mm, Rain fall pattern Uni Modal, Land use system in (ha), Cultivated land 19677.25, Forest land 457.00, Grazing land 79329.37, Land used for construction 6,302.9, Others 28,200.00, Total area of land in the district 133,967.00, Total livestock 781,099, Goat 129,424, Sheep 106,932 and Major livelihood activities (%) 95% farming 5% non-farming.

2.2. Sources of Data and Method of Collection

Both secondary and primary data were used for this study. Secondary data was collected from Small Ruminant.

Quarantine at Adama, abettors, WoA, ZoA, CSA, published and unpublished materials.

Primary data was collected from small ruminant producer farmers, traders and consumers using semi-structure questionnaires and check lists.

2.3. Sampling Procedure and Sample Size

A multi-stage sampling procedure was used for the selection of sample household heads.

1st Fentale districts were selected purposively depending on the small ruminant production potential.

Four small ruminant producer kebeles (Banti, Debiti, Haro Kersa & Kobo) from Fentale were selected based on population of small ruminant production.

From total small ruminant producers in the districts 98 samples households were randomly selected exhausting Sample size determined based on [16]. As follows:

$$n = \frac{N}{1+n(e)^2}$$
 Where: n = is the sample size taken from

population, N is the population size of small ruminant producer households and e is the level of precision defined to determine the required sample size at 90% level of precision.

Twelve (12) small ruminant traders were selected from Fentale markets.

Four (4) small ruminant exporter were selected from Fentale markets.

Twenty (20) small ruminant consumers were selected from Fentale to obtain information related to consumers.

2.4. Method of Data Analysis

Descriptive statistics such as frequency, mean, percentage, and standard deviation were used for this study.

Marketing margins are also calculated at different points along the value chain and then compared with consumer price.

$$TGMM = \frac{\text{Final consumers' price} - \text{producers' price}}{\text{Final consumers price}} \times 100$$

$$GMM_p = \frac{\text{Consumers price} - \text{gross marketing margin}}{\text{consumers price}} \times 100$$

3. Results and Discussion

Table 1. Descriptive analysis is employed to describe the socio-demographic characteristics of sampled households.

Variables		Number	%
Sex	Male	69	70.40
	Female	29	9.60
	Illiterate	72	73.50
Education status	Attending elementary (1-6)	9	9.20
	Educated (7-12)	17	17.30
Access to extension service	Yes	43	43.90
	No	55	56.10
	Back yard	71	72.40
Production type	Small scale	23	23.50
	Medium scale	2	2.00
	Commercial	2	2.00
Access to credit service	Yes	17	17.30
	No	81	82.70

Source: Survey, 2019.

3.1. Descriptive Statistics

Descriptive analysis is employed to describe the socio-demographic characteristics of sampled households.

As indicated in above table about 70.40% of producers' respondents are male while 9.60% are females. Most of small ruminant producer's (73.50%) are illiterate, flowed by grade 1-6, (9.20%) grade 7-12, (17.30%). This shows that most of pastoralists at Fentale areas are not attending primary education (Table 1).

Access to extension service: The study reveals that dominate small ruminant producer's (65.10%) have no access to extension service but about 43.90% have access to extension service This shows that most of pastoralists at Fentale areas are not settled which makes access to extension service difficult (Table 1).

Production type

The study reveals that dominate small ruminant producer's (72.40%) practiced back yard production system followed by small scale production system (23.50%), medium scale production system (2%) and commercial production system (2%). The result of this study revealed that even if small ruminants supplied to the markets by pastoralist more or less meet the quality attributes required by export markets still the majority of producers (72.4%) backyard production type, followed by small scale (23.5%), medium scale (2%) and commercial scale (2%) respectively which needs future intervention (Table 1).

Access to credit service

The study reveals that dominate small ruminant producer's (82.70%) have no access to credit service but about 17.30% have access to credit service This shows that most of

pastoralists at Fentale areas were not have access to credit service. (Table1).

Table 2. Average age, farming experience and distance from the nearest market.

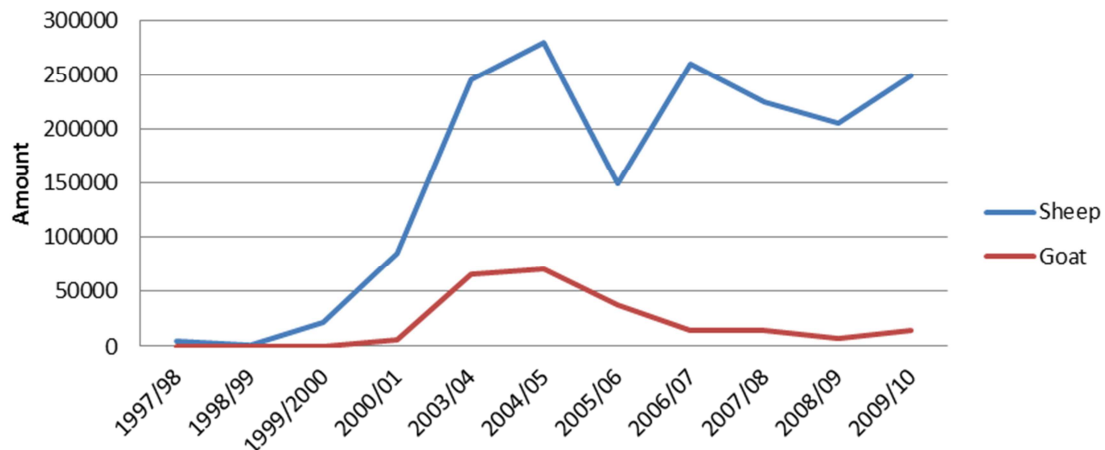
Variables	Mean	SD
Age	38.33	13.51
Farming Experience	21.04	12.11
Distance from nearest market	3.45	1.86

Source: Survey, 2019.

As shown in above table about the average age of respondent were 38.33, farming experience of respondents were 21.04 years and distance from the nearest market were 3.45 km. (Table 2).

3.2. Last Ten Years Small Ruminant Export from Ethiopia Under Monitoring of Adama Quarantine

Small Ruminant Export from Ethiopia under monitoring of Adama Quarantine



Source: Adama Quarantine 2019.

Figure 2. Ten Years Small Ruminant Export from Ethiopia.

As shown in above table in the last ten years sheep is dominating the export market from Ethiopia.

3.3. Quality Requirement of Export Market

General health of sheep and Goat

The treated sheep and Goat against internal and external parasite.

The sheep and goats must be vaccinated and certificated against the following disease PPR, Anthrax, Sheep pox, and Ovine Pasturellosis and quarantine time 21 days after vaccination.

Dubai and Saudi Arabia additionally requires blood test certificate against Brucellosis, Raft valley fever and FMD.

Mainly 20 to 25 kg of live weight occasionally extended to 30 kg.

Mutton should be quarantined for 18 hours in abettors.

Totally removed tail for mutton export that becomes a challenge as it reduce the price per kilogram.

3.4. Profitability of Small Ruminant

Table 3. Profitability of Small Ruminant.

Items	Livestock type Small ruminant
Average feed cost (Birr/head)	220.00
Average vet drug cost (Birr/head)	35.00
Average barn cost (Birr/head)	25.00
Average labor cost (Birr/year)	110.00
Average others cost (Birr/head)	80.00
Total average variable cost (Birr/head)	470.00
20 kg live weight S. ruminant (price/head) 40etb/kg	800.00
Revenue (Birr)	800.00
Gross margin (Birr/head)	330.00

In small ruminant production and marketing business the total average variable cost (Birr/head) 470 ETB while Gross margin (Birr/head) obtained from small ruminant production were 330.00 ETB (Table 3).

3.5. Value Chain Analysis

3.5.1. Small Ruminant Value Chain Actors, Supporters and Major Function

(i) Input suppliers

Inputs such as feeds and vet drug are supplied by private sectors (vet pharmacy), Woreda Office of Agriculture (WoA), NGOs, open market traders.

Most (88%) of the farmers were purchased feeds and vet drug from market for small ruminant production.

(ii) Producers

Both small holder farmers and investors are acting as producers in the study area they are primary and most valued actor in the small ruminant value chain.

The major value chain functions that small ruminant producers perform include, managing, (feeding, watering, housing) and marketing. The majority of producers (72.4%) backyard production type, followed by small scale (23.5%), medium scale (2%) and commercial scale (2%) respectively.

(iii) Rural collectors

Rural collectors are independent operators at primary markets who buy and transport small ruminant from smallholder farmers, for sale to Butchers, Abettors, larger traders, institutional consumers.

(iv) Brokers/middlemen

Brokers facilitate transaction by convincing farmers to sale his small ruminant and facilitating the process of searching good quality and quantity of small ruminant for exporters.

(v) Large Traders

Large traders are traders that buy small ruminant from rural collectors of Fentale districts and sell to exporter and abettors at different markets.

(vi) Butchers

Butchers are key actors in small ruminant value chain within and outside the study area. They are the last link between domestic producers and consumers.

(vii) Abattoirs

Abattoirs are key actors in small ruminant value chain specially for export market in the study area Functional export abattoirs are located five in mojo (mojo, Luna, organic, Halal and Alawa) three in Bishofu (Abssinia, Elfora and Ashine) one in Fentale (Elfora) and one in Awash Melkassa having a capacity of slaughter 2000 to 3000 per day per each. The study reveal Abattoirs are operating under their capacity only 20 to 30% are operating because the reasons related to the supply of small ruminant.

(viii) Exporters

Exporters are key actors in small ruminant value chain within and outside the study area. They are the last link

between producers and foreign consumers. The most important destination markets for Ethiopian small ruminant are mainly eight countries such as Dubai, Oman, Saudi Arabiya, Djibouti, and Somalia land Qatar, Bahrein and Quiet (live animal export) mutton to Dubai and Saudi Arabiya. Offals such as intestines, stomach, brain, penis and liver are exported to China, while liver, kidney and heart are exported to Saudi Arabia. Ethiopia exports about 19,000 metric tons of meat annually. Until very recently, small ruminant weighing from 20 – 30kg were needed for slaughter and the carcass was exported. However, sheep heavier than 30 kg are currently accepted by Bahrain, provided that they are not older than 2 years of age. According to the export abattoirs, there is emerging competition from Kenya and Tanzania for the Dubai market. It was also reported that inconsistent supply of quality animals, cargo space shortage and technical problems in chilling management are some of the major problems of the export abattoirs.

The study shows that live animal export is dominated by sheep (72.6%) while mutton export is dominated by Goat. Sheep demand is high during Arefa holiday in imported countries.

(ix) Consumers

Consumers are final purchasers of small ruminant mostly from producer, butcher and exporters for consumption purpose.

Individual consumers buy animals to slaughter mainly during cultural or religious festivals in the Ethiopian New Year. There is a marked color choice which is largely seasonal or related with certain occasions. Individual consumers buy small ruminant from traders, collectors and small ruminant producers in market places and at farm gate (government employees living in rural areas and other farmers). It was reported that the number of consumers has been increasing over time. Consumers also reported that small ruminant price has increased substantially in recent years.

Small ruminant consumers are individual households (both local and international) and institutional consumers like hotels and university. The majority of sampled consumers preferred the small ruminant from Fentale because of the test preference.

3.5.2. List of Stake Holders Supporters, Actors and Their Role in Small Ruminant Value chain Analysis of Fentale District

Value chains also include the institutional and governance arrangements that enable these systems to function [17].

Table 4. List of stake Holders supporters, actors and their role in small ruminant value chain analysis of Fentale district.

S/N	Stakeholders	Activities	Roles/Function
1	Input suppliers (privet and governmental sectors)	Supply of feed and vet drug	Actors
2	Small holder farmers	Small ruminant rearing, feeding and selling to trader	Actors
3	Rural collectors	Collection, transporting and delivery to traders	Actors
4	Large Traders	Collection of small ruminant, transporting and delivery to traders	Actors
5	Butchers	They are the last link between domestic producers and consumers	actors
6	Abattoirs	Selling, Transporting processed small ruminant meat and mutton	actors
7	Exporters	Selling, Transporting processed small ruminant both live and	Actors

S/N	Stakeholders	Activities	Roles/Function
8	Adama quarantine	slaughtered	supporter
9	Adami Tulu Agricultural research center and ILRI	Vaccinate small ruminant and facilitate certification Demonstrating new technologies and giving training and advice test animals for disease TB, brucellosis...	supporter
10	District cooperative office	Organizing farmers and training on cooperative formation and saving advantage	supporter
11	Oromia Credit and Saving Share Company	Credit service but very low	supporter
12	District Agricultural office	Training and technical support	supporter

Source: survey result, 2019.

3.6. Value Chain Map of Small Ruminant in the Study Areas

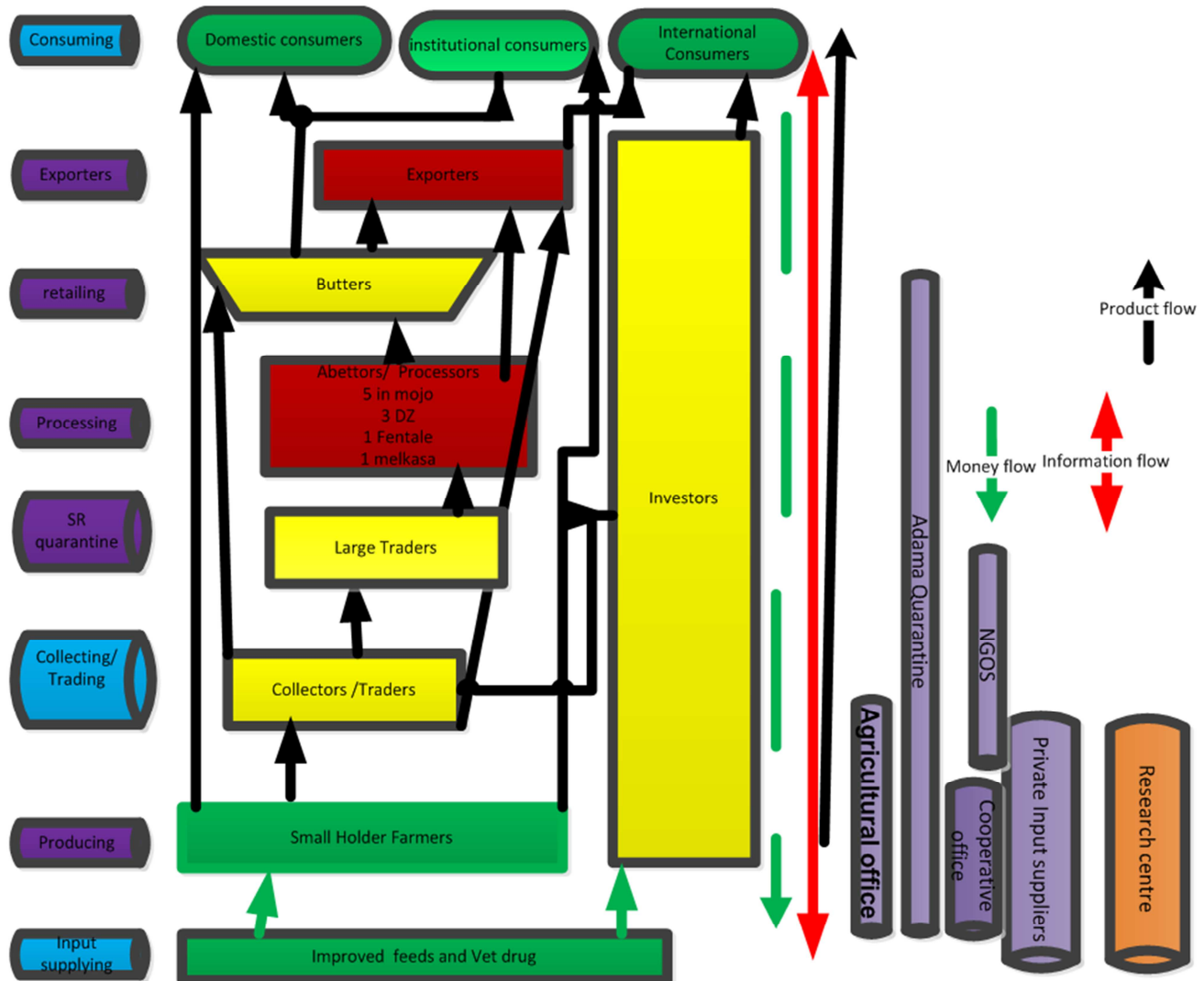


Figure 3. Value chain map of small ruminant in the study areas

3.7. Challenges & Opportunities of Actors Along Small Ruminant Value Chain

Table 5. Challenges & opportunities of actors along small ruminant value chain.

Value chain stage	Constraints	Opportunities
Inputs supply	Shortage of improved breed High cost of inputs like feeds and vet drug	High demand for improved breed, feed and vet drug
Production	low genetic potential, shortage of feed in quality and quantity, disease, lack of technology Less vet service and drug shortage Limited knowledge on quality and minimum kg requirement	Enabling policy environment & support for export market

Value chain stage	Constraints	Opportunities
Marketing	Price setting problem Brokers interferences Illegal traders Shortage of transportation from rural to market place. Removal of tail for mutton export Operation of abattoirs below their capacity	Government investment on infrastructure development Good market demand of the product
Consumers	Limited knowledge on quality and price	High demand because of test preference by consumers High consumption preference

3.8. Marketing Channels and Volume/Quantity

Small ruminant marketing channels

The small ruminant marketing channel consists of eight different channels. In this particular small ruminant marketing channel, the highest number of small ruminant is exchanged at marketing channel I, (26.50%) flowed by small ruminant marketing channel V (18%).

- I. Input suppliers- Producer- Domestic Consumer (26.50%).
- II. Input suppliers- Producer- Institutional Consumer (4%).

III. Input suppliers- Producer- collector-Butcher – Domestic Consumer (16%).

IV. Input suppliers- Producer-collector – Abattoirs - Domestic Consumer (5%).

V. Input suppliers- Producer-collector- large trader- Exporters – International Consumer (18%).

VI. Input suppliers- Producer-collector- large trader- Abattoirs – International Consumer (8%).

VII. Input suppliers- Producer- collector- Butcher – Institutional Consumer (10%).

VIII. Input suppliers- Producer- collector- Institutional Consumer (12.5%).

3.9. Small Ruminant Marketing Gross Margin and Value Share

Table 6. Small ruminant marketing Gross margin and value share.

Actors	Description	Market channels (Birr/head)							
		I	II	III	IV	V	VI	VII	VIII
Producers	Production cost	470	470	470	470	470	470	470	470
	Selling price	870	780	800	800	950	950	800	800
	Market cost	85	85	50	50	50	50	50	50
	Gross profit	315	225	280	280	430	430	280	280
Collectors	Purchasing price			800	800	950	950	800	800
	Selling price			900	900	980	980	900	1000
	Market cost			50	50	50	50	50	50
	Gross profit			50	50	-20	-20	50	150
large traders	Purchasing price					980	980		
	Selling price					1300	1300		
	Market cost					23	23		
	Gross profit					297	297		
Butchers	Purchasing price			900				900	
	Selling price			1800				1800	
	Market cost			150				150	
	Gross profit			750				750	
Processors	Purchasing price				900		1300		
	Selling price				1300		1950		
	Gross profit				400		650		
Producers share (%)		54	60	59	59	49	49	59	59
TGMM (%)		46	40	41	41	51	51	41	41

The small ruminant marketing channel consists of eight different channels (Table 6). From this marketing channel, the highest producer share were obtained by producers at channel II but the total Market gross margins were highest in channel-V (51%) and VI (51%).

4. Conclusion and Recommendations

4.1. Conclusion

There are multiple actors that involved in small ruminant value chain with diverse roles.

Eight d/t markets channels were identified for small ruminant value chain having different marketing margin. Producer's market share (GMMp) was the highest (60%) from the total consumers' price in channel II. The total gross marketing margin (TGMM) was highest in channel-V and VI. The result of this study revealed that even if small ruminants supplied to the markets by pastoralist more or less meet the quality attributes required by export markets still the majority of producers (72.4%) backyard production type, followed by small scale (23.5%), medium scale (2%) and commercial scale (2%) respectively. The value chain is constrained by low genetic potential, shortage of feed in

quality and quantity, disease, lack of technology, both legal and illegal livestock marketing systems are operating at different magnitudes, lack of market information and lack of integration among chain actors are common problem in the study area.

4.2. Recommendations

The farmers got more benefit when they sell small ruminant to market channel II. However, the amount of small ruminants supplied along this channel is very small. Therefore it was recommended market channel II for domestic market but market channel V and market channel VI for foreign market because they have the highest total market gross margin for the producers.

Strengthening farmers & consumers linkage is recommended to benefit farmers more from the channel.

Small ruminant value chain actors should work together in an integrated way to design alternative small ruminant production system, breed and feed improvement, disease control and strengthen sustainable market linkage.

Therefore, empowering poor pastoralist smallholder farmers help to provide high-quality, sustainable small ruminant production with an identified market destination and access to basic production inputs, credit, capacity-building, market-related information.

Strengthening the forward and back ward linkage among value chain actors and supporters.

Appropriate extension service that responds to the peculiar needs of export markets, especially on the aspect of providing information and knowledge on the desired small ruminant characteristics and quality requirements of importing countries should be provided for the producers.

References

- [1] Belachew Hurissa and Jemberu Eshetu. 2003. Challenges and opportunities of livestock trade in Ethiopia. Challenges and opportunities of livestock marketing in Ethiopia. In: Yilma Jobre and Getachew Gebru. (eds), *Proceedings of 10th annual conference of the Ethiopian Society of Animal Production (ESAP) held in Addis Ababa, Ethiopia, August 22–24, 2002*. ESAP, Addis Ababa, Ethiopia. pp. 1–14.
- [2] CSA (Central Statistical Agency). 2013. Agricultural sample survey, 2012/2013 (2005 EC). Report on livestock and livestock characteristics. Statistical Bulletin 570. Addis Ababa, Ethiopia: CSA.
- [3] ECRC (Ethiopian Customs and Revenue Authority). 2012. Raw data on the type, volume, value and destination of export items from Ethiopia. Addis Ababa, Ethiopia: ECRC.
- [4] FAO (Food and Agricultural Organization of the United Nations). 2012. *FAO statistical database FAO Stat. 2012*. Rome, Italy: FAO. (Available from http://faostat3.fao.org/faostat_gateway/go/to/home/E).
- [5] Gizaw, S., Lemma, S., Komen, H., Van Arendonk, J. A. M. (2007b). Estimates of genetic parameters and genetic trends for live weight and fleece traits in Menz sheep. *Small Ruminant Res.*, 70: 145–153.
- [6] Tibbo, M. (2006). Productivity and health of indigenous sheep breeds and crossbreds in the central Ethiopian highlands. PhD Thesis, Swedish University of Agricultural Sciences, Uppsala, Sweden.
- [7] Growth Commission. (2008). The Growth Report: Strategies for Sustained Growth and Inclusive Development. World Bank. Washington, DC.
- [8] CSA (Central Statistical Authority). 2009. Ethiopian agricultural sample survey. Vol II. Report on livestock and livestock characteristics. Statistical Bulletin 388. CSA, Addis Ababa, Ethiopia.
- [9] FAO (Food and Agriculture Organization of the United Nations). 2004. Livestock sector brief: Ethiopia. Livestock information, sector analysis and policy branch (AGAL), FAO, Rome, Italy.
- [10] Food and Agriculture Organization of the United Nations. 2007. Livestock and Livelihoods: Priorities and Challenges for Pro-Poor Livestock Policy.
- [11] CSA (Central Statistical Agency), 2014. Summary and statistical report of the 2013/2014 survey on Livestock and livestock characteristics, Volume II Addis Ababa, Ethiopia.
- [12] Deutsche Gesellschaft für Technische Zusammenarbeit GmbH (GTZ) (2007). Value Links Manual: The Methodology of Value Chain Promotion, First Edition. Found at Internet address <http://www.value-links.de/manual.html>, retrieved 20 February 2015.
- [13] Solomon Gizaw, Komen H, Hanotte O and van Arendonk JAM. 2008. Indigenous sheep resources of Ethiopia: Types, production systems and farmers preferences. *Animal Genetic Resources Information* 43: 25–40.
- [14] Aklilu Nigussie and Dana Hoag (2017). Goat Value Chain Analysis in Pastoral Communities of Ethiopia *Journal of Innovative Techniques in Agriculture* volume 1 (1), Ethiopia.
- [15] Weldeyesus Gebreyowhens, Zelealem Tesfay and Yaynishes Tesfay. 2016. Management and Breeding Objectives of Indigenous Smallholder Highland Sheep in Northern Ethiopia. *Journal of Biology, Agriculture and Healthcare*, 6 (1): 96–106.
- [16] Yamane, Taro. (1967). *Statistics: An Introductory Analysis*, 2nd Ed., New York: Harper and Row.
- [17] Mohamadou, F. (2013). Situation Analysis of Small Ruminants Value Chain in Ethiopia: Draft report. Nairobi: International Livestock Research Institute.