Global Veterinaria 14 (1): 48-55, 2015
ISSN 1992-6197

DOI: 10.5829/idosi.gv.2015.14.01.91154

Livestock Market Value Chain Assessment in Selected Sites of Tigray, North Ethiopia: Challenges and Opportunities for Enhancing Animal Product Export

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Abstract: Livestock systems represent a potential pathway out of poverty for many smallholders in the developing world. Ethiopia ranks in the top ten countries from the world by livestock population number but benefits less because of various factors, like poor market networking. This study was therefore conducted from November 2013 to June 2014 in selected districts of Tigray state, northern Ethiopia to assess market opportunities and challenges and key actors on value chain existing in livestock, hide and skin market linkage from the source to the inlet of the sector. A cross-sectional study design with multistage sampling technique was employed. Questionnaire survey and observational data collection were conducted to collect the required information. Four hundred four individuals (Farmers: 256; Skin and hides traders: 35; fattening cooperatives: 4; homestead slaughter house: 70; live animal traders: 29; export abattoir staff members: 5; and leather industry staff members: 5) were interviewed. Documented data were also taken for retrospective study. Among the farmer respondents 148(57.81%) had habit of branding their animals by hot iron when they get diseased. 143(55.86%) used raw skin and hide for traditional use rather than selling to skin and hide traders. In other direction, all participants from leather industry indicated inadequate supply of raw skin and hide to the industry. Hence, many hides and skins remain uncollected in the village areas of the region despite the amount of raw skin and hide supply to nearby leather industry is inadequate. As per the output of this study, 16(55.17%) live animal traders, 48(68.57%) homestead slaughter house and 198(77.04%) farmers participants replied lack of market information as major challenges. However, export abattoir is suffering from inadequate supply of live animals. Majority of the value chain problems observed on live animals and skins and hides in the region were resulted from lack of awareness of farmers, absence of market information and training services to the key actors on the network. Empowering livestock farmers and animal fatteners in order to supply high-quality and sustainable livestock production with an identified market destination will enhance the input supply.

Key words: Branding · Inadequate · Livestock · Market Information · Tigray

INTRODUCTION

Majority of the world's rural poor and a significant proportion of the urban poor keep livestock for various reasons that extend far beyond income generation [1]. Ethiopia ranks first in Africa and tenth in the world with respect to livestock population. The estimated livestock population of Ethiopia is 53.99 million heads of cattle, 25.49 million heads of sheep, 24.06 million heads of goats, 50.38 million heads of poultry and 5.21 million beehives. Tigray region owns an estimated 4.07 million heads of cattle, 1.38 million heads of sheep and 3.19 million heads of goats. In spite of the existing enormous livestock resource and great potential for increased livestock production, productivity is disproportionally lower. The contribution of this sector in the agricultural economy of the country in general and the region in particular remains lower. Poor animal husbandry, animal diseases, feed shortage, weak breed selection practice, insufficient market infrastructure, inadequate market linkage and insufficient veterinary service are major factors. Having this in mind, livestock sector in Ethiopia accounts for merely 47.687% of the national agricultural output and 23.7% of the agricultural export [3].

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The value chain concept has been applied in both crop and livestock sectors as an approach for assessing potential interventions from a development perspective. It goes beyond supply chain analysis to make more critical assessment of performance and competitive advantage in a dynamic context particularly in terms of opportunities of the organization [4]. However, it is not sufficiently practiced in Ethiopia. The entire livestock supply chain in Ethiopia is further characterized by numerous intermediaries/actors namely: brokers, collectors; agents; animal trekkers, small, medium and big traders; Wholesalers; abattoirs; butcheries; exporters and local authority. This makes the supply chain unnecessarily long with increased transaction costs and without significant value added activities [5]. Hence, competitiveness of livestock industries in the country has limited participation in domestic and export markets due to underutilization of their processing capacities. This is apparently due to inadequate supply of the required quantity and quality live animals which makes them less competitive in the global or regional meat market. Besides, live animals informal (Cross-border) trade has also its role in this insufficiency. Recent studies estimate annual illegal flow of livestock through boundaries is high [6].

Furthermore, Ethiopia used to get largest foreign currency earnings from the export of skins and hides. Thirty years ago tanneries in Ethiopia used to produce 70% of processed skins with grades 1-3 (Export standard). Currently, only 10-15% are graded in good category while the rest are downgraded or rejected due to many reasons such as ectoparasites infestation, poor flaying habits and handling issue due to poor awareness are in front [7]. Due to this fact, companies are leading into a high amount of downgrading and rejection rate after passing many processing stages [8].

The Sheba leather industry and Abergelle international export abattoir are livestock related industries established in Tigray region where this study has been done. There is a gap between supply and demand of the desired quality and quantity of the input materials to increase the capacity of exporting products. Therefore, the industries are unable to compete with international markets which is pressing issue and in need of an immediate solution. The objective of this study was to assess market opportunities and challenges and key actors on value chain existing in livestock, hide and skin market linkage from the source to the inlet.

MATERIALS AND METHODS

Study Area: The study was conducted from November, 2013 to June, 2014 in selected districts of Tigray region namely Degua-Temben, Hawzen, Sahrti-Samre, Kilte-Awlaelo, Taesiet-Tsaeda-Emba, Kolla-Temben, Ganta-Afeshum, Enderta, Atsbi-Wemberta, Hentalo-Wajrat and Mekelle. Tigray is located at the northern limit of the central highlands of Ethiopia. The region has diversified ago-ecological zones and the climate is generally sub-tropical with an extended dry period of nine to ten months and a maximum effective rainy season of 50 to 60 days [9]. The region is divided into seven zones – West Tigray, North West, East Tigray, Central Tigray, South Eastern, Mekelle and Southern Tigray and 35 districts.

Study Participants: Study participants were merchants of live animals (Sheep, goats and cattle), local collectors and wholesalers of skin and hides, animal fatteners (Unions or cooperatives), homestead slaughter houses, livestock owners and representative staff members of Sheba leather industry and Abergelle international export abattoir.

Study Design, Sampling Technique and Data Collection: The current study employed a cross-sectional study design with multistage sampling technique. Districts were selected purposively considering livestock population of the district and its proximity from the livestock industries. Peasant associations were selected using simple random sampling on lottery basis and livestock owners were also selected similarly, whereas all urban sub-districts in which livestock traders, local and wholesaler of skin and hides, homestead slaughters and animal fattening cooperatives were included purposively based on their availability of the actors on the value chain of the selected districts. Moreover, representative staff members of both Sheba leather industry and Abergelle international export abattoir were included in the study.

Number of farmers from each sub-district and peasant associations was selected using proportion population sampling technique based on owing sheep, goats and cattle. A total of 256 farmers were interviewed. Homestead slaughter house taken from each urban sub-districts were interviewed during holidays (Chris-mass, Epiphany and Easter), as most household slaughter sheep, goats and cattle during these periods. Accordingly, a total of 70 households were interviewed, of which 25, 10, 10, 6, 10 and 9 were from Mekelle, Wukro, Abi-Adi, Hagere-Selam,

Atsbi-Wenberta and Hawzen respectively. A total of 35 skin and hide traders were interviewed in this study, of which 10 were from Mekelle, 9 from Wukro, 6 from Abi-Adi, 2 from Hagere-Selam, 5 from Atsbi-Wenberta and 3 from Hawzen. Out of the total 29 live animal traders interviewed, 7, 5, 5, 3, 5 and 4 were from Mekelle, Wukro, Abi-Adi, Hagere-Selam, Atsbi-Wenberta and Hawzen respectively. Five individuals from Abergelle international export abattoir and 5 from Sheba leather industry and 4 from fattening cooperatives were interviewed. Overall, a total of 404 individuals were interviewed in the current study.

Semi-structured questionnaire and focus group discussion were used to acquire baseline information about challenges, opportunities and key actors on the value chain (Annex I-VII). Secondary data was collected using designed formats in the form of tables. Furthermore, observational data collection method was used to acquire information on market channels of live animals and skins and hides, methods used for curing hides and flaying methods.

Data Analysis: Data derived from the interviewed actors on the value chain was coded and entered in to a Microsoft excel 2007 spread sheets and statistical software of STATA version 11.0 was used for the analysis. Descriptive statistics was employed and expressed in terms of frequencies, percentages and tables.

RESULTS

Out of the total 256 farmer participants interviewed, 177(69.14%) replied as spray do not took place on time when their animals infested by ectoparasites, 148(57.81%) brand their animals by hot iron when they get diseased and 143(55.86%) used raw skin and hide for traditional use rather than selling to skin and hide traders (Table 1).

From 70 household heads interviewed, 58(82.86%) respondents were not getting training on handling and preservation of skin and hide during and after slaughtering. Moreover, 61(87.14%) respondents replied as they take care only to meat during slaughtering of their animals (Table 2).

Out of 35 skins and hides traders, 31(88.57%) wholesalers were interact directly to Sheba leather industry. Moreover, 20(57.14%) respondents were getting training on handling and preservation of skin and hide during collection and preservation (Table 3).

Table 1: The overall information collected from farmer respondents

Characteristics		No. of respondents	Percentage (%)
Market information	No	198	77.34
	Yes	58	22.66
District	Seharti-Samre	19	7.42
	Ganta-Afoshim	26	10.16
	Kilete-Awlaello	25	9.77
	Atsbi-Wenberta	52	20.31
	Saesiea-Tsaedaemba	69	26.95
	Enderta	65	25.39
Spray on time	Yes	79	30.86
	No	177	69.14
Branding when the animal get diseased	Yes	148	57.81
	No	108	42.19
Fate of skin and hide	Sell to traders	113	44.14
	Traditional use	143	55.86
Nearby Veterinary service	Adequate	119	46.48
	Inadequate	137	53.52

Table 2: The overall information collected from homestead slaughter house respondents

Characteristics		No. of respondents	Percentage (%)
Level of education	Illiterate	3	4.29
	Elementary	13	18.57
	High school	7	10
	College and above	47	67.14
More care is given to	Skin	9	12.86
	Meat	61	87.14
Market opportunity	Good	22	31.43
	Moderate	34	48.57
	Poor	14	20
Training on skin and hide management	Yes	12	17.14
	No	58	82.86

Table 3: The overall information collected from skin and hide traders

Characteristics		No. of respondents	Percentage (%)
Level of education	Illiterate	8	22.86
	Elementary	12	34.29
	High school	11	31.43
	College and above	4	11.43
Interaction with buyer	Directly to Sheba leather Industry	31	88.57
	Through wholesaler	4	11.43
Training on skin and hide management	Yes	20	57.14
	No	15	42.86
Days between order and delivery	1-3 days	7	20
	3-5 days	1	2.86
	A week	2	5.71
	Two week	7	20
	More than 1 month	18	51.43
Market opportunity	Good	11	31.43
	Moderate	18	51.43
	Poor	6	17.14

Table 4: The overall information collected from live animal traders

Characteristics		No. of respondents	Percentage (%)
Level of education	Illiterate1	12	41.38
	Elementary	11	37.93
	High school	4	13.79
	College and above	2	6.90
Market Information	Yes	13	44.83
	No	16	55.17
Market opportunity	Good	5	17.24
	Moderate	17	58.62
	Poor	7	24.14
Linkage with abattoirs and/or fattening enterprise	Yes	14	24.14
	No	15	75.86

Table 5: The overall information collected from animal fattening cooperatives

Characteristics		No. of respondents	Percentage (%)
Interaction with buyers	Direct	4	100
	Via an intermediary	0	0
Market Information	Yes	3	75
	No	1	25
Training on animal management	Yes	3	75
	No	1	25
Market opportunity of fattened animal	Good	2	50
	Moderate	2	50
Major challenges encounter	Lack of feed	3	75
	Lack feed and capital	1	25

Table 6: The overall information collected from Sheba leather industry

Characteristics		No. of respondents	Percentage (%)
Source of raw skins and hides	Traders/suppliers	2	40
	Abattoirs	3	60
Supply of raw skin and hide	Adequate	0	0
	Inadequate	5	100
Network with local collectors	Yes	5	100
	No	0	0
Training to local collectors	Yes	5	100
	No	0	0
Price of raw skin and hide	Expensive	5	100
	Moderate	0	0
	Cheap	0	0
Market opportunity	Moderate	2	40
	Poor	3	60

Fourteen (24.14%) of the 29 live animal traders were input suppliers to Abergelle international export abattoir. While, 16(55.17%) had no market information (Table 4).

Four representative animal fattening cooperatives (from Samre, Enderta, Kola-Temben and Hentalo-Wajrat) were interviewed. All said interaction with buyers like Abergelle international export abattoir is direct. Majority of the respondents 3(75%) said lack of feed was the major challenge during animal fattening (Table 5).

Table 7: Information obtained from Abergelle international export abattoir

Characteristics		No. of respondents	Percentage (%)
Source of animal	Market	1	20
	Market and fattening cooperatives	4	80
Breed preference	Local	4	80
	Cross	1	20
Linkage with other industries	Yes	5	100
	No	0	0
Supply of live animals	Adequate	0	0
	Inadequate	5	100
Market opportunity	Good	1	20
	Moderate	1	20
	Poor	3	60

Five representative staff members of Sheba leather industry were interviewed. All of the interviewed respondents indicated the inadequacy of raw skins and hides supply and also they have network with local collectors and give training to the local collectors (Table 6).

A total of 5 representative staff members of Abergelle international export abattoir were interviewed. Even though 4(80%) of the respondents replied that animals were purchased both from market and fattening cooperatives but the cooperatives are not as such strong to supply adequate amount of animals to the abattoir (Table 7).

Secondary data obtained from Sheba leather industry showed that the quality of goat skins was downgrading from year to year (Table 8).

The secondary data below also shows the down grading of wet salted sheep skins in terms of quality from year to year.

In the current study the market channel for skin and hide in Tigray region function at four levels; primary, secondary, tertiary and terminal markets. Primary markets were done by homestead slaughter houses based in rural towns of various districts. Secondary markets were done by local collectors (Primary traders). Primary traders collect hides from livestock keepers in the villages or households in the cities and sell to secondary trader (Wholesale traders). Secondary traders after preservation by sun or air drying or as fresh sell to terminal markets / tanneries / in Tigray particularly to Sheba leather industry and other urban centers (Addis Ababa tanneries). The tannery was also supplied directly from the slaughter premises (Abergelle international export abattoir and Addis Ababa abattoir). The tannery is at the final end of the marketing chain of raw skin and hides. As they were the end users of the raw materials, their role in the trade

Table 8: Retrospective data of air dried goat skins taken from Sheba leather industry

		Grades and Quantity (pcs) or percentage (%)				
Year	Quantity collected	G1-G3	G4	G5	G6	G7(Reject)
2007/8	387,452	108,071 (28%)	119,812(31%)	106,715(27.5%)	42,818(11%)	10,036(2.5%)
2008/9	521,151	65,717(12.61%)	133,779(25.67%)	192,565(36.95%)	98,914(18.98%)	30,175(5.79%)
2009/10	1,126,749	163,380 (14.5%)	313,005(27.8%)	410,650(36.44%)	190,779 (16.9%)	48,935(4.3%)
2010/11	753,700	100,016 (13.27%)	177195(23.51%)	348,586(46.25%)	98,433(13.06%)	29,470(3.91%)
2011/12	642,482	100,532 (15.6%)	140,527(21.9%)	249,662(38.9%)	108,621 (16.9%)	43,140(6.7%)
2012/13	337,250	19,541(5.8%)	47,841(14.2%)	120,952(35.86%)	87,260(25.87%)	61,655(18.28%)
Sep-Jan 2013/14	184,780	112(0.06%)	2,309(1.23%)	42,848(22.82%)	62,563(33.3%)	79,913(42.6%)

G= stands for grade, pcs=pieces

Table 9: Retrospective data of wet salted sheep skins taken from Sheba leather industry

		Grades and Quantity (pcs) or percentage (%)				
Year	Quantity collected	G1-G3	G4	G5	G6	G7(Reject)
2007/8	574,014	165,127(28.77%)	165,127(28.77%)	149286(26%)	72950(12.71%)	21,523(3.75%)
2008/9	1,095,098	147,618(13.5)	260,612(23.78%)	376,904(34.42%)	216,975(19.8%)	92,989(8.5%)
2009/10	1,838,837	265,266 (14.43%)	448,856(24.41%)	623,983(33.93%)	350,071(19.04%)	150,661(8.19%)
2010/11	1,540,871	147,401(9.57%)	312,017(20.24%)	632,026(41.02%)	314,630(20.42%)	134,797(8.75%)
2011/12	905,972	27,179(3%)	99,657(11%)	389,568(43%)	262,732(29%)	126,836(14%)
2012/13	651,972	13,039(2%)	39,118(6%)	182,552(28%)	208,631(32%)	208,631(32%)
Sep-Jan 2013/14	486,035	0(0%)	4,860(1%)	82,626(17%)	155,531(32%)	243,018(50%)

G= stands for grade: pcs= pieces

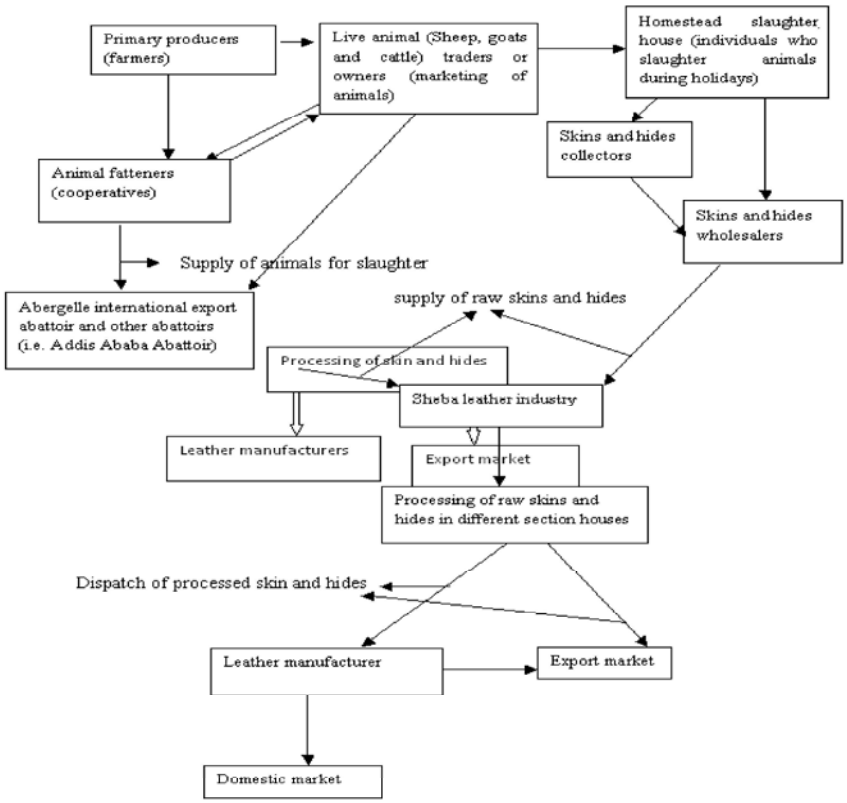

Fig. 1: Market channels of raw skins and hides in view of Sheba leather industry

was decisive all the way along the market chain. The tanneries process the skins and hides received from their suppliers either in the green (Fresh), air-dried or wet salted states to semi-finished or finished stages for both local and export markets (Figure 1).

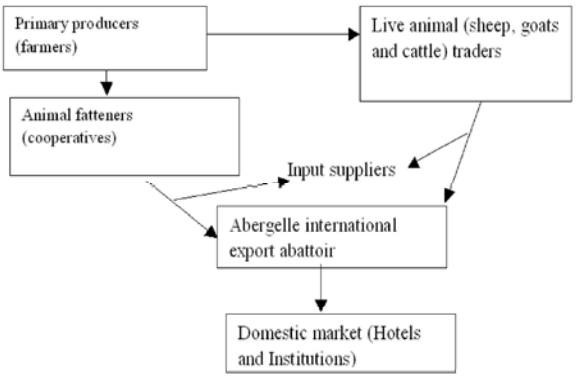

Fig. 2: Live animals` market channel in view of Abergelle international export abattoir

This study revealed that small-scale traders directly procure live animals in the markets from livestock producers(Farmers) and then sell the animals to other traders (Large –scale traders).Small-scale traders commonly assemble slaughter stock and transport directly to Mekelle market area from different small cities of Tigray region. Large-scale traders living in Mekelle city then directly supplies animals for slaughter to Abergelle international export abattoir after they collected the animals from small scale traders or farmers. There are also animal fattening cooperatives that supply live animals to Abergelle export abattoir house. In the abattoir per- slaughtering and post slaughtering handling was performed. Lastly the products were dispatched to local and export markets (Figure 2).

DISCUSSION

The study showed that majority of the farmers did not spray their animals on time when they get diseased by ectoparasites. Thus, quality of raw skin and hide has deteriorated with an increasing number of reject grades due to the appearance of a skin disease called "Ekek" (Itching) that is mainly due to lice, keds and mange infestation. This is in line with other reports [6], saying thirty years ago tanneries in Ethiopia used to produce 70% of processed skins with grades 1-3. Currently, only 10-15% is in good category while the rest are downgraded or rejected mainly due to the increase in external parasite infestations during the period.

Majority of respondent farmers brands their animals when they get diseased. Thus has a negative effect on the quality of skins and hides. Traditionally farmers treat their animals when they get sick or injured. This agreed with previous reports [10], who said different traditional methods of treating animal practiced by the farmers such as branding This has a significant negative effect on the quality of the hides or skins produced from branded animal.

As shown in the current study, majority of the farmers utilized raw skin and hide for traditional household items. Hence, many hides and skins remain uncollected in village areas of Tigray region. Thus, the amount of raw skin and hide supply to Sheba leather industry is inadequate. Similar finding showed that household consumption of hides and skins in Western Tigray reaches 37% and 61% respectively for household consumption [11], largest proportion in the region. The study is also in agreement with parallel study [12] saying that many hides and skins remain uncollected, which are estimated at 14% for hides, 34% for sheep skins and 29% for goat skins.

The study identified as most animals in Tigray region are slaughtered in facilities which do not have adequate infrastructure or tools required to ensure production of good quality hides and skins. Homestead slaughter was found commonly habited practice in the region which agrees with previous reports [13], indicating slaughter of livestock in rural slaughter slabs is done under very poor conditions. Cattle, sheep and goats are mainly slaughtered in poorly equipped slaughter points where the infrastructure is sometimes a slab of concrete, under a tree or using poles for hoisting carcasses. The slaughtering is, therefore, takes place in scattered areas and often without adequate supervision. The tools used in these facilities or in homesteads are usually rudimentary and cause damage to the hides during slaughter, resulting in poor prices and causing man made defects on skins and hides. Goats and sheep are mainly slaughtered in homesteads during cultural and religious festivals which are scattered and periodic. After slaughter, the skin is removed by hand with a knife (i.e. hand flaying) and this reflects directly on the poor quality of raw skins obtained, with the traditional slaughter having many slaughter defects and, consequently, fetching poorer price [14].

The study indicated that majority of the traders of live animals; homestead slaughter house and farmers had no market information. This might be due to the existence of communication gaps among traders, farmers, homestead slaughter house, Abergelle international export abattoir and Sheba leather industry. There was mismatch between the demand of the sectors (Abergelle international export abattoir and Sheba leather industry) and t he participating suppliers in both sectors. Market

information is said to be more perishable than the commodity itself. Access to timely and accurate market information is therefore vital not only for hides and skins marketing but also for the marketing of other commodities. Other studies argues that the existence of information barriers results in unexploited market opportunities, seasonal gluts and produces with inadequate quality specification and control, inequitable returns to producers and fundamentally poor returns to production and marketing system as a whole [15]. Accurate and timely market information enhances market performance by improving the knowledge of buyers and sellers concerning prices, price trends, production, supply movements, stocks and demand conditions at each level of the market [16]. Although producers, traders and the industries are the direct beneficiaries of the reliable and timely market information, ultimately, there are benefits to the consumers (Users of leather products and meat) and government, as a result of market efficiency and enhanced competition.

The current study revealed that value addition along the skins and hides value chain is relatively un-developed. This might be due to the main constraints include, low supply, poor quality and faster spoilage of skins and hides as a result of improper preservation technique. Poor quality is caused by parasites and diseases, inappropriately placed brand marks and flay cuts and inappropriate curing techniques. Although Sheba leather industry has a processing capacity of 378,000 tone skins per annum [17] and exports most of its products to Italy, China, India, Pakistan, Netherlands, Turkey, Thailand, Malaysia and other countries while the domestic markets are mainly with the local producers of finished products like shoes and other leather articles. However, the current study indicated that the company was getting inadequate supply of raw skin and hide. As a result Sheba leather industry is unable to compute international markets.

The study presented that Abergelle international export abattoir is getting inadequate supply of live animals for slaughtering. This might be, due to poor livestock market linkage and infrastructures, insufficient livestock market facilities, poor performance of output in quantity and quality, poor practice of fattening, breeding and feeding, health and husbandry management of animals. This is in line with the idea saying live animals throughput is inadequate resulting in the existing meat processing facilities operating at less than 50% of their operational capacities [18]. This is apparently due to inadequate supply of the required quality live animals for meat processing by the export abattoirs which makes them less competitive in the global or regional meat market. The result also shows similar finding with Workneh [6], saying the legal export of processed meat is constrained due to shortage created by the illicit export.

In the survey area majority of the homestead slaughter household heads were rejected by skins and hides traders and they were forced to sell skins and hides at lower prices. This might be due to knife cut and being small size. As a result, Sheba leather industry gets poor quality of Skins and hides from animals slaughtered in households than animals slaughtered in legal places (Abattoirs) with high care of skins and hides flaying. The study shows similar finding done in Eastern Tigray; According to the traders, hides and skins obtained from butcheries fetch better prices compared with backyard slaughter, which lack quality due to improper slaughtering technique, place and preservation method. The rejected hides or skins, most of the time, are sold to the tanneries at lower prices [19].

CONCLUSION

The study showed that majority of the problems observed on the value chain of live animals and raw hides and skins to the livestock related industry in the region were lack of market information and insufficient training services to the key actors involving in the network. Poor animal husbandry, high infestation of external parasites, traditional slaughtering supported with inadequate tools and places, improper preservation and general handling and improper transportation technique were identified factors for downgrading of hide and skin quality. Poor public awareness, inadequate market linkage and information flow and inadequate animal supply in terms of age and quality looking to customer demand were recorded challenges of the meat export industry. Furthermore, inadequate number of cooperatives and unions to satisfy the supply in quantity and quality was also additional challenges in the sector. Tremendous interventions in the coordination of livestock and livestock products marketing activities and provision of market support services are needed. Empowering livestock farmers, animal fattening cooperatives/unions in order to supply high-quality and sustainable livestock production with an identified market destination is mandatory. Integrated efforts towards improved livestock husbandry, animal health care and application of insecticide and acaricide are crucial.

Competing Interests: We declare that we do not have competing interest on all activities pertaining this research work.

ACKNOWLEDGEMENTS

This investigation received financial support from Mekelle University College of Veterinary Medicine, Veterinary Extension and Consultancy Center. The authors gratefully acknowledge Sheba lather industry and Abergelle International export abattoir for provide us all requested information. The authors also extend special acknowledgement to all target respondents/participants of the study for provision of useful information.

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