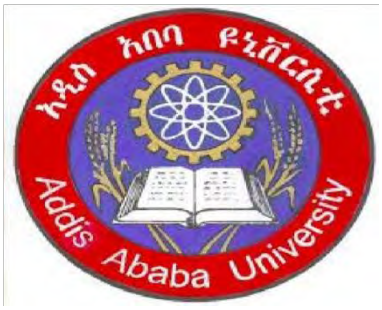
Thesis Ref. No. _____

ASSESSMENT OF POST SLAUGHTER HIDE AND SKIN DEFECTS AND MARKET ANALYSIS IN ARSI NEGELE AND SHASHEMENE WOREDAS, WEST ARSI, OROMIA REGIONAL STATE

MSc.Thesis



By

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Addis Ababa University, College of Veterinary Medicine and Agriculture,
Department of Animal Production Studies

June, 2015

Bishoftu, Ethiopia

ASSESSMENT OF POST SLAUGHTER HIDE AND SKIN DEFECT AND MARKET ANALYSIS IN ARSI NEGELE AND SHASHEMENE WOREDA, WEST ARSI, OROMIA REGIONAL STATE

A Thesis Submitted to the College of Veterinary Medicine and Agriculture of Addis Ababa University in partial fulfilment of the requirements for the degree of Master of Science in Tropical Animal production and Health

By
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June, 2015
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As members of the Examining Board of the final MSc open defence, we certify that we have read and evaluated the Thesis prepared by Selamawit Terefe, titled "Assessm ent of Post Slaughter Hide and Skin Defect and Market Analysis in Arsi Negele and Shashemene Woreda, West Arsi Oromia Regional State" and recommend that it be accepted as fulfilling the thesis requirement for the degree of Masters of Science in Tropical Animal Production and Health.

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DEDICATION

I dedicate this thesis to all my beloved families, to my Father Ato Terefe Getu, to my Mother w/ro Betelhem Albew and especially to my beloved Brother Biruk Terefe for his unreserved encouragement during my study and for their dedicated partnership in the success of my life.

STATEMENT OF AUTHOR

First, I declare that this thesis is my *bonafide* work and that all sources of material used for this thesis have been duly acknowledged. This thesis has been submitted in partial fulfilment of the requirements for an advanced (MSc) degree at Addis Ababa University, College of Veterinary Medicine and Agriculture and is deposited at the University/College library to be made available to borrowers under rules of the Library. I solemnly declare that this thesis is not submitted to any other institution anywhere for the award of any academic degree, diploma, or certificate.

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Date of Submission: 15/06/2015

ACKNOWLEDGMENTS

Above all, I would like to provide thanks to the Almighty God for the blessing and supplying strength, believes, hope, patience and protection to me and my families throughout my life.

First and foremost I would like to thank my advisor Dr.Getachew Terefe, in providing me the required materials, liaison me with the sponsoring project, offering helpful and constructive comments, guiding and encouraging me in all moments since the researc h proposal preparation. His comments on the survey instruments greatly helped me to come up with good and comprehensive data set for the thesis. Without exaggeration, the finalization of this thesis report would have been hardly possible without his guidance and heart full support. My thanks also go to Dr. Tariku jibat for his kindness, positive thinking, precious comments and suggestion during proposal development, data collection and thesis write-up.

I am also thankful to Addis Ababa University for granting me a scholarship to study MSc education in the College of Veterinary Medicine and Agriculture. I would also like to acknowledge the Office of the Vice President for Research and Technology Transfer of Addis Ababa University for supporting my research work through the "HIDE AND SKIN QUALITY MANAGEMENT" thematic research project.

Thanks are also presented to the Arsi Negele and Shashemene woreda hides and skins traders, producers and the key informants. I am extremely thankful to my friends Dr. Asheber Abraha, Dr Yonas Gizaw, Dr Moa Melaku, Dr Yodit Ayele, Ato Andualem Toman and Askale Gizaw in providing their precious advices and unreserved help. Finally a very special appreciation goes to my Father Ato Terefe Getu and my Mother w/o Betlehem Alebew, for their unreserved encouragement, patience and love during my study. Their special prayer helped me to have strength and endurance in my work. They are a source of my happiness and well-being. Thanks God for giving me such a brave family.

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LIST OF ABBREVIATIONS

ARMD	Animal Resources Marketing Department
CSA	Central Statistical Authority
EEA	Ethiopian Economic Association
ELICO	Ethiopian Leather industry Plc
EQSA	Ethiopian Quality Standard Authority
EU	European Union
FAO	Food and Agriculture Organization
GDP	Gross Domestic Product
LDMPS	Livestock Development Master Plan Study
LLPI	Leather and Leather Products Industry
LMA	Livestock Marketing Authority
MOA	Ministry of Agriculture
MOTI	Ministry of Trade and Industry
NBE	National Bank of Ethiopia
PIC	Productivity Improvement Centre
SFF	Static Flaying Frame
SLDP	Second Livestock Development Project
SNNPRS	Southern Nations, Nationalities and Peoples Regional state
SWAO	Shashemene Woreda Agricultural Office
TLU	Tropical Livestock Unit
UNIDO	United Nation's Industry Development Organization
USD	United States Dollar
USDA	United States Department of Agriculture
WAZLDHO	West Arsi Zone Livestock Development Health Office

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ABSTRACT

The current cross sectional study was conducted from November 2014 to March 2015 on post slaughter hide and skin defects and market chain analysis in Arsi Negele and Shashemene woredas of west Arsi Zone Oromia Regional state. Eight kebeles from each woredas were selected purposively and numbers of house hold producer in each kebeles were taken proportionally. In addition to these, 24 butcheries, 5 middlemen and 4 collection centres were visited. One hundred households from each woreda were interviewed and 384 hides and skins at each woreda were sampled for prevalence of post slaughter defects at the four collection centers. Accordingly, 180 hides, 284 sheep skin and 304 goat skins (based on the supply proportion for each species) were visually inspected. Measurement of hide and skin were also carried out and were graded according to the standard set by Ethiopian Quality and Standard Authority. The result showed 94% of Arsi Negele and 97% of Shashemene house hold respondents had experience of slaughtering livestock at home. Respondents perceive that absence of flay cut, Freshness, Size and weight of the skin are major criteria for quality of hide and skin. Respondents from their experience ascertained also that flay cut, dirt, flesh remnant and blood were among the major defects encountered during slaughtering process where as dirt, delay in selling and putrefaction are also problems encountered after slaughtering process of livestock by producers. Majority (89%) of the sampled households reported to sell hide and skin to the formal market. Salting hides and skin is a practice very commonly adopted by middle men and collection centers in both woredas. Inspection of hides and skins at collection centres revealed that cattle hides had major defects such as flesh remnants, blood, dirt, corduroying and hole/flay cut. Similarly sheep skins were found to have flesh remnant (79.6%) and dirt (65.5%) Flesh remnant and dirt were also encountered as major defects on goat skins of the study areas. Measurement of the raw materials also demonstrated that large proportion of the sampled fresh and salted cattle hide were in the medium weight category whereas large proportion of the sampled fresh sheep and goat skin were in the extra light category and salted sheep and goat skin fall in the extra heavy category. On the other hand size measurement also showed that most of the sampled fresh and salted sheep and goat skin fall in medium and small size

category. Four lines of market channels were identified for hides and skins. This starts from producers followed by middlemen, collection centres and tanneries. Producer in the study woredas usually were price takers and also had limited market information. It can be concluded that the post-slaughter defects demonstrated have the potential to downgrade the quality of hide and skins in the study areas. However, they can easily be minimized through continuous awareness creation and training and provision of more access to market and better price offer.

Key words: *Arsi Negele, hide, management, market, quality, Shashemene, skin, post slaughter.*

1. INTRODUCTION

Ethiopia is generously endowed with livestock resources. Its cattle population of more than 53 million, along with sheep and goat populations of 25.5 and 24.1 million, respectively, put the country first in Africa (CSA, 2013).The agricultural sector in Ethiopia, engaging 85% of the population, contributes 52% to the gross domestic product (GDP) and 90% to the foreign exchange earnings (CSA, 2008).

The livestock is an important sub-sector within Ethiopia's economy in terms of its contributions to both agricultural value-added and national GDP. Between 1995/96 and 2005/06, the livestock sub-sector's share averaged 24 percent of agricultural GDP and 11 percent of national GDP, with the highest shares recorded at 27 percent and 13 percent, respectively, at its peak (NBE, 2005/06). The role played by livestock in the economy of Ethiopia, as in many developing countries, is varied but substantial. Livestock contribute to the production of food (meat, milk, eggs and blood), industrial raw materials (wool, hair, hides and skins) input for crop production (draught power and manure) and export earnings (live animals, skin and hides). They also generate cash income which can be used to purchase food grain, seeds, fertilizer and farm implements (Ayele *et al.,* 2003 and Azage, 2006).

Hides and skins are the basic raw materials for the leather industry. Currently there are about 27 tanneries in the country and have an average capacity of processing 4,000 pieces of hides and 30,000 pieces of skins per day (EEA, 2007/08). Based on the off-take rate of 7%, 33% and 35% for cattle, sheep and goat respectively, it is expected to produce 3.1 million hides, 7.8 million sheep skins and 8.2 million goat skins (CSA, 2004 and CSA, 2007).

In Ethiopia hides and skins contribute substantially to the export earnings from the livestock sector and it has been exporting hides and skins in the past hundreds of years (Girma, 2003). In 2002 hides and skins represent major source of foreign exchange earnings for the country accounting for 14-16% of the total export revenue. The major export contributor of the manufacturing sector in Ethiopia is the leather

and footwear industries, which contributed 70% of the export earnings for the year 2005-2007 (Kassa, 2001).

In Ethiopia, livestock is the second major source of foreign currency through export of live animals, meat, skins and hides. Livestock hide and skin contribute a significant proportion of domestic leather. However in recent years, this rank has been relegated to fifth level mainly because of rejection and down grading inflicted on hides and skins mainly due to infestation by external parasites (Kassa, 2005) but also due to pre- and post-slaughter skin management problems (Zenaw and Mekonnen 2012).

These problems include during ante-mortem (on the farm, during transport, at markets/abattoir) and post-slaughter (at the abattoir/hide market, during storage, preservation). Pre-mortem defects include: Scratches, cockle brand marks, scars, old age defects and poor substances (Kassa,1998 and Kidanu, 2001) while post-mortem defects comprise of bruise gouge marks, flay cut, bad bleeding, putrefaction, hair slip and beetle damages (Kidanu, 2001). The consequences of all such defects are that every tannery (or trader) had to adopt customized criteria to select/sort quality of incoming raw hides/skins and outgoing finished leather ultimately resulting in price differences among grades (Hagos *et al.*, 2013).

Determining the extent of loses from hides and skins that are not collected for processing or are processed improperly is difficult to estimate, many of them are ,discarded soon after slaughtering but the majority losses occur among which have been damaged before, during or after collection (FAO, 2009).

Traditionally household producer slaughter their animals at backyard system with improper flaying and by unskilled person. This has a significant negative effect on the quality of the hides or skins produced from poor flaying and preservation effect. Hides and skins are meat by-products and there is still little consideration given to the care required for the handling, collection and processing of the hides and skins in to high quality leather (Adugna, 2004). Limited studies were conducted regarding the quality and marketing of the hide and skins in Ethiopia. However, there is no detail study on post slaughter defect and marketing aspects of the hide and skin in Arsi Negele and Shashemene woredas of west Arsi zone Oromia region.

Therefore, the general objective of this study is to assess hide and skin quality and marketing chain and its constraints in Arsi Negele and Shashemene woredas of West Arsi zone, Oromia Regional State.

With the following specific objectives:

- To assess participants' perception and practices on the quality and management of hides and skins.
- To assess the quality of hides and skins in the study areas with special emphasis on post-slaughter defects and some physical parameters of the raw materials.
- To describe hide and skin marketing at Arsi Negele and Shashemene woredas.

2. LITERATURE REVIEW

2.1. Hide and Skin Definition

Boahen (2005) defines hide and skin as: “Large animals are said to have “hides” (e.g. cow-hide, buffalo-hide), while smaller animals have “skins” (e.g. goat-skin, sheep-skin). Hides and skins are the basic raw material for the production of leather for footwear, clothing, upholstery, industrial uses, etc. A good proportion of this raw material comes from the farmer, village trader, trader, and country butcher and therefore these producers must make all possible efforts to maintain a high standard of quality of the raw materials (PIC, 1990).

2.2. Development of Hide and Skins

Archaeological studies have shown that hides and skins have been used since antiquit y as clothes, vessels, bedding, and possibly structurally in ancient dwelling places. At present, leather is used in various applications. Hides and skins, raw materials for the tanning industry, are renewable and easily perishable resources (Arugna, 1995). Their production is dependent on the rearing, management and disposal of the livestock pop ulation. The availability of hides and skins through slaughtering or death of livestock is of particular importance to the leather industry. Hides and skins could be obtained from fish, birds, and reptiles as well as wild and domesticated animals. The most important sources are cattle, sheep and goats (Ahmed Mahmud, 2000).

More widespread use of hides and skins would have required the development of special processing techniques. Raw hides and skins are of little use in their natural state and spoil quickly. The simplest way of protecting and processing them is by drying, which causes major changes in their physical characteristics. Some of the applications for dried hides include the manufacture of personal armour, shields, musical instruments (such as drums) and upholstering chairs. Dried skins have also been used for similar purposes and, because of the abundance of hair, fur or wool that

commonly occurs on them, skins have long been used to make clothes particularly suitable for use in cold climates (Leach, 1995).

By far the most important application for hides and skins, in terms of both value and volume, are their use at the principal raw material in the manufacture of leather. Tanning, which is synonymous with leather manufacture, may refer specifically to the one crucial step in processing, which changes hides and skins into leather. Alternatively, tanning may be applied to a whole series of related operations. In fact, the whole sequence of procedures involved in the manufacture of leather consists of more than a dozen different steps (Lockhart-Smith and Elliott 1974).

Until recently the general trade in hides and skins consisted of exports from developing countries to developed countries. Only in the 1970s did the net trade in raw materials balance and then change with developing countries starting to import more hides and skins (FAO, 1986).

Since hides and skins are by-products, their supply is not primarily affected by the demands of the tanning industry. Deliberate slaughter of animals for meat production accounts for most of the hides and skins available to the tanning industry. In some countries, significant numbers of most hides and skins may also be provided by fallen or casualty animals. Though deliberate slaughter usually occurs in response to the demand for meat, they may be influenced by other factors (Leach, 1995). Despite the significance of activities undertaken in slaughterhouses, it is generally accepted that the facilities available in most developing countries are less than ideal. In some instances, the problem is a general lack of money for the provision or improvement of facilities (Leach *et al*., 1993). Although hides and skins from conventional slaughtering operations constitute the bulk of raw materials for the tanning industry in some places, those from fallen animals and game animals may provide another useful source (Leach *et al*., 1993).

2.3. Hide and Skin Production in the World

According to the Food and Agricultural Organization of the United Nations (FAO, 2013), the global population of bovine, sheep and goats is estimated at 1.6 billion, over 1 billion and 909 million respectively, with the off-take rates of 21.9 per cent for bovine, 49.1 percent for sheep and 52.1percent for goats. Thus, considering these rates, the output for 2001-2003 averaged approximately 353 million pieces of cow-hides, 532 million pieces of sheep skin and 474 million pieces goat skin. Africa's livestock population represents over 14%, 20% and 28% of the global cattle, sheep and goats population respectively and with the estimate of 220 million cattle heads, 214 million sheep and 257 million goats flock (Table 1).

Table 1. Raw hides and skins: Average 2009-2011

	BOVINE HIDES AND SKINS					SHEEP AND LAMB SKINS					GOAT AND KID SKINS				
	Livestock Numbers	Share of global herd	Ratio of output to livestock numbers	Numerical out put	Average unit weights	Livestock Numbers	Share of global herd	Ratio of output to livestock numbers	Numerical out put	Average unit weights	Livestock Numbers	Share of global herd	Ratio of output to livestock numbers	Numerical out put	Average unit weights
	Million head	(…percent…)	(…percent…)	Million pieces	Kg.wet salted	Million head	(…percent…)	(…percent…)	Million pieces	Kg.dry	Million head	(…percent…)	(…percent…)	Million pieces	Kg.dry
WORLD	**1616.6**	**100.0**	**21.9**	**353.4**	**18.19**	**1083.5**	**100**	**49.1**	**531.6**	**0.75**	**909.4**	**100**	**52.1**	**473.9**	**0.71**
Developing	**1305.3**	**80.7**	**18.7**	**243.9**	**16.20**	**762.5**	**70.4**	**46.7**	**356.1**	**0.61**	**866.9**	**95.3**	**52.5**	**455.1**	**0.70**
Latin America	408.9	25.3	19.4	79.4	21.79	86.7	8	25.3	21.9	0.78	34.5	3.8	28.7	9.9	0.59
Africa	220.6	13.6	12.5	27.6	13.27	213.8	19.7	36.2	77.5	0.72	256.6	28.2	33.6	86.1	0.57
Near East	76.4	4.7	23.6	18	16.31	195.7	18.1	39.6	77.4	0.63	107.1	11.8	44.6	47.8	0.77
Far East	598.7	37	19.9	118.9	13.11	266.4	24.6	67.3	179.3	0.53	468.5	51.5	66.4	311.2	0.74
Developing other	0.7	0.1	14.3	0.1	20.40	0.0	0.0	0.0	0.0	0.50	0.3	0.0	33.3	0.1	0.60
Developed	**311.3**	**19.3**	**35.1**	**109.4**	**22.62**	**321.0**	**29.6**	**54.7**	**175.5**	**1.05**	**42.5**	**4.7**	**44.5**	**18.9**	**0.76**
North America	106.5	6.6	36.2	38.6	25.15	6.5	0.6	49.2	3.2	1.11	3.1	0.3	22.6	0.7	0.99
Europe	94.6	5.9	32.6	30.8	23.92	108.2	10.0	63.4	68.6	0.97	14.4	1.6	74.3	10.7	0.66
Area of the former Ussr	54.1	3.3	43.3	23.4	18.93	77.9	7.2	53.0	41.3	0.70	14.1	1.6	27.7	3.9	0.90
Oceania	37.7	2.3	32.4	12.2	18.74	103.3	9.5	51.8	53.5	1.37	4.6	0.5	23.9	1.1	0.95
Other developed	18.5	1.1	23.8	4.4	22.08	25.1	2.3	35.1	8.8	1.28	6.4	0.7	39.1	2.5	0.80

Source: FAO 2013 World Statistical

2.4. The Hides and Skins Sector in Ethiopia

The emergence of modern tanning in Ethiopia dates back to 1918 and 1927 with the establishment of the then ASCO (currently Addis Tannery) and Darmar/Awash (currently ELICO) Tanneries, respectively. Between 1954 and 1976, Dire, Mojo and Combolach tanneries were established (Darge, 1995). Ethiopia has been exporting more of hides and skins relative to its meat and live animals export. The channels for the collection of hides and skins to the tanneries are relatively well established but need significant improvements to reduce damages caused by thorns, ectoparasitic diseases, poor flaying and storage methods. Whereas achieving significant improvements on the former two may not be easy given the country's' under developed animal health delivery system and livestock grazing habits, technical improvements on the latter two are within reach given some commitment (Yacob, 2002).

Cattle hides: Probably the best-known types of mammalian hides used by the tanning industry are those provided by cattle. In 1990, based on the level of recorded slaughtering for meat production, cattle would have provided about 28% of the total number of all hides and skins. On the basis of weight, cattle hides may have contributed as much as 90% of the tanning industry's raw materials from conventional sources (Berhe, 2009).

Sheep skins: are important sources of raw materials for the tanning industry, providing 48% of the pieces in 1990 or 7% of the weight of raw material from conventional sources (Berhe, 2009).

Goat skins: are the third principal sources of raw materials for the tanning industry, providing 24% of the pieces in 1990, or 3% of the weight. They are about the same size as sheep skins, but slightly lighter at 2-5 kg and thinner at 1-2 mm. They are generally considered by tanners to be one of the best materials for leather manufacture. The papillary layer constitutes about 50% of the thickness of the dermis, but it does not seriously weaken the skin (Berhe, 2009).

The introduction of modern system of improvement of hides and skins in an organized form in the country could be looked at in three different stages of development: The first was the establishment of Livestock and Meat Board in 1964 and continued introducing the system of moving the traditional method of preservation of hides and skins (ground drying, smoking and pegging of sheep and goat skins etc.) to modern preservation frame drying technique, so as to promote the production and supply of better quality raw material and to discourage the improperly preserved hides from reaching the central market. This resulted in a systematic procedure of marketing (Ahmed, 2000). The Board has been involved in the employment, training and assignment of hides and skins technicians at potential hides and skins production centers such as Shashemene, Addis Ababa, Dessie, Mekele and Gondar. The second stage was the establishment of the Second Livestock Development Project (SLDP) in 1972 for the improvement of livestock marketing infrastructure and quality of hides and skins (Girma, 2002), planned to intensify the improvement scheme initiated in phase one of the Meat Board, and has contributed greatly to the proper handling of hides and skins in the country. In the third stage of development, the government tried to have a broader outlook of the hides and skins industry of the country and a detailed work was done. A series of comprehensive hides and skins development programs and projects were also systematically prepared and launched.

The hides and skins improvement responsibilities were decided upon in 1980, to be under the MoA, which were represented in all 14 provinces and in each province there were a number of extension workers responsible to properly execute the extension programs in their respective areas. Under such a scheme, the specific responsibility of hides and skins improvement development was then vested in the MoA. The Animal Resources Marketing Department (ARMD) in the Ministry, whose mandate covers both extension and regulatory activities, took over these responsibilities together with the hides and skins improvement staff of the SLDP that were transferred to the MoA (Girma, 2002).

To implement the foregoing of the ministry found necessary to establish an autonomous and responsible public authority with appropriate powers and duties. Therefore, an animal products and by-products marketing authority, known as

Livestock Marketing Authority (LMA) has been brought into being by proclamation as an autonomous Federal Government body having juridical personality (Girma, 2002).

2.5. Hide and Skin Production in Ethiopia

The production of hides is mainly in the mountains and high plateau area (more than 500 m above sea level), where more than 80 per cent of the cattle are dispersed and the environment has impacted the cattle to have considerably thicker hides. Since the majority of sheep is found in the highland regions of the country and they are consumed close to where they are raised, about 70 per cent of the national production comes from these areas. This production, such as 'Sellale' sheep skin, has an international reputation for a unique combination of characteristics of fine quality, thickness, flexibility, strength, and compact fixture. Goats mainly occupy lowland areas and are mainly consumed by their pastoralist owners. Some are sold along the fringes of the highlands or treks to nearby commercial (export) abattoirs, etc. Thus, the supply of goat skins primarily comes from these areas. Goat skins which are classified as Bati-genuine and Bati-type and characterized as being thick, highly flexible with a clean inner surface, are in great demands for the production of fashion leather. It is estimated that 70 per cent of hide and sheep skins are derived from the highland areas of the country; while 75 per cent of goat skins and about 30 per cent hide output comes from the lowland areas contrary to Pastoral Development Study of some selected lowland areas (MOARD, 2007).

In Ethiopia annual per capita consumption of food of animal origin, particularly of meat is very low (7.4 kg). However, this is assumed to grow with the improvement in income per head and population growth, leading to increased slaughter of animals and hides and skin production (Girma, 2003). Ethiopia has been exporting more of hides and skins relative to its meat and live animals export. The channels for the collection of hides and skins to the tanneries are relatively well established but need significant improvements to reduce damages caused by thorns, ectoparasitic diseases, poor flaying and storage methods. Whereas achieving significant improvements on the former two may not be easy given the country's' under developed animal health

delivery system and livestock grazing habits, technical improvements on the latter two are within reach given some commitment (Yacob, 2002).

According to (CSA 2004 and 2006) an annual growth of 3.1, 8 & 11.2 per cent per annum for cattle, sheep & goats respectively for the period 1976-2006 using 1976 as a base year (Table 2). The corresponding growth of hides/skins production is also 2.3, 6.8, 13.7 percent for hides, sheepskins and goats skins respectively again using 1976 as a base year. The minimum growth forecast for the 2026 at the same rate is 57.60 million, 34 million and 34.3 million for cattle, sheep and goats and 3.4 million, 11 million and 12.2 million hides, sheep and goatskins in that order.

Table 2. Livestock Population and Hides/Skins Output by Region

No	**Geographic Area**	**Livestock Population ('000 heads)**			**Hides and Skins Production ('000 pieces)**		
		Cattle	**Sheep**	**Goats**	**Hides**	**Sheep skins**	**Goat skins**
1	Tigray	2,688	687	1,760	188	227	616
2	Afar	1,991	2,300	3,960	139	759	1,386
3	Amhara	10,533	5,320	3,816	737	1,750	1,336
4	Oromiya	18,036	4,700	4,170	1,262	1,551	1,460
5	Somali	1,180	6,865	6,100	83	2,265	2,135
6	Benishangul gumuz	310	59	200	21	19	70
7	SNNP	8,830	3,170	2,651	618	1,046	628
8	Gambella	126	44	49	9	15	17
9	Harare	34	6	19	2	2	6.65
10	Addis Ababa	_					
11	Dire Dawa	54	34	91	3.8	11	31.85
	Ethiopia	43,800	23,190	22,820	3,062	7,645	7,987

Source: (CSA 2004, 2006)

2.6. Types of Hide and Skin Production Systems in Ethiopia

2.6.1. Traditional production system

The great majority of sheep and goats (90%) and most of the cattle (70%) are slaughtered informally in homesteads for consumption by the owner or in a small community where no formal slaughtering facilities exist. The rate of traditional production of hides and skins strongly correlates with the homestead kill rates (MOARD, 2007).

One probable reason for informal slaughter is because of the widespread dissatisfactio n (informal interview) among butchers in Addis Ababa with the present system that the existing abattoirs are not efficient in their services, the slaughter fee is too high and there is improper take-out of meat cuts. In rural as well as urban areas, due to traditional and religious customs, lack of slaughtering facilities and transportation and scattered settlement of the farmers, when the need for meat arises at different occasions, animals are slaughtered at home (MOARD, 2007).

This traditional production system results in a considerable amount of inferior quality grades and rejects of outputs. One major cause for this is that preservation often starts after celebrating a feast, when the hides or skins have started to putrefy. An unacceptable practice such as pecked drying methods of hides, flaying cuts, drying by burning fire underneath are major defects practiced in some remote areas of the country. In particular, smoked hides and skins are graded as rejects as they are partially tanned with chemicals in the smoke and cannot produce good leathers (MOARD, 2007).

2.6.2. Modern production system

Rural slaughter slabs

The livestock slaughter in rural slaughter slabs is done under poorly equipped slaughter points, where the infrastructure is sometimes a slab of concrete, under a

shade or using poles for hoisting carcasses. These facilities are normally located in small towns adjacent to butcheries in various trading centers. More than 80 percent of such facilities are established in Oromiya (54%) and Amhara Regional State (27%) (Table 3).Such facilities are scattered in rural towns and often without adequate supervision. The tools used in these facilities are usually rudimentary and of inferior qualities causing damage to the hides and skins during flaying/slaughter. In many cases running water is not available and hides are not watered off after slaughter and most often, all operations are carried out on the floor (MOARD, 2007).

Table 3. Distribution of Slaughtering Facilities by Regional States

No	**Geographic Area**	**Bigger Slaughter Houses**	**Medium Municipal Slaughter House**	**Rural Slaughter Slabs**	**Grand Total**
1	Tigray	4	15	6	25
2	Afar		1		1
3	Amhara	2	10	20	32
4	Oromiya	9	25	40	74
5	Somali		1	1	2
6	Benishangul gumuz			6	6
7	SNNP	14	15		29
8	Gambella	N.A	N.A	N.A	
9	Harare				2
10	Addis Ababa	3			3
11	Dire Dawa	1			1
	total	33(commercial)	69	73	175

Source: MoARD, 2004/05.

Municipal slaughter houses (bigger and medium abattoirs)

Cattle hides are recovered by hand from the carcass, causing extensive damage in the form of deep cuts and holes. Cuts and holes reduce the value of a hide or skin. The difference between a machine-flayed hide, which presents no cuts or holes, and a hand-flayed hide, with cuts and holes, can reach 20-30% of the hide's value (MOARD, 2007).

The Static Flaying Frame (SFF) assists flaying and can produce, at very little cost, a perfectly machine flayed hide without holes or cuts. There are no special requirements, maintenance, nor power needed. The SSF could be introduced to slaughter houses and abattoirs. UNIDO and COTANCE support the dissemination of this promising technology. The greatest appeal of the SFF is that artisans without external supplies can produce it cheaply and locally. These facilities are better attended by local concerned officials, in particular meat inspectors, as there is continuous supervision and inspection of their activities. They are bigger in size and often located in medium to bigger towns. They are also relatively better equipped than rural slabs as far as water provision is considered (MOARD, 2007).

Export Abattoirs

They do not kill until they have orders, which is a major organizational problem. The flaying methods in all mechanized abattoirs with the presence of skilled work force and appropriate tools along with the water availability, peri-slaughter damage are almost completely avoided. However, currently the abattoirs are mainly slaughtering lowland sheep as they are cheaper than the highland ones. Many concerned leather technologists have often complained that lowland sheepskins are inferior to the highland sheepskins mainly used for lining leathers. Therefore, although slaughter damage is overcome, this is of little economic benefit to tanners. These skins are still being salted before processing, for the convenience of the tanners (MOARD, 2007).

2.7. Collection of Raw Hide and Skin

The collectors of raw hide and skin are available in almost all towns of Ethiopia. At least one businessperson is found in the smallest town. Some of them have other sideline business such as butchery, retail trade, and brokerage. They collect Hide and Skin from both rural-through rural agents or through farmer's carriage to market-and urban areas-through intermediary collectors or themselves. Many of them are indeed long age experience starting from the time of Armens, with the majority of them starting the business in the 1960s. With this practice, Tannery enterprise has gone long experience in the country (Bekele and Ayele 2008). There are over 1,800 licensed hides and skins traders/collectors and an estimated 3,000 illicit /non-registered collectors (Table 4). Moreover, there are over 6,900 traditional tanners, 25 operative modern tanning enterprises and about 400 leather products manufacturers in the country (Tadesse, 2007).

Table 4. Hides and Skins Traders /Collectors by Regional States

No	Geographic Area	Certificated Regional Traders	Nonregistered (illicit)	Total	Remarks (Shades)
1	Tigray	115	170	285	105
2	Afar	2	20	22	
3	Amhara	905	1,200	2,105	1065
4	Oromiya	595	1050	1,645	638
5	Somali	3	50	53	
6	Benishangul	7	70	77	
7	SNNP	220	475	695	280
8	Gambella	3	30	33	
9	Harare	3	NA	3	
10	Addis Ababa	22	NA	22	45
11	Dire Dawa	8	30	38	12
	Total	1883	3095	4,978	2145

Source: Tadesse (2007)

2.8. Quality of Hide and Skin

The quality of hides and skins for production of different types of leather is determined by certain characteristics of the raw material and these are (PIC, 1990):

- The thickness, and evenness of the thickness over the surface
- The weight
- The density
- The presence of defects

Hides and skins differ in their structure depending upon the habit of life, season of year, age, sex, and breeding. The various operations involved in the preparation of hides and skins are most easily classified according to when they occur with respect to the time of slaughter. Accordingly, the first of three such periods is designated pre-slaughter. It covers the greater part of the animal's life, from its birth to about the time it is collected for delivery to the butchery (Russell *et al.*, 1980).

The pre-slaughter operations that affect the quality of the hides and skins available to the tanning industry are principally the result of the quality of the husbandry applied by those who looked after the animals-herders, farmers, ranchers, feedlot staff, veterinarians, hides and skins merchants and transport operators (Russell *et al.*, 1980).

The final part of the pre-slaughter operations involves the supply and transportation of the animal to the market and ultimately the butchery. Special attention is required at this stage since any damage to the animal will not have time to heal before the animal is slaughtered, so any defect will remain on the hide or skins as an open wound. The range of different problems that can occur at this stage is extensive, and many others associated with improper transportation (Russell *et al.*, 1980). Hides and skins supplied to the tanning industry generally come from two different sources, controlled slaughter in designated establishments and slaughters and deaths elsewhere. The latter includes the significant quantities of hides and skins sometimes available from special festivals (Leach *et al.*, 1993).

Hides and skins from designated slaughtering operations may come from any one of a range of places including backyard activities, shambles, slaughter slabs, slaughterhous es and abattoirs. The facilities available at these establishments vary tremendously. At worst, they may consist of no more than a small space and a few small items of equipment such as knives. At best, they may consist of purpose-build structures with all mains services (electricity, steam, water, effluent treatment, etc.) and highly trained staff. Irrespective of the size of the establishment the slaughter facilities should conform to certain minimum standards, which are prescribed by law in most countries (Leach *et al.*, 1993).

Preservation prevents putrefaction and keeps in good condition until they are processed in tanneries. Being protein in nature; skins are susceptible to attacks by bacteria or mould that leads to putrefaction in hot and humid climates. Dust, dirt soil, water, blood, fodder, etc., are sources of infection apart from microorganisms that could be transmitted by air, insects, or contact with diseased animals. The weight of a fresh skin is about 60% water, ideal conditions for bacteria to thrive. The protein matter hydrolyzed by bacteria leads to loss of skin substance resulting in poor- quality leather. Curing creates conditions whereby bacteria are prevented from destroying skins. The type of curing used depends on weather conditions, availability of material s, location of tanneries, and so on. For instance, some drying techniques do not work during the rainy season, and salting is preferred. In all techniques, the natural water is removed so that the low percentage of moisture makes the bacteria ineffective and as soon as this condition is reversed, bacteria become active again. (FAO, 2013).

Most hides and skins are preserved in one way or another before being shipped to a tannery, but it is not always necessary in the manufacture of leather (Haines,1975) freshly flayed hides and skins may be dispatched immediately to the tannery and made into leather. Unfortunately, few tanneries are sited close enough to their source of raw material to be able to receive fresh skins. Generally though, tanneries are still geographically isolated from their raw material. This has significant implications in the utilization of hides and skins.

If freshly prepared hides and skins cannot be delivered directly to the tannery, they must be preserved. They should also be preserved if the delivery to a tannery is likely to be delayed, especially when the tannery is a long way from the butchery, and it may not be possible to deliver the fresh hides or skins quickly enough. Without preservation, the hides or skins would spoil before they were received in the tannery (Haines, 1975).

2.9. Peri and Post Slaughter Hide and Skin Defects

Skin defects are classified into two main groups. First group being those created or acquired during the life of the animal (Pre-mortem defects) and second group being those that occur during and after slaughtering of animals (Post-mortem defects) (Yacob, 2013).

At least 60 percent of hides and skins defects found in African countries are attributed to defects, which are caused during slaughter, due to handling and preservation procedures. Loss of quality of hides and skins due to post slaughter activities is therefore very significant for leather industries (Arthuro, 2001). Some of the damages are grain crack (is caused by drying in a crumbled conditional and by multi fold any pressure on strain), bacterial damage, mechanical damage. In addition, other damages such as defects during wet salting, damages caused during storage, packaging and transportation, wetting and contamination, insect infestation (UNIDO, 2003).

Defects such as knife cut, poor bleeding, machine defects, putrefaction, beetles damage, crack and heat were technical defects due to faulty flaying, preservation, handling and processing of skin. Post-slaughter defects related to poor management and treatments of skins after slaughter are also among important problems (Hagos *et al*., 2013).

2.9.1. Slaughter defects

These are defects due to flaying and poor bleeding during slaughtering. Flay defects are very common in Ethiopia because of lack of knowledge and experience of people who perform the job. Inadequate bleeding causes rapid development of bacteria along

the blood vessels as a result of bacterial spread from the blood vessels, skin fibers in the vicinity are destroyed and open channels following the course of the blood vessels are formed through the skin surface. These defects show up in the final stage as a groove on the grain surface following the patterns of the damaged blood vessels (Kassa, 2005 and 2006). The type of flaying equipment also plays a major role in the production of good quality hides. Almost all slaughter facilities except some modern abattoirs use hand flaying.

Flay cuts: A large number of skins contain defects due to careless and inefficient use of the flaying knife. Cuts, holes, and scores produced through faulty flaying greatly diminish the value of skins. Use of an improperly pointed knife adds to the problem. Flaying on the floor causes more cuts and delays in flaying which makes the carcass cold and more difficult to flay. Other defects due to unnecessary use of a knife, insecure position of the carcass, bad lighting, and lack of skill. Using a fist wherever possible will improve the quality. If the ripping line is not properly cut, the final shape will not be symmetrical and may affect the usefulness of the sin for commercial production of quality, ultimately affecting the value of the leather itself. Improper fleshing allows fatty tissues to remain on the skin, resulting in poor curing both by salting and air drying. In tanning and finishing, improper curing results in patches of different quality leather during later processing (Ahmed, 2000).

Improper bleeding: if carcasses are not bled out properly at the time of slaughtering, blood remains in the vessels and capillaries of the hides and skins. This blood supplies ideal condition for the growth of bacteria and favours putrefaction along the blood vessel. (FAO, 1995). Veininess is a prominent defect in goat skins and very prominent in glazed kid leather (Tekle, 2009).

Poor pattern: It is meant, the shape or outline of the flayed hide when it is spread out flat. A regular pattern is very important to the tanner because it enables them to get the best cuts and the most useful part of the raw material. Poor pattern that is asymmetric shape of the hide of skin is considered damaging to hides and skins as far as cuts or scores are concerned. It is caused by incorrect line of ripping. The bleeding cuts must be directly at the centre of the throat. If the legs are not ripped open properly, the proportion of the hide in the shoulder, belly and butt section are not

proper. Thus belly hide that should have been part of the belly may be on the butt or the shoulder area. “V” cut in the button either side of the tail downgrades the hide, according to the degree of damage to the pattern. It is very important that the bleeding cut, the belly cut, and the leg cut are made as straight (FAO, 1995).

2.9.2. Preservation and storage defects

Preservation methods such as salting or frame drying are not practical fully by farmers, collectors and traders of hides and skins, as a result of which hides and skins suffer from hair slips, mould and bacterial attacks. Delays in cleaning, drying or curing cause damage through putrefaction (Amsalu *et al*., 2000). Rubbing, wetting, vermin damage and insect damage are also damages that occur due to incorrect storage of skins (Kassa, 2005 and Desta, 2008).The main constituent of skin is protein. After an animal’s death, skin proteins are exposed to bacterial attack that leads to decomposition (FAO, 2005). Hair slippage is a sign of putrefaction, usually occurring due to delays in preservation, improper curing, or when dried skins are exposed to rain during transport or storage. If hair slippage is not checked in time, putrefaction starts which can be from both the grain and flesh sides. This leads to decomposition of the grain layer. Lack of air circulation, excess atmospheric humidity, skins contacting frames, ground/soil, poles, or ropes etc. during drying/curing will all lead to putrefaction. High temperatures can exacerbate the problem. Blood is difficult to remove from wool or hair and it aids in bacterial attack along with dung.

2.9.3. Transportation defects

Inefficient transportation may cause delays in arrival to tanneries or preservation centers as a result of which green or salted hides and skins deteriorate in quality. Poor handling during loading and unloading may damage quality of hides and skins (Kassa, 2005). Rubbing damage caused during normal transportation by road is more or less negligible, but a certain amount of care is required to ensure protection of bales against rubbing and tearing on the outside surface by adequately covering them with hessian or gunny sacks (Ahmed, 2000).

2.10. Market Chain Analysis

2.10.1. The concept of marketing

The concept of exchange and relationships lead to the concept of market. It is the set of the actual and potential buyers of a product (Kotler and Armstong 2003). Conceptually, however, a market can be visualized as a process in which ownership of goods is transferred from sellers to buyers who may be final consumers or intermediaries. Therefore, markets involve sales locations, sellers, buyers, and transac tions. According to (Kotler and Armstrong 2003), marketing is managing markets to bring about profitable exchange relationships by creating value and satisfying needs and wants.

2.10.2. Marketing systems

In broad terms, marketing system may be defined as the totality of product channels, market participants and business activities involved in the physical and economic transfer of goods and services from producers to consumers. Marketing system operates through a set of intermediaries performing useful commercial functions in chain formations all the way from the producer to the final consumers (Islam *et al*., 2001).

2.10.3. Marketing channels

Formally, a marketing channel is a business structure of interdependent organizations that reach from the point of product origin to the consumer with the purpose of movin g products to their final consumption destination (Kotler and Armstong 2003).This channel may be short or long depending on kind and quality of the product marketed, available marketing services, and prevailing social and physical environment (Islam *et al*., 2001).

2.10.4. Hides and skins marketing

About 70 per cent of hides and 90 per cent of skins come from the homestead slaughter (Tadessa, 2005).Thus, the marketing chain for hides and skins trade is principally from the primary producer/household/ to rural markets, to small dealers and agents-collectors, to town traders and shed owners, to the big traders in Addis Ababa (the central market), and finally to the tanneries. The hides and skins produced in slaughter houses and abattoirs are auctioned to big traders and to tanneries, both public and private. Contrary to the research findings of (Tadesse, 2005) there are currently over 850 hides and skins traders registered with the Ministry of Trade and Industry (MoTI). There are also numerous unregistered ones, (illegal traders who lack technical skills as well as the necessary preservation and storage facilities). It is the sum total contribution of these stakeholders that make up the marketing system. In practice, no price differentiation based quality currently exists at the input supply level, and therefore primary producers, usually farmers, no incentives to maintain the quality of the hides and/or skins when the animals are still alive or at the time of slaughter.

According to MOTI (2005), in Ethiopia, hides and skins are marketed in accordance with international free market condition in terms of price. But this system works to the advantage of the big traders and tanneries that have the opportunity and capacity to follow world market price, trends and fluctuation; the farmers or household consumers who are considered primary producers lack this opportunity. Traders supply about 70 per cent of herds, and 90 per cent of the skins into industry. Although there is high demand for Ethiopian leather and leather products in the world market, especially for sheepskin, the potential is far from being fully exploited due to different kinds of limitations imposed by poor production at different stages of the whole process, i.e. pre-slaughter and post-slaughter conditions. Coupled with these, poor infrastructure regarding all aspects of markets and marketing networks has further suppressed the development of this sector. In addition, poor breed (as depicted by light weight of cattle and alike) and low off-take (one of the lowest in the world) arising out of Ethiopians' perspective about bovine animals, sheep and goats have put a check on the growth of hides/skins market. Nevertheless, many efforts have been

exerted at different times by different bodies, as further elaborated in various parts of this study, to alleviate these drawbacks (MOARD, 2007).

2.10.5. Market structure

Market structure depicts the institutional environment among others in which transactions take place, which influences completion and pricing is considered to be fixed in the short run for actor in the marketing channels. Market structure is defined as characteristics of the organization of a market, which seem to influence strategically the nature of the competition and pricing within the market (Meijer, 1994).

2.10.6. Marketing chain of hides and skins

The marketing chain for the hides and skins trade is principally from the primary producer (rural farmer) to rural markets, to small dealers and agents-collectors, to town traders and shed owners (where the hides and skins are frame-dried and /wet salted), to the big traders in Addis Ababa (the central market) - and finally to the tanneries. The hides and skins produced in butcheries and abattoirs are auctioned to big traders and to tanneries, both public and private (MoTI and UNIDO, 2004).

As Girma (2003), explained, the market is generally very wide with long channel in which different market forces with different trading capacities are involved. These are primary producers, collectors, big suppliers, butcheries and abattoirs, traditional tanners, tanning industries, and transport enterprises

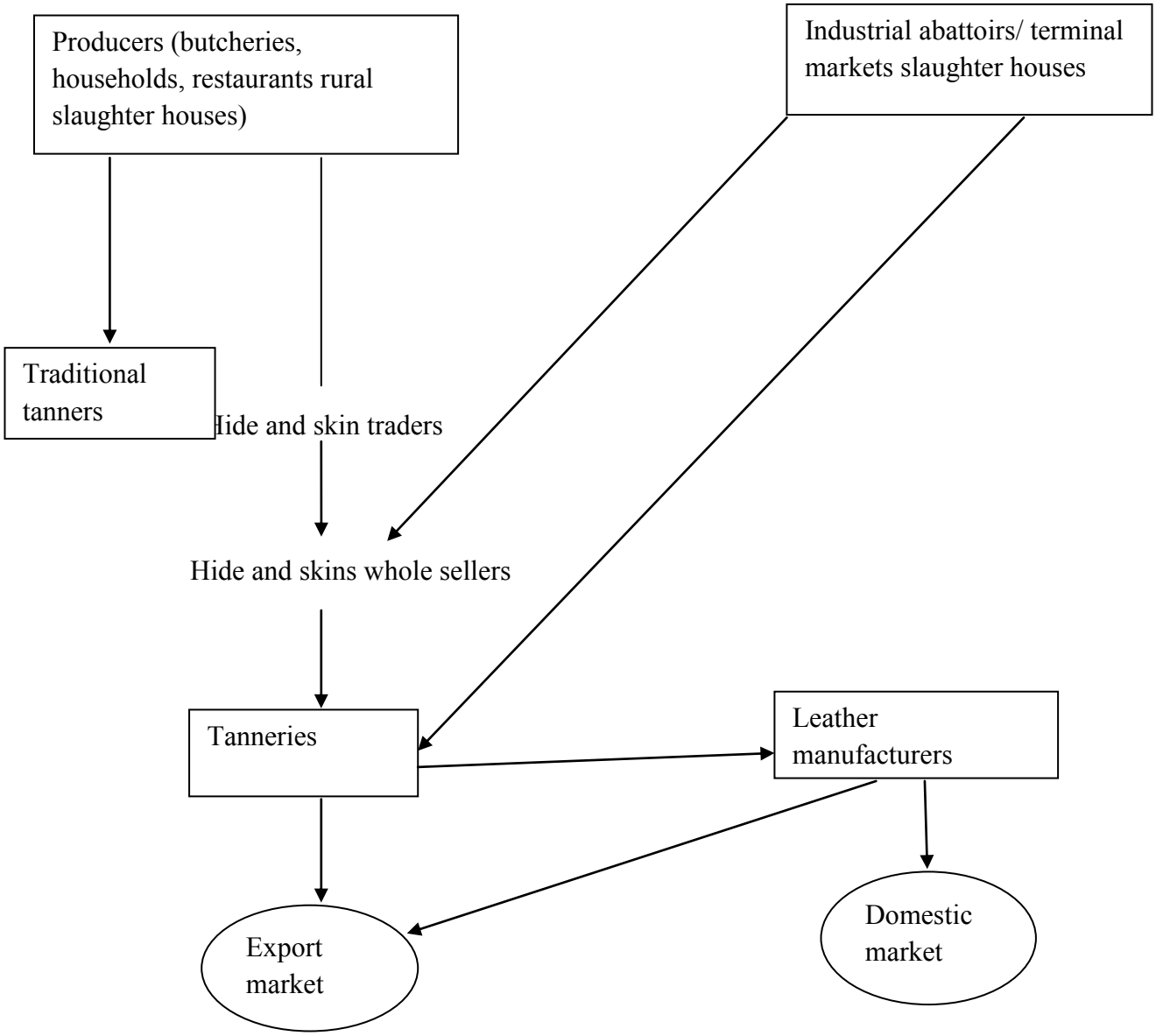

Figure 1. The marketing channels for hides and skins in Ethiopia

Source: (Yacob, 2002)

3. MATERIALS AND METHODS

3.1. Description of the Study Area

The study was conducted in west Arsi Zone of Oromia Regional state. The Zone is located in South-Eastern Ethiopia at an altitude ranging from 1500 to 3800 meters above sea level (m.a.s.l). The annual mean rainfall ranges from 500 to 2000 mm and annual ambient temperature varies from 9^{o}C to 31^{o}C. The livestock population in the zone include 2,951,300 cattle, 951,301sheep, 483,984 goats, 201,448 donkeys, 266,781 horses, 962,482 poultry and 24,417 mules. Total human population of the zone is 2,321,183 (2,086,105 account for rural population and 235,078 account for urban population except for Shashemene town). Out of the total area of 1,241,450 ha, crop land accounts for 562,832.2 ha, 274 is 2,321,183 (208, 6105 account, 292.2ha forest land, 141.326ha grazing land, 60,382 ha water bodies and 202,617.6 ha land for other purposes (WAZLDHO, 2014).

Shashemene is one of the administrative woreda found in west Arsi Zone of Oromia Regional state and located at 250km southeast of the capital Addis Ababa, and 25 km north of Awassa, the regional capital of the SNNPRS. The annual rain fall and temperature of the woreda are 800-1000mm and 12-27^{o}C, respectively. The area found at altitudes of 1685-2922m.a.s.l. (SWAO, 2014). The livestock populations in the woreda include 244,120 cattle, 69,828 sheep, 105,156 goats, 7,625 horses, 30,331 donkey and 138,002 poultry and 197 mules. Total human population of the woreda is 248,093. The *kebeles* in the *woreda* are categorized as *Kolla* (51%), *Woinadega* (27%) and *Dega* (22%). Out of the total area of 46,716 ha, crop land accounts for 40,840ha, 2,138 forest land, 2,300 grazing land, and 1,438 ha land for other purposes.

The Arsi Negele woreda is found at 226 km from Addis Ababa. The annual rain fall and temperature of the area are 500-1150 mm and 10-27^{o}C respectively. It found at altitude of 1500 3500m.a.s.l. Livestock population include; 260,869 cattle, 65,953 sheep, 126,087 goats, 14,911 horses, 34,200 donkeys, 1,848 mules and 107,121 poultry. Total human population of this area is 394,050. The *kebeles* in the *woreda* are

categorized as *Kolla* (39%), *Woinadega* (42%) and *Dega* (19%). Out of the total area of 193,669.087 ha, crop land accounts for 65,864.0482 ha, 16,855.89 forest land, 16,559 grazing land, water bodies 65,550 ha, land account for housing /living 8,659 ha, land account for national parking 18,969.636 ha, degraded land 1000 ha and land account for inventory 209.5128 ha.

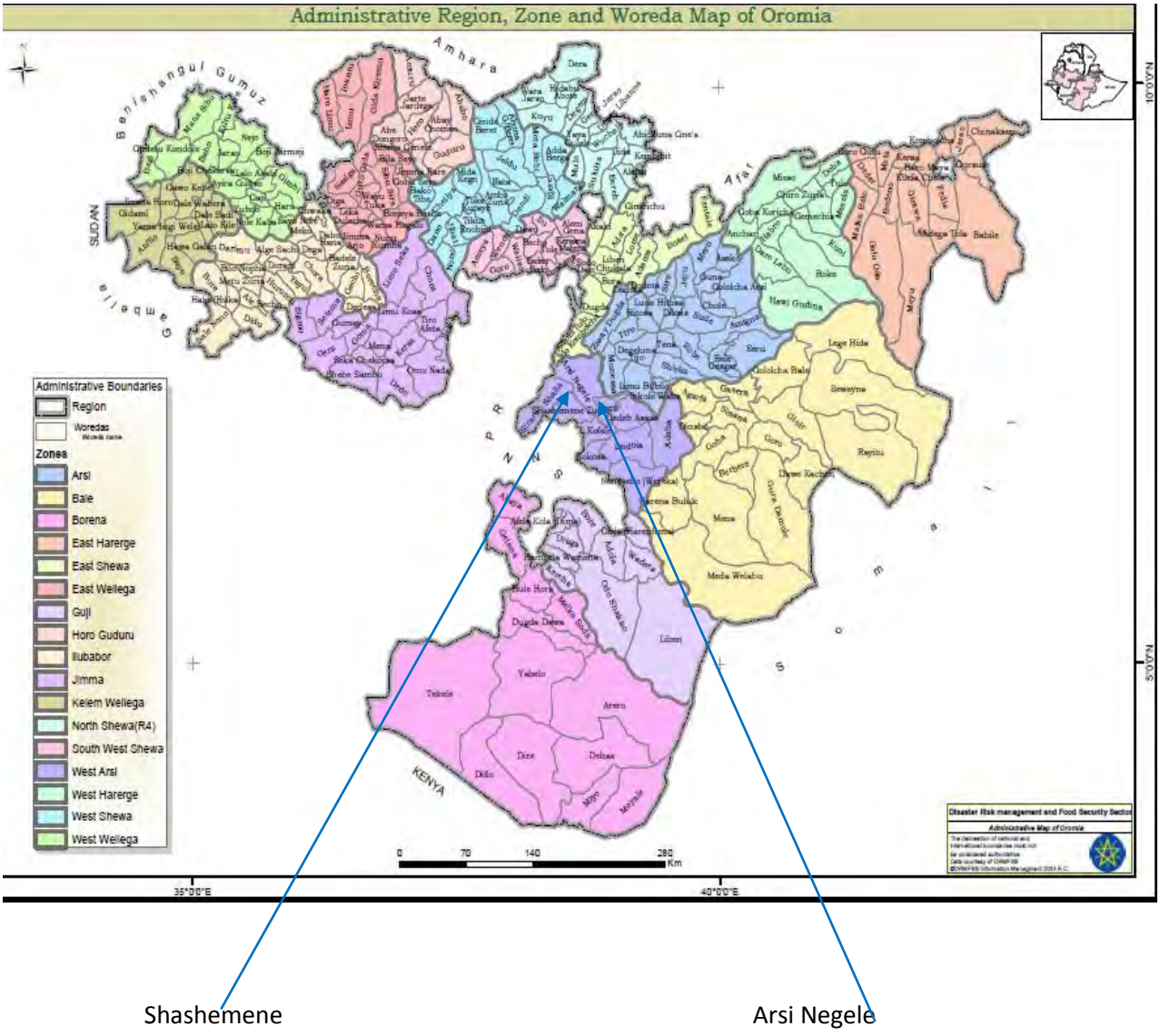

Figure 2. Map showing the study area within Oromia Regional State

3.2. The Study Design

A cross-sectional study design was employed from November 2014 to March 2015 to assess the perception and practices on the quality and management of hides and skins; types of post slaughter defects affecting quality of hides and skins and market chain in Arsi Negele and Shashemene woredas.

3.3. The Study Population

The study populations included in this study were rural households found in Arsi Negele and Shashemene woredas, middlemen, collection centers, butchery and key informants in both woredas. In addition, hides and skins of cattle, sheep and goats in each woreda were incorporated to assess their quality.

3.4. Sample Size Determination

The approximate sample size of the hide and skin required was determined, according to (Thrusfield, 2005).

$$n = \frac{1.96^2 p_{exp} (1-p_{exp})}{d^2}$$

Where n=required sample size P_{exp} =expected prevalence d=desired absolute precision

Since no previous study has been undertaken in the study areas, 50% expected prevalence of skin defects was considered. Accordingly, with 95% confidence level and 5% precision, the calculated sample size was 384 skins and hides from each woredas in the study area.

The number of respondents for the questioner survey was determined by using the formula recommended by Arsham (2002) for formal survey studies.

Use formula

$$N = \frac{0.25}{se^2}$$

$$N = \frac{0.25}{0.05^2}$$

$$N = 100$$

Where N=sample size

SE=standard error assuming the standard error of 5% at a precision level of 0.05 and the confidence interval of 95%.

Accordingly, a total of 200 respondents 100 from each woreda were included in the study.

3.5. Sampling Techniques

Study Woredas were selected purposively based on potentiality of the area and livestock population. Four kebeles (Awasho Denku , Ellala Korka, Bulchana Danaba, and Alcha Harbate) from the Shashemene woreda and (Kersa Meja, Edo Jigessa, Besku Ellala, and Galife Kelo) from Arsi Negele woreda were purposively selected from the list provided by Woreda Offices of Agriculture as availability of research fund was limited to visit more kebeles and farthest woredas. The number of household from each kebeles was taken by the proportion of the number of household in each kebele and households to be interviewed were taken randomly. The unit of study was house hold where by the head of the households were interviewed. It was held that major decisions are held at the household regarding sale and utilisation of livestock product (Table 5) gives details of the distribution of producers per kebele.

Table 5. Distribution of producers interviewed by woredas.

Name of woredas	Kebeles of respondents	House hold population size	Sample size
Shashemene	Ilala korke	809	19
	Alache Harabate	1282	30
	Bulchana Danaba	1274	30
	Awasho Denku	900	21
Total		4265	100
Arsi Negele	Edo jigesa	804	26
	Galefe Kelo	480	16
	Kersa Meja	687	22
	Beseku Ellala	1123	36
Total		3094	100

On the other hand sample of five middlemen, 24 butcheries, four collection centers (all available) in both woredas were included in the study. Purposive sampling was used to select middle men, butcheries, collection centers and key informants. Although it is difficult to find and know the number of middle men involved in the hide and skin market chain, those encountered during the study were only included.

The number and proportion of hides and skins sampled for determination of prevalence of post slaughter defect was determined, after taking one week preliminary survey on the supply of hides and skins proportion that were registered from one and three collection centers of Arsi Negele and Shashemene woredas respectively. Based on this, the proportions of cattle hide, sheep skin, goat skins from the total sample size of 384 for each woreda were selected as shown in the (Table 6) below.

Table 6. Sampling of raw hide and skin in the study areas.

Product	Arsi Negele		Shashemene		Over all	
	Actual supply/wk	Sample size	Actual supply/wk	Sample size	Actual supply/wk	Sample size
Sheep skin	187	120	863	164	1050	284
Goat skin	231	148	826	156	1057	304
Cattle hide	179	116	340	64	519	180
Total	597	384	2029	384	2626	768

3.6. Method of Data Collection and Sources of Data

3.6.1. Questionnaire survey

Structured questionnaire survey was used to collect information from hide and skin producers, traders and tanneries. The questionnaire includes data on perception of major criteria for quality of hides and skins, post slaughter hide and skin management practices and market chain of the products from producers to tannery level.

3.6.2. Gross examination of hide and skins

One from Arsi Negele woreda and three from Shashemene woreda private skin shades/stores or collection centers were purposively selected. Fresh and wet salted hide and skins were selected using simple random sampling and assessed for prevalence of post slaughter defects by using close observation both in hair and flesh side. Various forms of hides and skin defects appearing beyond 5cm from the edges towards the center of the skin like hole, poor pattern (loose fiber), dirt, corduroying, flesh remnant (patches of fat or flesh), blood and heating (putrefaction of skin revealed by a premature loss of the hair) were collected on raw hide and skin.

3.6.3. Measurement of hides and skins

The mass of fresh hide and skin was determined by weighing each piece on a balance before salting. Salted skins were weighed 3 days later after sufficient salting and removal of excess salt by shaking and brushing. Thus depending on the mass each hide was categorized in to 4 categories (light, medium, heavy, extra heavy) (Appendix 6)and mass of each skin was also categorized in to 5(extra light, light, medium, heavy, and extra heavy) (Appendix 7).Similarly, the size of the raw material will be measured from its width (at the middle) and length (Base of the neck to base of the tail) using a measuring tape and hence graded in to extra small, small, medium, large and extra large(Appendix 8).The squared method was used to measure the size (surface area) of each skin. The skins were sampled and graded by their size and mass based on the standard set by the Ethiopian Quality Standard Authority (EQSA, 2001).

3.6.4. Direct observation

Methods of curing hides and skins, slaughter houses and collection centers where hides and skins are stored were visited and observed during the study.

3.7. Data Analysis

Appropriate data were collected from each respondent and stored in Microsoft excel spread sheet. The data were analyzed through relevant computer software packages using SPSS (version 20, 2013). Descriptive statistics such as means, frequency distribution, and percentage were used to analyze categorical data. Data which had multiple response such as the use of hide and skin after slaughter, list of domestic materials, perception on major criteria for quality of hide and skin, data on major hide and skin management problem during and after slaughter and hide and skin marketing constraints were analyzed using descriptive statistics. Quantitative data associated with physical measurement of hide and skin, average selling and buying price of hide and skin were also analyzed through descriptive statistics. Chi - square test was used to know the association of variables and to know the significance of the difference between the two woredas.

4. RESULTS

4.1. Characteristics of Study Participants

In this regard, producers, middle men, collection centers and tanneries were identified as major actors in the hides and skins production and marketing in the study area. Table 7 indicates that the majority of the sampled households were headed by males. The educational background of the sample household heads is believed to be an important feature that determines the readiness of household heads to accept new ideas and innovations. In this regards, above 40% of the sampled respondents have attended secondary school or above. The average age of the sample household heads was 39.49 in Shashemene and 40.26 in Aris Negele woreda.

Table 7.Demographic characteristics of sample house hold respondents

Variables		**Woredas**		
		Arsi Negele %	Shashemene %	Overall %
Sex	Male	80	54	67
	Female	20	46	33
Education	Illiterate	12	18	15
	Primary school	44	42	43
	Secondary school and above	44	40	42

In both Arsi Negele and Shashemene woredas of the total 24 sampled butcheries only 4% of the respondents were illiterate whereas the proportion of those who have attended primary school and above secondary school were 36% and 41 % Respectively. On the other hand, about 40% of the five interviewed middle men were illiterate and the remaining has attended primary school. Most of them had more than 2 years of experience on hides and skins trading and are not licensed for the work. Middle men are the first link between producers and collection centers. They mainly buy small lots of hides and skins directly from house hold producer and sell to collection centers depending on the agreement made prior and/or fairness of the price

offered. Their sources of money and market information in most cases are collection centers.

Owners of four hide and skin collection centers (one from Arsi Negele and three from Shashemene) were interviewed. One of them has completed secondary school and the rest have first degree. The centers absorb raw hides and skins supplied to the woreda market and sell salted products to tanneries. Hence, in most cases they played the leading role in price determination during purchasing at woreda level. All collection center owners had more than 10 years of experience on hides and skins trading at the time of this study.

4.2. Livestock Ownership

The livestock species found in the study area are cattle, goat, sheep, donkey, mule, horse, poultry, and bee colony. Livestock is a means of generating income, in addition to serving as food and traction power. To assess the livestock holding of each household, Tropical Livestock Unit (TLU) per household was calculated according to the conversion rate recommended by Harvest Choice (2011).The tropical livestock unit (TLU) per house hold for Arsi Negele is 7.117 and for Shashemene woreda is 3.257.As shown in table 8, the sampled households had an average of about 4.34 cattle, 1.37 sheep, and 0.82 goat in Shashemene woreda and 9.45 cattle, 1.86 sheep, and 3.16 goat in Arsi Negele woreda. Cattle and sheep holding was significantly higher in Arsi Negele woreda than in Shashemene ($P<0.05$).

Table 8. Average number of livestock house hold owner

Name of	**Arsi Negele (N=100)**		**Shashemene (N=100)**	
animal	Sum	Mean±SD	Sum	Mean ±SD
Cattle	945	9.45±12.894	434	4.34±5.388
Sheep	186	1.86±3.573	137	1.37±2.465
Goat	316	3.16±12.930	82	0.82±2.862

Means show significant difference in the two woredas, n= total livestock (for each species) SD= standard deviation

4.3. Perception and Practices of Study Participants

4.3.1. Purpose of hide and skin after slaughter

Only six and three percents of the respondent households from Arsi Negele and Shashemene respectively lack experience of slaughtering livestock at home. The rest reported to use hide and skin for sale and household purposes (Table9) following backyard slaughtering of their animals. Majority of sheep and goat skins are sold whereas significant number of cattle hides is kept for household use in both woredas. There was no significant difference ($P>0.05$) in the use of hide and skin after slaughter between the two woredas. However, significantly higher number of respondents ascertained that sheep/goat skin are sold to the market than those reporting to sell cattle hide ($P<0.05$).

Table 9.Use of hides and skin after slaughter in the two woredas as per the response by house hold heads

Product	**Use of hide and skin**	**Arsi Negele N= 94**	**Shashemene N= 97**	**P value**
Cattle hide	Sold all	63(67%)	69(71.1%)	0.539
	Kept all for house hold use	31(33%)	28(28.9%)	0.539
Sheep/goat skin	Sold all	84(89.4%)	92(94.8%)	0.159
	Kept all for house hold use	10(10.6%)	5(5.2%)	0.084

4.3.2. Domestic use of hide and skin by house hold producers

Thirty three percent of Arsi Negele and 29% Shashemene House hold producers use hide and skin for various domestic purposes from which majority of them use hide and skin for bedding '*kurbet*' (Table 10). Muslim communities also use hide and skin for praying mats which is 12.1% and 10% in Arsi Negele and Shashemene

woreda respectively. And there is no significant difference (P>0.05) in the domestic use of hide and skin after slaughter between the two woredas.

Table 10. Domestic use of hide and skin by producer house holds

Domestic material	**Arsi Negele** N=33	**Shashemene** N=30	**P value**
Praying mates	4(12.1%)	3(10.0%)	0.789
Making ropes	2(6.1%)	1(3.3%)	0.612
Kurbet for bed	27(81.8%)	26(86.7%)	0.599
Making milking containers	2(6.1%)	5(16.7%)	0.181
seat covers	5(15.2%)	2(6.7%)	0.285

4.3.3. Perception on major criteria for quality of sheep and goat skin

Based on the survey result there are different criteria used by respondents for quality of sheep and goat skin. These include absence of hole/flay cut, absence of lesions and brands, freshness of the skin, size/pattern of the skin, weight of the skin, absence of dirt in flesh part of the skin, absence of blood in flesh part of the skin, thickness of the skin and absence of flesh remnant.

Overall, 63% and 79% of Arsi Negele and Shashemene respondent producers respectively had awareness on the criteria for raw skin quality. As shown in table 11 below absence of flay cut, freshness and size were the most frequently reported criteria for better quality sheep/goat skin in both study Woredas. Presence of skin lesions and weight of the skin were better considered in Arsi Negele than in Shashemene (P<0.05) whereas skin thickness and absence of flesh remnants were more considered in Shashemene than in Arsi Negele (P<0.05) suggesting differences in experiences of sheep/goat skin producers.

Table 11. Perception of major criteria used for selection of sheep and goat skin by house hold owner

Selection criteria	Arsi Negele N=63		Shashemene N=79		P value
	Yes	%	Yes	%	
Absence of hole/flay cut	57	90.5	78	98.7	0.024
Absence of lesions & brands	6	9.5	1	1.3	0.024
Freshness of the skin	27	42.9	27	34.2	0.290
Size/pattern the skin	15	23.8	17	21.5	0.746
Weight of the skin	10	15.9	3	3.8	0.013
Absence of Dirt	1	1.6	0	0	0.261
Absence of Blood	1	1.6	1	1.3	0.872
Thickness of the skin	0	0	5	6.3	0.042
Absence of Flesh remnant	0	0	5	6.3	0.042

Butchers, middle men and collection centers also reported to have selection criteria for sheep and goat skin as indicated in table 12 below. Freshness of the skin is the main criteria for middlemen whereas presence of lesions and brands, size and pattern of the skin and weight of the skin are less considered by both butchers and middlemen. Except for freshness and size of the skin, the perception on the major criteria for skin quality is significantly different between the three actors ($p<0.05$).

Table 12. Major criteria used for selection of sheep and goat skin by respondents

Criteria	Butcher (N=20)	middlemen (N=5)	Collection centre (N=4)	P value
Absence of hole/flay cut	20(100%)	3(60%)	4(100%)	0.006
Absence of lesions/brand	1(5%)	1(20%)	3(75%)	0.003
Freshness of the skin	10(50%)	5(100%)	3(75%)	0.101
Size/pattern of the skin	8(40%)	2(40%)	4(100%)	0.083
Weight of the skin	1(5%)	0(0%)	3(75%)	0.001

4.3.4. Perception on Major criteria used for quality of cattle hides

Sixty four percent and 39% of Arsi Negele and Shashemene respondent producers respectively had awareness on the quality measures of raw cattle hides. Similar criteria were mentioned as in the case of sheep /goat skin for determining the quality (Table13). Majority of the house hold respondents use absence of hole/flay cut for selection of cattle hide followed by freshness, size and weight in both study woredas. Hide weight is more assessed in Arsi Negele whereas thickness and absence of flesh remnants were given more importance in Shashemene areas ($P<0.05$).

Table 13. Perception of major criteria used for selection of cattle hides by respondent households

Criteria	**Arsi Negele** N=64		**Shashemene** N=34		**P value**
	Yes	%	Yes	%	
Absence of hole/flay cut	61	95.3	33	97.1	0.677
Absence of lesions & brands	5	7.8	1	2.9	0.338
Freshness of the hide	24	37.5	9	26.5	0.271
Size/pattern of the hide	10	15.6	8	23.5	0.336
Weight of the hide	29	45.3	5	14.7	0.002
Absence of Dirt in flesh part of hide	1	1.6	0	0	0.464
Absence of Blood in flesh part of hide	0	0	1	2.9	0.168
Thickness of the skin	0	0	2	5.9	0.050
Absence of Flesh remnant	0	0	2	5.9	0.050

Similar to the quality indicators considered for sheep/goat skin, butchers, middle men and collectors also use five major selection indicators for cattle hides (Table14) Flay cut was considered by all whereas size is less important for butchers and collection centers, lesions and brands are not considered by middlemen and butchers.

Table 14. Major criteria used for selection cattle hide by sampled respondents for both woreda

Criteria	Butcher (N=21)	middlemen (N=2)	Collection centre (N=4)	P value
Absence of hole/flay cut	21(100%)	2(100%)	4(100%)	-
Absence of lesi ons & brands	0(0%)	0(0%)	3(75%)	0.000
Freshness of the hide	14(66.7%)	2(100%)	3(75%)	0.600
Size/pattern of the hide	6(28.6%)	2(100%)	2(50%)	0.115
Weight of the hide	10(47.6%)	0(0%)	3(75%)	0.221

4.3.5. Slaughtering practice

Most of the small stocks are slaughtered in homesteads and therefore this is scattered and periodic. Producers in Arsi Negele and Shashemene woredas revealed that goats and sheep are mainly killed during festivities, like for religious purposes or weeding celebrations. Cattle are mostly slaughtered by forming groups among household neighbours '*kercha'* at rural slaughter slab. Ninety four percent and 97% of respondents in Arsi Negele and Shashemene woredas household producers respectively have ascertained to have experience of homestead slaughter/rural slaughter slab of cattle and small ruminants. Most of them slaughtered between one and three cattle and one or two sheep/goat in the last three months of the data collection period.

In cattle: Based on the survey result there are different slaughtering and finishing areas. Eighty six percent of Arsi Negele and 85% of Shashemene household responde nts use separate areas for slaughtering and finishing cattle. As summarized in the table below, for majority of the producers slaughtering and finishing is on the floor for

cattle in both study woredas. Hoisting after bleeding is only rarely practiced in Arsi Negele (Table15). There is no significant difference ($p>0.05$) on the selection of slaughtering area between the two woredas. However, finishing the slaughtering process by covering the floor with tree leaves, grass and other materials was practiced more in Arsi Negele than in Shashemene ($p<0.05$).

Table 15. Cattle slaughtering area selection by households

Stage	**Practice**	**Arsi Negele N=86**		**Shashemene N=85**		**P value**
		Yes	%	Yes	%	
Slaughtering/ Bleeding	On earth floor	76	88.4	79	92.9	0.305
	On grass field	8	9.3	5	5.9	0.399
	On concrete floor	2	2.3	1	1.2	0.567
Finishing	By hoisting	3	3.5	0	0	0.082
	On the floor	42	48.8	79	92.9	0.000
	Covered floor	41	47.7	6	7.1	0.000

In Sheep and goats: Sixty one percent of Arsi Negele and 85% of Shashemene house hold producers use different slaughtering and finishing area for sheep and goat slaughtering. Almost all respondents interviewed affirmed that bleeding of sheep and goats was done on floor. On the other hand, the finishing area of sheep and goat slaughter is done mostly by hoisting which is 86.9% in Arsi Negele and 88.2% in Shashemene. There is no significant difference ($p>0.05$) on the bleeding and finishing area selection between the two woredas (Table 16).

Table 16. Sheep and goat slaughtering area by house hold owner

Stage	**Slaughter area**	**Arsi Negele N=61**		**Shashemene N=85**		**P value**
		Yes	%	Yes	%	
Slaughtering/ Bleeding	On earth floor	61	100	83	98.8	0.392
	On concrete floor	0	0	2	2.4	0.228
Finishing	By hoisting	53	86.9	75	88.2	0.807
	On the floor	8	13.1	10	11.8	0.807

4.3.6. Major hide and skin management problems that occur during slaughtering

Thirty four percent and 41% of hide and skin producer households interviewed from Arsi Negele and Shashemene Woredas respectively confirmed that they had experience of causing one or more hide and skin defects during the slaughter process. The major defects mentioned were flay-cut, dirt, flesh remnant and blood (Table 17). Dirt as a problem of hides and skins was significantly more frequent in Arsi Negele than in Shashemene woredas ($P<0.001$). Moreover, two-third (16) of the respondent butchers had experience of encountering one or more hides and skin defects during slaughtering process. Defects include flay cut/hole 11(45.8%), flesh remnant 3(12.5%), blood 1(4.2%) and corduroying 1(4.2%). When data was analysed based on respondents' household education, there was no association between level of formal education and the frequency of reporting post-slaughter defects.

Table 17. Defects encountered during slaughtering by household respondents

Defects encountered	**Arsi Negele (N=34)**		**Shashemene N=41**		**P value**
	Yes	%	Yes	%	
flay cut/hole	24	70.6	29	70.7	0.989
Dirt	12	35.3	1	2.4	0.000
Flesh remnant	11	32.4	12	29.3	0.773
Blood	8	23.5	9	22.0	0.871
Corduroying	3	8.8	0	0	0.052

4.3.7. Major post-slaughter hide and skin management problems

Twenty two percent and 20% of hide and skin producer households interviewed from Arsi Negele and Shashemene Woredas respectively confirmed that they had experience of causing one or more hide and skin defects after slaughter. The major problem reported by Arsi Negele respondents were dirt, delay in selling, lack of transport and putrefaction (Table 18) whereas main problem in the eyes of respondents from Shashemene was delay in selling.

Table 18. Post-slaughter hide/skin problems listed by household respondents

Problem encountered	**Arsi Negele N=22**		**Shashemene N=20**		**P value**
	Yes	%	yes	%	
Dirt	11	50	1	5	0.001
Delay in selling	10	45.5	8	40	0.721
Lack of transport	8	36.4	1	5	0.013
Damage by rodents(carnivores)	3	13.6	1	5	0.341
Putrefaction	7	31.8	11	55	0.129

4.3.8. Timely selling of hide and skins

Almost all of the house hold producer sold hide and skin to market after back yard slaughter is in fresh (un preserved state).The study further indicated that there is low or no demand for sun dried hides and skins and the traders and tanners preferred fresh and wet salted hides and skins. This was reflected by the lower prices offered for sun dried skins. In addition, 83.3% and 16.7% of Butcheries in both woreda were sold fresh and salted hide to the market respectively and also 87.5% of them sold fresh skin.

From table 19 below, it can be concluded that 92-96% of respondents sell hides and skins within 24 hours after flaying and the greatest share is within 12 hours of slaughter which is a more frequent response for Shashemene area than for Arsi Negele ($p<0.05$) Moreover, 79.2% of butcheries sell hide and skin within 12 hour in both woreda and 12.5% of them sell their hide and skin within 24 hour. Data was filtered to see if respondent education has an impact on selling time of hide and skins. It was observed that 77% of illiterate, 80% of those with primary education and 90-92% of those with secondary education and above has sold their fresh products within the first 12hrs of slaughter suggesting an increasing trend with increasing formal education.

Table 19. Timing of hide and skin selling after flaying

Duration	**Arsi Negele N=86**		**Shashemene N=92**		**P value**
	Yes	%	Yes	%	
Within 12 hours	63	73.3	84	91.3	0.002
Within 24 hours	16	18.6	5	5.4	0.006
With 48 hours and above	7	8.1	3	3.3	0.158

4.3.9. Storage of hide and skin

All collection centres visited had preservation and storage place for sheep skin, goat skins and cattle hides. The storage room in Arsi Negele is made of wood where as in Shashemene woreda collection center of the storage room made of cement wall (appendix2). And in both woreda the storage room is well ventilated and there is a drainage system for the disposal of waste material from the raw hide and skin after preservation with salt. To prevent damage from insects and rodents hides and skins are stored on pallets at least 10cm off the ground.

4.3.10. Preservation practice by respondents

The questionnaire survey revealed that very few households (7 from Arsi Negele and 4 from Shashemene) use preservation methods for hides and skins, most of them practicing salting more frequently than air drying. This study also revealed that lower proportion of producers, 28% Arsi Negele and 39% in Shashemene, were aware of wet salting methods of hides and skins. A much lower level was also registered (10% for Arsi Negele and 7% for Shashemene) on the experience of practicing wet salting method. In addition, in both woredas, all of the sampled butcheries stated that they always sold fresh hide and skin and hence do not usually use any preservation methods.

Salting is a practice very commonly adopted by middle men and collection centers in both woredas. The salt applied will introduce an excess of inorganic salts and produce some dehydration. The traders believe that salting arrests the growth of bacteria that will otherwise decompose the hides and skins. The hides and skins are spread on a slightly inclined slatted plat form, with the flesh upward as shown in figure 3. Unknown quantity of salt is applied over the flesh side until it completely covers the entire surface. The succeeding hides or skins are piled on top, using the same application rate of salt. Technically, the first salting should be carried out at the time when the hide or skin reach to the collection center. The second salting is done 2-3 days after the first salting and then raw materials are transformed into pallets for each

species separately (Figure 3). The height of a pile of wet salted hide or skin shall not exceed 1.5 meters as reported by center owners.

Figure 3: steps in curing of hides and skins
A) Inclined slatted plat form for preservation by salting, B) wet salting process, C) salted sheep and goat skin and D) pile of wet salted skin

4.3.11. Transportation of hide and skin to market

Based on the survey result, hides and skins are mainly transported from producers to markets using different methods that include animal transport, by cart, vehicle, on foot in open air and on foot in plastic bags. Majority of producers who supplied cattle hide to the market used cart as a means of transport followed by vehicles like Bajaj in Shashemene areas. (Table 20). There is significant difference ($p<0.05$) on method of transportation by cart and vehicle between the two woredas.

Similarly most Arsi Negele respondents use cart and on foot transportation and Shashemene producers used vehicle and on foot means to bring their sheep and goat skins to the markets (mainly to collection centers). And there is also a significant

difference ($p<0.05$) on method of transportation of sheep and goat skin to market by animal transport, cart and vehicle between the two woredas (Table 21).

Table 20. Transportation of cattle hides by house hold owner

Method of transportation	**Arsi Negele N=64**		**Shashemene N=41**		**P value**
	Yes	%	Yes	%	
Animal transport	3	4.7	5	12.2	0.157
By cart	51	79.7	20	48.8	0.001
Vehicle	2	3.1	12	29.3	0.000
On foot in open air	4	6.2	0	0	0.103
On foot in plastic bags	4	6.2	4	9.8	0.509

Table 21. Transportation of skin by house hold owner

Method of transportation	**Arsi Negele N=57**		**Shashemene N=80**		**P value**
	Yes	%	Yes	%	
Animal transport in plastic bag	9	15.8	1	1.2	0.001
By cart in plastic bag	19	33.3	8	10	0.001
Vehicle in plastic bags	6	10.5	50	62.5	0.000
On foot in open air	2	3.5	0	0	0.091
On foot in plastic bags	21	36.8	21	26.2	0.185

From the total of 21 butcheries in both woredas that sold hide to market, 90.5% of them use cart and the other 9.5% use animal transportation method. Similarly, for sheep and goat skin, from total of 22 butcheries who sold skin to market 45.5%, 22.7%,18.2%,13.6% use animal transport, cart, vehicle and on foot in plastic bag for

the transportation of their skin to the market respectively. Three of the four middlemen who responded to this interview used animal transportation method for cattle hides and the other transports by cart. Similarly for sheep and goat skin 60%and 40% of five middlemen use animal transport and vehicle respectively. Based on the survey result the entire collection center in both woreda transport their hide and skin to tanneries in Addis Ababa and Modjo using Isuzu tracks. The salted and orderly arranged raw products are bundled together just prior to loading and will be opened as soon as they are received by the tanneries.

4.4. Hide and Skin Quality based on Post-Slaughter Defects & Physical Characteristics

4.4.1. Post-slaughter examination of defects

By using the total number of hide examined the prevalence of each defect type was determined. All the 384 fresh and 384 salted skin and hides for each woreda had at least one type of defect. Accordingly, the apparent defects of fresh and salted cattle hide are presented in table 22 and the result showed that the most frequently observed defects in raw fresh cattle in order of importance include blood, flesh remnant, dirt and corduroying (Figure 4). In the same case the most frequently observed defects in salted cattle hide include dirt and flesh remnant.

Table 22. Major post-slaughter defects observed on cattle hides in selected stores

Types of defect	**Cattle hide (N=180)**			
	Fresh (N=90)		Salted(N=90)	
	No	%	No	%
Hole/flay cut	50	55.6	34	37.8
Corduroying	60	66.7	27	30
Dirt	66	73.3	83	92.2
poor pattern	30	33.3	26	28.9
flesh remnant	88	97.8	73	81.1
Putrefaction	2	2.2	6	6.7
Blood	88	97.8	25	27.8

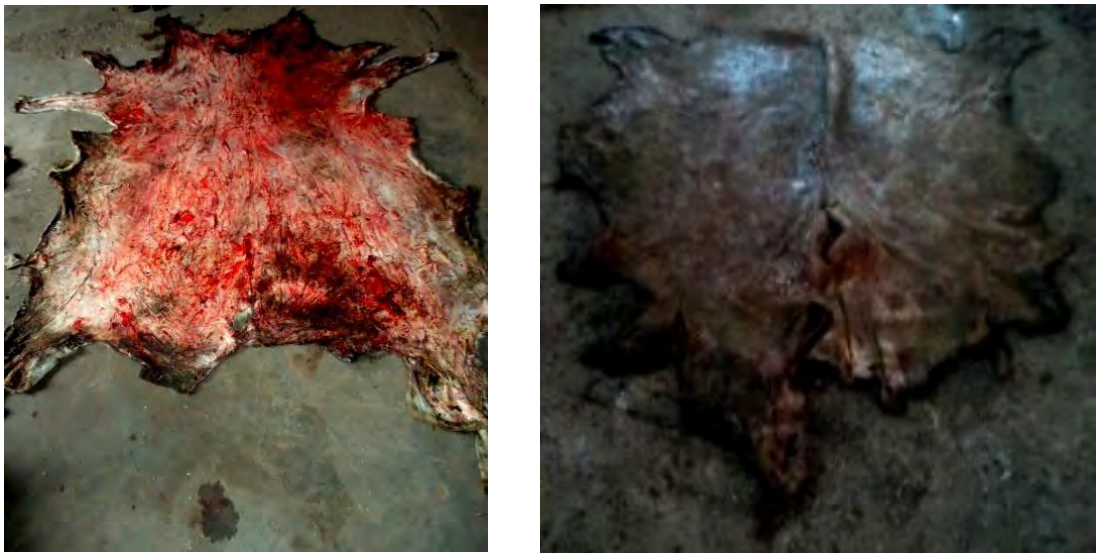

Figure 4: Defect observed in cattle hides
Left: cattle hide with defects of flesh, blood and dirt and Right: cattle hide defect with poor pattern

Similarly, the apparent defects of fresh and salted sheep and goat skin are presented in table 23.It was found that the most frequently observed defects in raw fresh and salted skin were flesh remnant, dirt and blood in order of importance.

Table 23. Major defects observed on sheep and goat skin in selected skin stores

Types of defect	**Sheep skin (N=284)**				**Goat skin (N=304)**			
	Fresh (N=142)		Salted(N=142)		Fresh (N=152)		Salted(N=152)	
	No	%	No	%	No	%	No	%
Hole/flay cut	23	16.2	25	17.6	30	19.7	20	13.2
Corduroying	6	4.2	2	1.4	20	13.2	1	0.7
Dirt	93	65.5	75	52.8	104	68.4	88	57.9
poor pattern	10	7	27	19	11	7.2	35	23
flesh remnant	113	79.6	98	69	120	78.9	99	65.1
Putrefaction	0	0	0	0	3	2	0	0
Blood	47	33.1	10	7	59	38.8	22	14.5


Figure 5: Defect observed in sheep skins

Sheep skin with defects of excess flesh and dirt (Left) and hole/flay cut (right) at main usable parts of the skin

4.4.2. Physical characteristics of hide and skin

Weight of cattle hide and sheep/goat skin

There was a significant difference between the fresh and salted state ($p<0.05$) in the mean weights of both cattle hide and goat skin (Table 24).

Table 24. Mean weight of cattle hide and sheep and goat skin in both woredas

Origin	**Fresh**		**Salted**		**P value**
	No	mean± SD	no	mean± SD	
Cattle hide (kg)	90	15.47±5.449	90	10.94±3.469	0.000
Sheep skin (g)	142	1567.25± 393.342	142	1538.03±447.211	0.559
Goat skin (g)	152	1488.16±565.561	152	1375.33±444.279	0.054

As shown in table 25 below, the large proportion of the sampled fresh cattle hide fall under medium category (10.9-16.5 kg) followed by heavy (16.6-21.9 kg), light (5.5-10.8kg) and extra heavy (>22 kg) category. In the same case majority of the sampled salted cattle hide was categorized under medium category (8.4-12.6kg) followed by light (5.2-8.3 kg), heavy (12.7-16.8kg), and extra heavy (>16.9).

Table 25. Weight of cattle hides in both woredas

Category of mass	**Cattle hide(N=180)**			
	Fresh(N=90)		Salted(N=90)	
	No	%	No	%
Light	16	17.8	19	21.1
Medium	41	45.6	48	53.3
Heavy	19	21.1	16	17.8
Extra-heavy	14	15.6	7	7.8

Similarly, majority of fresh sheep and goat skin were categorized under extra light category (<1500g), followed by light (1510-1800g), medium (1810-2100g), heavy (2110-2400g) and extra heavy (>2410g) categories. Most of the sampled salted sheep and goat skin were categorized under extra heavy (>1210g), followed by heavy (1060-1200g) and only a small percentage were categorized under light (760-900g), extra light (<750g) and medium (910-1050g) categories (Table 26).

Table 26. Weight of sheep and goat skin in both woredas

Category of mass	**Sheep skin (N=284)**				**Goat skin (N=304)**			
	Fresh (N=142)		Salted(N=142)		Fresh (N=152)		Salted(N=152)	
	No	%	No	%	No	%	No	%
Extra light	72	50.7	1	0.7	94	61.8	8	5.3
Light	43	30.3	10	7	31	20.4	13	8.6
Medium	14	9.9	1	0.7	12	7.9	6	3.9
Heavy	11	7.7	19	13.4	3	2	30	19.7
Extra heavy	2	1.4	111	78.2	12	7.9	95	62.5

Size measurement of cattle hide and sheep/goat skin

There was a significant difference between the fresh and salted state ($p<0.05$) in the average size of cattle hide, sheep and goat skin (Table 27).The study depict that most of the sampled fresh sheep and goat skins were in medium (40-65dm^2) and small (20-40dm^2) size category with few skins in the large size (65-90dm^2) classification. Fresh sheep skin in both extra small (<20) and extra large (>90) were not encountered. Similar to the case of fresh skin, most of the sampled salted sheep and goat skins were in medium and small size category as summarized in table 28.

Table 27. Average size of cattle hide and sheep and goat skin in both woreda

Species	**Fresh**		**Salted**		**P value**
	No	mean± SD	No	mean± SD	
Cattle hide (dm^2)	90	195.403±48.329	90	156.021±31.141	0.000
Sheep skin (dm^2)	142	45.68±11.603	142	42.046±10.444	0.006
Goat skin (dm^2)	152	45.390±13.506	152	39.310±11.821	0.000

Table 28. Size of sheep and goat skin in both woreda

Category of size	**Sheep skin (N=284)**				**Goat skin (N=304)**			
	Fresh (N=142)		Salted (N=142)		Fresh (N=152)		Salted (N=152)	
	No	%	No	%	No	%	No	%
Extra small	0	0	1	0.7	2	1.3	7	4.6
Small	53	37.3	64	45.1	56	36.8	83	54.6
Medium	79	55.6	75	52.8	79	52	59	38.8
Large	9	6.3	2	1.4	14	9.2	3	2
Extra large	0	0	0	0	1	0.7	0	0

4.7. Marketing Practice and Constraints

4.7.1. Marketing chain of hide and skin

The various agents involved in the marketing process of hides and skins in the study area include producers, middle men, collection centers and tanneries. Producers are the initial sources and consist of individual meat consumers and butcheries and agents could be of middle men, collection centers and tanneries. Based on the survey result 87% and 91% of Arsi Negele and Shashemene household producers sell their hide and skin and there is no significant difference ($p>0.05$) between the two woredas on the magnitude of house hold producers that sell hide and skin.

From these, the vast majority of Arsi Negele respondents sell raw hides and skins to collection centers after transporting to the woreda market in expectation of better prices while most of Shashemene woreda household producers sell their produces at their farm gate to middlemen who in turn sell them to licensed collection centers as summarized in table 29. There is significant difference ($p<0.05$) between the two woredas with respect to the first destination of the raw materials.

Table 29. Place where the house hold owner sold their hide and skin

Destination	**Arsi Negele N=87**		**Shashemene N=91**		**Over all**	**χ^2**	**P value**
	Yes	%	yes	%			
Collection center	69	79.3	25	27.5	94(52.8%)	47.959	0.000
Middle men	18	20.7	66	72.5	83 (46.6%)	50.179	0.000

Butcheries and municipal slaughter house in both woredas who also kills animals for different purpose mentioned that the destinations of their hide and skin were collection centers.

Three of the four hides and skin collectors supply their raw materials to tanneries in Addis Ababa (ELCO, HAFDE and Walia tannery) while the fourth one sells to the Modjo tannery. The tanneries process the hides and skins purchased from their suppliers, to semi-finished or finished leather for both domestic and export markets.

Four lines of market channels were identified for hides and skins. Two of them went through intervention of middle men between the producer and collection center and while the other 2 are directly from collection center of the woreda to tanneries (Figure 6). Hence, the hide and skin marketing channels that were observed in the two woredas are as follows:

Channel 1: producer—collection center—tanneries (AA)
Channel 2: producer—collection center—tannery (Modjo)
Channel 3: producer—middle men—collection center—tanneries (AA)
Channel 4: producer—middlemen—collection center—tannery (Modjo)

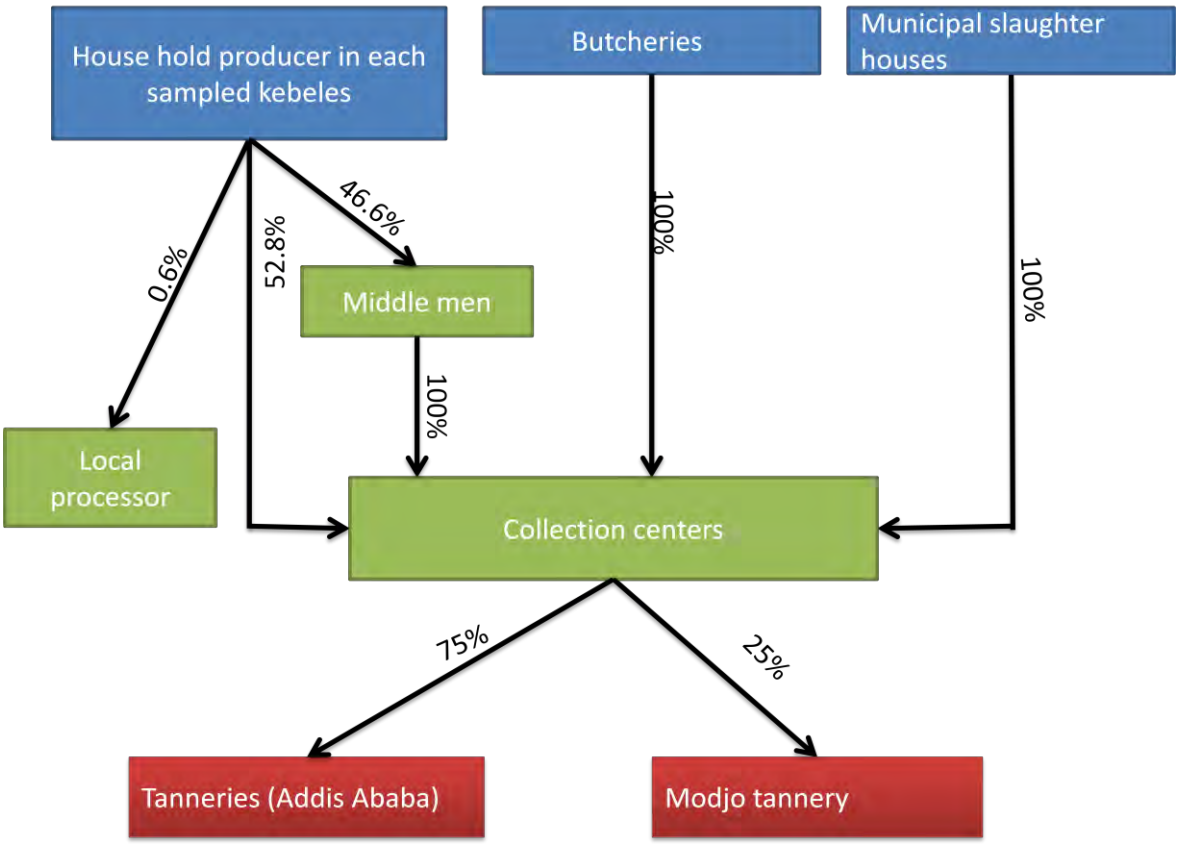

Figure 6: The main marketing channels of hides and skins in the two woreda

4.7.2. Hide and skin market price

According to the various respondents the price of hide and skins fluctuates at different occasions. From the questionnaire survey response by middlemen, butcher men and collection center heads, it can be concluded that price of raw materials increases as it goes from producers to collection centers. However, it was also observed that buying and selling price reporting was irregular among the actors interviewed (Table 30). Middlemen usually buy cattle hide without weighing and hence, the maximum weight of hides (21kg) measured at collection centers was taken to calculate their buying price per kg of hide.

Table 30. Average buying and selling price of hide and skin by different actors in Arsi Negele and Shashemene woreda.

Marketing actors	**Product type**					
	Sheep (birr/pc)		Goat (birr/pc)		Cattle (Birr/kg)	
	Buying	Selling	buying	Selling	Buying	Selling
Butcheries	-	47.53	-	18.50	-	7.50
Middle men	33	47.90	12.25	21.25	2.75	4 .00
Collection centers	47.50	59.75	15	22	4.00	10.36

House hold producers usually do not set price for their hide or skin. The reasons stated is that: usually prices are set by traders, they are mostly price takers, because they can't return back their hide or skin to their home. According to the survey response majority of household producers sell their hide and skin either by price fixed by the buyers or through negotiation based on size and quality of the materials (Table 31). From the total 22 respondent butchers in the two woredas, 76% and 12% said that price was fixed by buyers and negotiation respectively. Negotiation was on the basis of freshness, post slaughter defects and by comparing price given by other traders.

Table 31. Hide and skin price fixing during marketing in both woredas

Price fixed by	Arsi Negele N=87		Shashemene N=91		P value	Overall %
	Yes	%	Yes	%		
My self	4	4.6	0	0	0.039	2
The buyer	78	89.7	52	57.1	0.000	73.4
National price	0	0	0	0	0	0
Negotiation	5	5.7	39	42.9	0.000	24.3

4.7.3. Access to market information

Producers have limited market access and weak bargaining power partly due to dearth of market information. Based on the survey result from the total producer households sampled, only 6% and 22% of Arsi Negele and Shashemene woreda respectively have access to market information with significant difference ($p< 0.05$) between the two woredas.

4.7.4. Hide and skin marketing constraints

There are a number of constraints that hamper further development of the hides and skins sector in Shashemene and Arsi Negele woredas. Based on the survey, majority of household producers of the two woredas listed lack of competitive market, lack of price information and fluctuating price as major constraints in hide and skin marketing (Table 32). Moreover, fluctuating price, lack of competitive market, lack of adequate slaughter facilities, inadequate infrastructure where slaughter houses are located for instance lack of piped water, lack of skill in slaughtering are problems that are also encountered by butcheries.

Table 32. List of hide and skin marketing problems as reported by household respondents

Marketing problems	**Arsi Negele N=71**		**Shashemene N=68**		**P value**	**Overall %**
	Yes	%	Yes	%		
Fluctuating price	38	53.5	31	45.6	0.350	49.5
Lack of competitive market	64	90.1	11	16.2	0.000	53.2
Lack of price information	37	52.1	31	45.6	0.442	48.9
Poor quality of product	11	15.5	6	8.8	0.230	12.2
Lack of awareness	8	11.3	12	17.6	0.284	14.5
Low price offer	2	2.8	12	17.6	0.004	10.2
Transportation problem	4	5.6	0	0	0.047	2.8
lack information on best market place	0	0	3	4.4	0.074	2.2

The problems faced by hides and skins traders in both woredas include poor quality, low price offer, administrative problems and unstable prices. Government facilitating and regulatory support, high transportation fee to market, in availability of salt for preservation, lack of information flow on price, are also reported as problems by traders.

5. DISCUSSION

5.1. Perception and Practices on the Management of Hides and Skins

In the current study, we have reported that majority of household questionnaire survey respondents sell hide and skin to the market. This finding partly disagrees with Hadush et al. (2013) in northern Tigray who reported that all their respondents never sell cattle hides to market because they use them to prepare household utensils. Moreover, the report of Hadush et al. (2013) and Asegede et al. (2015) that indicated 31% and 44.14% of respondents respectively ascertaining the selling of sheep and goat skins is below the figures indicated in this study. Such difference could arise from differences in the perception of the products, price and market access. It could also be because of the huge importance of hides for local use than the revenue it may fetch to the owner. Despite this fact, our study also revealed that significant number of cattle hides fail to reach the formal market. This is in agreement with the report of Muthee (2008) who claimed that many hides and skins remain uncollected, which are estimated at 14%, for hides, 34% for sheep skins and 29% for goat skins.

Presence or absence of hole/flay cut, lesions and brands, freshness of the skin, size/pattern of the skin, weight of the skin, absence of dirt on the flesh part of the skin, absence of blood on the flesh part of the skin, thickness of the skin and absence of flesh remnants were used to assess the hide and skin quality perception of respondents. Chemonics (2002) stated that weight, size, patches, and holes are just a few parameters that determine the value of hides and skins. Accordingly, the questionnaire survey response revealed that majority of the respondents had awareness on these indicators. Absence of flay cut, freshness and size/weight were the most frequently reported criteria for better quality sheep/goat skin in both study Woredas. However, there was still significant number of mainly household respondents who were unaware of the significance of one or more of the listed indicators for the quality determination.

Most of the small stocks in the study area are slaughtered in homesteads and therefore this is scattered and periodic. Producers in the study woredas revealed that goats and sheep are mainly killed during festivities, like for religious purposes or wedding celebrations. Cattle are mostly slaughtered by forming groups among household neighbours at rural slaughter slab. This is in line with Hadush *et al*. (2013) whose report revealed that sheep and goats are slaughtered at their home while other large animals, cattle, are slaughtered outside their home. Wayua and Kagunyu (2008) also reported that Most of the hides and skins are sourced from rural slaughter slabs and homestead slaughter.

Based on the survey result Cattle, sheep, and goats are mainly slaughtered in poorly equipped slaughter points where the infrastructure is sometimes on earth floor, a slab of concrete, on covered floor or under a tree, or using poles for hoisting carcasses in both woredas. This is in line with the report of Wayua and Kagunyu (2008) who report that rudimentary tools used for slaughtering causing manmade defects on skins and hides and thus poor prices.

On the current study household producers interviewed confirmed that they had experience of causing one or more hide and skin defects during and after slaughter which results in rejection by collection centers due to poor quality. The major defects mentioned were flay-cut, dirt, flesh remnant and blood during slaughtering and contamination with dirt as well as putrefaction resulting from delayed selling. These finding agrees with Kagunyu *et al*. (2011), Kassa (2005, 2006) and Mwinyihija (2010) who report that flay defects because of lack of knowledge and experience of people who perform the job and post-slaughter management problems (Hadush *et al.,* 2013) are responsible for hide and skin quality deterioration.

Almost all of the household producers in the study area sold hide and skin in fresh (unpreserved) state. The study further indicated that there is low or no demand of sun dried hides and skins. This is in line with Hadush et al. (2013) who stated that raw hides and skins supplied from farmers are all in the fresh state and majority being sold in the first 12 hours post-slaughter. While this is a good practice that should be encouraged, on the contrary Kagunyu et al. (2011) in part of Kenya revealed that only 7.2% of producers sold their hides and skins when they were raw (fresh) and sun

drying methods are the most commonly used by the producers. Different from our finding, Hadush et al. (2013) in northern Tigray reported 63% of farmers sell the raw hides and skins after one day. This suggests that levels of awareness vary from place to place in the country. Better quality of skin and hide products is obtained when the raw materials are preserved or processed within very early hours of slaughter as recommended by Kanagaraj and Babu (2002).

This study also revealed that lower proportions of producers, were aware of wet salting methods of hides and skins this is in agreement with the study Kagunyu et al. (2011) who said 18% of producers had knowledge on wet salting of hides and skins and Hadush et al. (2013) who revealed that 69% of respondents also confirm that they did not know about the advantage of adding salts to the skins and hides. This lack of knowledge on preservation means that producers cannot stockpile hide and skins until they transfer them to the next market chain and this gives a good explanation why majority of hide and skin producer households sell them fresh.

Transport facilities used to create place utilities of the product. During the transportati on process hides and skins are exposed to sun drying, putrefactions, soil contaminatio n, and wastages along the chain if there is poor handling system (Berhe, 2009). The main transportation methods of hide and skin to market in the study woredas were animal transport, by cart, vehicle, on foot in open air and on foot carried in plastic bags.

A similar transportation condition was reported by Hadush et al. (2013) in Northern Tigray. It was stated that the most common transportation systems for the raw hides and skins by the farmers is through sacks, carrying by them through sticks and carrying by their hand for their raw hides and skin. From this it is clear that the fresh raw materials could be exposed to dirt, and putrefaction due to inappropriate handling especially in plastic bags for long hours which favours bacterial growth.

Butcheries in both woredas use cart and pack animal for transportation of hide and skin to market respectively. Similarly middle men located in both woredas use animal transport and vehicles for transportation of hide and skin to the market and the entire collection center in both woreda transport their hide and skin to tanneries in Addis

Ababa and Modjo using Isuzu tracks. This is in line with Berhe (2009) who reported that all local collectors used pack animals and small Isuzu trucks to transport from local markets to the town and wholesale traders used medium and big size trucks to transport hides and skins to Wukro, Adigrat and Addis Ababa.

5.2. Hide and Skin Quality in the Study Areas

In Ethiopian tanneries, 35% of sheep and 56% of goat skins are reported to be downgraded and rejected due to pre and post-slaughter defects (Berhanu *et al*., 2011). The fact that over 90-95% of skins are collected from sheep and goats slaughtered at household level (Ahmed, 2001) means that post-mortem defects are very prevalent (Chanie *et al*., 2010). In this study, the most common post-mortem defects recorded on cattle hides include flesh remnant, contamination with dirt, flay cut/hole and corduroying. This is in line with previous reports that have indicated some of the most frequently observed defect were dirt (Melkamu, 2014), corduroying and knife cuts (CSA, 2004). Berhe (2009) also reported that disease and flay cut were the main defects of cattle hides.

Similarly contamination with dirt and presence of flesh remnants were the most frequent defects detected on sheep/goat skins. This finding is in line with the report of Zembaba et al. (2013) in Bahir dar, CSA (2004) and Melkamu (2014) in East Gojjam Zone. However, poor pattern and corduroying as other most important defects on the report of Zembaba et al. (2013) were not the most frequently observed defect on the current study. Our findings also disagrees with the report of CSA (2004), which stated that poor pattern (34.79%) and knife cut (20.04%) were the main defects of sheep skin. This variation has come from the awareness of people towards the skin during slaughtering time. Nowadays, farmers take great attention for knife cut rather than dirt, flesh remnant and blood, because knife cut does not fetch a good price by legal traders.

Physical parameters such as weight and size are frequently considered as hide and skin quality indicators (PIC, 1990). On the current study the large proportion of the sampled fresh cattle hide were categorized under the medium category (10.9-16.5kg)

followed by heavy (16.6-21.9kg).This finding was lower than with the report of (USDA, 2012) which stated that a typical steer or heifer slaughtered in a U.S. Meat Packers plant has a 29 kg hide a typical slaughtered cow a 22 kg hide. Similarly, majority of the sampled fresh sheep and goat skins were categorized under extra light category, followed by light .The result is not in line with the report of Zembaba et al. (2013), who reported that large proportion of fresh sheep skin were in medium and heavy categories. In the same case on the current study the large proportion of the sampled salted sheep and goat skin were categorized under extra heavy, followed by heavy. This also disagrees with the report of Zembaba et al. (2013), who reported that large proportions of salted sheep and goat skin were in heavy and medium categories. Such difference may arise from the size and breed of the animals from which the skins were derived.

Measurement of the sizes of hides and skin revealed that most of the sampled fresh and salted sheep and goat skin were classified in medium and small size categories according to the weight standard set by (ESQA, 2001).This is in line with the report of Zembaba et al. (2013) who showed that most of the fresh and salted skins collected from sheep from Bahirdar area were of medium size.

5.3. Marketing Practice and Constraints

In this study the major sources of products for collection centers were house hold producers, butchers and abattoirs and the final destination of the product from collection centers were tanneries. The current study was in agreement with Ahmed, (2000) who reported that the market chain for raw hide and skin consists of the primary producers/consumers, who were the initial sources (individual meat consumers, rural slaughter slabs, municipal slaughter houses, abattoirs, meat processing plants), agents of traders, collectors, local tanners, regional medium/ small traders, regional/Addis Ababa big traders and tanneries. The current market chain is also in line with koloa and moreki (2010) and chemonices (2002).

Hides and skins markets are librated, and government institutions provide only technical support, licensing and regulatory work. The initial links for hides and skins

marketing channels are producers that kill animals either on festivals or occasions and the final destinations are tanneries that process the raw material to semi-processed and finished leather, and sell to domestic and export market. In between, lots of actors existed which play significant roles for the movement of the product to its final destination (Berhe, 2009).

This study demonstrated that significant number of household hide and skin producers sell their products to collection centres and middlemen. This result supports the report of Hadush et al. (2013) in Tigray who indicated that 53% of respondents' confirmed to sell hide and skin to collection centers.

In the current study House hold producer in both woredas do not set price for hides or skins. The reason stated is that prices are usually set by traders and that they are mostly price takers, because they can't return back their hide or skin to their home after bringing it to market. This is in line with Berhe (2009) who showed a similar situation in Tigray suggesting that producers have little say on the price of their products. Some have also responded that price can also be determined by negotiations based on some quality criteria. This agrees with the finding of Kagunyu et al. (2011) who reported that prices of hides and skins are determined by the form in which they were sold; the prices of sun dried hides and skins (suspension dried and ground dried) were lower than fresh raw hides and skins. From the questionnaire survey response by middlemen, butcher men and collection center heads, it can be concluded that price of raw materials increases as it goes from producers to collection centers. However, it was also observed that buying and selling price reporting was irregular among the actors interviewed.

Although the potential for hide and skin production in many places is high, there are a number of market constraints hampering supply of hides and skins market. Producers had limited market access due to dearth of market information. Only 6% and 22% of Arsi Negele and Shashemene woreda producers respectively have reliable access to market information. This is in line with Berhe (2009) who reported that only 15.7% of the sampled farmers have access to market information. However, Asegede et al. (2015) reported about 58% of total respondent had market access. This variation might be due to differences in the distance between collection centers and producers

or due to differences in the availability of communication and transportation infrastru cture. 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 (Scarborough and Kydd, 1992).

Other marketing constraints mentioned price fluctuations; lack of competitive market; inability to provide the desired quality due to poor methods of curing such as sun drying, poor flaying due to lack of flaying skills and lack of proper flaying tools. Berhe (2009) reported that lack of competitive pricing (price setting), lack of transparent quality measurement and lack of access to the market (information and distance) also have a significant problem to the farmers. Kagunyu et al. (2011) also reported that poor quality of hides and skins led to low prices which on the other hand discouraged pastoralists from selling their products. The problems faced by hides and skins traders in both woredas include poor quality, low price offer, administrative problems and unstable prices. Government facilitating and regulatory support, high transportation fee to market, unavailability of salt for preservation, lack of informatio n flow on price, are also reported as problems of traders. Berhe (2009) reported that poor quality, capital shortage, administrative problems, and unstable prices, access to credit or nearby bank service, transport, information flow, as problems of traders.

6. CONCLUSION AND RECOMMENDATIONS

The present study was conducted with the objectives of assessing respondents' perception on the quality criteria and management practice of hide and skin, identify post slaughter defects and assess marketing of skins and hides in Arsi Negele and Shashemene Woredas. Accordingly, it was found that majority of hide and skins produced are brought to the market although there are a significant number of cattle hides that fail to reach the formal market. Moreover, most respondents are aware of some of the criteria for determining quality of hide and skins. However, they have clearly ascertained that they are still causing one or more of those defects both during and after slaughtering. Considerable percentage of cattle hides and goat/sheep skins had defects such as blood, flesh remnant, dirt, flay cut and corduroying and all the skins and hides examined in fresh or salted state had at least one type of defect that can reduce quality. Large proportions of the sampled fresh and salted cattle hide were categorized under the medium weight category whereas majority of the sampled salted sheep and goat skin were categorized under extra heavy. Most of the sampled fresh and salted sheep and goat skin were in medium and small size category and hence imply the small size of animals slaughtered in the area. Marketing of hide and skins involves primary, secondary and tertiary markets and the selling price increases with the market level. Major constraints in marketing of the raw materials include in adequate access to market and market information, fluctuating market prices, absence of competitive market and hide and skin defects which can be avoided or minimized through various means.

Based on the above concluding remarks, the following recommendations are forwarded:

- Since hide and skin defects primarily originate during the slaughtering process, adequate slaughter facilities such as slaughter slabs/houses should be made available to the public so that slaughtering will be done properly

- Both during slaughter and post-slaughter defects can be avoided or minimized through trainings and continuous awareness creation programs. Hence, livestock development extension programs should integrate this issue in their development work
- Appropriate ripping and flaying knives should be made available to the farmers to minimize the rate of flay cuts, corduroying etc
- A means of better market information and access and differential price offers according to defined quality of raw materials should be installed

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8. ANNEX

Annex 1. Questionnaire format

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I. Households producer

A. General information

Respondent ID____ Woreda _____Kebele _____Date _____

1. Demographic Characteristics of the respondent

   Age ---------- Gender: Female = 0 Male = 1

2. Respondent Education: A) Illiterate B) Primary school/read and write D) secondary school D) Diploma E) Degree and above

3. Do you have livestock at home? If yes, how many A) cattle ____B) Sheep ____C) goat_____ other_____

B. Respondent perception on hides and skin selection criteria

4. Do you slaughter livestock at home? _____

✓ How many sheep and goat did u slaughter per a month? _____

✓ How many cattle did u slaughter per a month? _____

5. Did you slaughter any animal in the last 3 month and last year? A) Yes B) No

6. If your answer is yes to Q5, how many Sheep____, Goat____ cattle____ camel____

   6.1 How many last year, sheep _____goat _____cattle _____

7. What did you do with the hide and skin you produced from slaughtering your animals?

A) Sold all B) kept all for household use C) sold some and kept the rest for other purpose

8. If u kept for household use which domestic purposes did you use?

A) making ropes B) building houses C) making milking containers D) drums E) seat covers F) praying mats

9. What determines best selling price for sheep and goat skin?

A) Absence of defects such as hole/flay cuts

B) Absence of defects such as skin lesions and brands

C) Color of the skin

D) Freshness of the skin/hide

E) size/pattern F) weight G) Breed of animal

H) other specify_____

10. What determines best selling price for cattle hide?

A) Absence of defects such as flay cuts

B) Absence of defects such as skin lesions and brands

C) Color of the skin

D) Freshness of the skin/hide

E) Size F) weight (hide) G) Breed of animal

H) other specify_____

C. Respondent perception on post slaughter hides and skin management

11. Where did you slaughter your cattle?

A) On Earth floor B) on grass field C) on rough surface D) on clean area

E) Other (specify) _____

12. How did you finish slaughtering your cattle?

A) by hoisting B) on the floor C) other specify_____

13. Where did you slaughter your sheep/goat?

A) On Earth floor B) on grass field C) on rough surface

D) on clean area E) Other (specify) _____

14. How did you finish slaughtering your sheep/goat?

A) by hoisting B) on the floor C) other specify_____

15. What problems did you face to your hides and skins during slaughter and flaying in the last 3 month and last year?

A) Flay cut B) hole C) silts and stains D) other (specify) ---

16. What problems did you face to your hides and skins after slaughter in the last 3 month and last year? A) Silts and stains B) delay in selling C) lack of transport D) damage by rodents and carnivores E) putrefaction F) Other (specify)

17. Have you ever discarded the hide or skin because of sever defect

A)Yes B) No

18. What type of Hides did you sell in the last three months and last year?

A) Fresh B) Sun dried C) Salted

19. What type of skins did you sell in the last three months and last year?

A) Fresh B) Sun dried C) Salted

20. If you sold fresh, after how long following flaying?

A) within 12 hours B) within 24 hours C) within 48 hours

21. If beyond 24hrs, how do you preserve?

22. Did u know the method of wet salting for preservation of hide and skin and have u ever experienced it?

23. What type of salt did you use for preservation?

24. How did you transport the Hides from home to market?

A) Animal transport B) by cart C) Vehicle

D) on foot in open air E) on foot in plastic bags F) other (specify) --------

25. How did you transport the Skins from home to market?

A) Animal transport B) by cart C) Vehicle

D) on foot in open air E) on foot in plastic bags F) other (specify) --------

D. Respondent perception on hide and skin market chain

26. Did you sell Hides or Skins to market in the? A) yes B) no

27. If yes, where did you sell your Hides or Skins?

A) to village market at_____

B) To woreda market at _____

C) to middlemen at _____

D) to collection center at_____

E) to local processors _____

F) Other (specify) ----------

28. How much did you sell A) Sheepskin_____, B) Goat Skin _____C) hide_____ to local market or middlemen?

29. How much did you sell A) Sheepskin_____, B) Goat Skin _____C) hide_____ to collection center?

30. Who fixes the price?

A) myself B) the buyer C) national price D) negotiation

31. If negotiation, what is the basis?

32. Did you face difficulty in finding buyers when you wanted to sell? 1= yes 2= No

33. If yes, what is the reason:

A) Inaccessibility to market

B) Lack of price information

C) Low price offer

D) Low quality product

E) Other (specify) ----------

34. Did you know the market price before you sell your Hides and Skins? A) Yes B)No

35. If yes, how did you get price information of Hides and Skins in the market?

A) Broker B) personal observation C) Other Hides and Skins traders

D) Mass media E) friends/ other producers ----------

36. What did you do, when the Hides and/or Skins you offered to the market were not sold?

A) keep for home use B) Sell at lower price

C) Sell or give to local processors D) discard it

37. What is the problem you encountered in hide and skin marketing?

A) fluctuating price B) lack of competitive market

C) lack of price information

D) inability to provide the desired quality

E) Other (specify) ----------

38. What is your suggestion to solve each problem?

_____

_____

_____

II. Butchers/restaurants

A. General information

Respondent ID____ Woreda _____Kebele _____Date _____

1. Demographic Characteristics of the respondent

Age ---------- Gender ---------- Female = 0 Male = 1,

2. Respondent Education: A) Illiterate B) Primary school C) Reading and writing D) secondary school D) Diploma E) Degree

B. Respondent perception on hides and skin selection criteria

3. How many sheep and goat did u slaughter per a month? _____

4. How many cattle did u slaughter per a month? _____

5. How important is hide and skin for you?

A) cash income B) make utensils

C) not so important D) other specify_____

6. Did you slaughter any animal in the last three months? A) Yes B) No

7. If your answer is yes to Q6, how many Sheep____, Goat____ cattle____ camel____

7.1 how many in the last year? sheep _____goat _____cattle _____

8. What did you do with the skin you produced from slaughtering your animals?

9. What did you do with the hide you produced from slaughtering your animals?

10. What determines best selling price for sheep and goat skin?

A) absence of defects such as flay cuts

B) absence of defects such as skin lesions and brands

C) color of the skin D) Freshness of the skin/hide

E) size F) weight (hide)

G) Breed of animal H) other specify_____

11. What determines best selling price for cattle hide?

A) absence of defects such as flay cuts

B) absence of defects such as skin lesions and brands

C) color of the skin D) Freshness of the skin/hide

E) size F) weight (hide)

G) Breed of animal H) other specify_____

C. Respondent perception on post slaughter hides and skin management

12. Where did you slaughter your cattle?

A) On Earth floor B) on grass field C) on rough surface

D) on clean area E) Other (specify) _____

13. How did you finish slaughtering your cattle?

A) by hoisting B) on the floor C) other specify_____

14. Where did you slaughter your sheep/goat?

A) On Earth floor B) on grass field C) on rough surface

D) on clean area E) Other (specify) _____

15. How did you finish slaughtering your sheep/goat?

A) by hoisting B) on the floor C) other specify_____

16. Do you care for the hides & skins during slaughtering & transporting?

A) Yes B) No

17. What problems did you face to your hides and skins during slaughter and flaying in the last three months and last year?

A) Flay cut B) hole C) silts and stains D) other (specify) -

18. What problems did you face to your hides and skins after slaughter in the last 3 months and last year? A)Silts and stains B) delay in selling C) lack of transport D) damage by rodents and carnivores E) putrefaction

F) Other (specify) ----------

19. Have you ever discarded the hide or skin because of sever defect A)Yes B) No

20. What type of Hides did you sell in the last three months?

A) Fresh B) Sun dried C) Salted

21. What type of skins did you sell in the last three months?

A) Fresh B) Sun dried C) Salted

22. If you sold fresh, after how long following flaying?

A) within 12 hours B) within 24 hours C) within 48 hours

23. How did you transport the Hides from slaughtering house to market?

A) Animal transport B) Vehicle

C) on foot in open air D) on foot in plastic bags

E) other (specify) ----------

24. How did you transport the Skins from slaughtering house to market?

A) Animal transport B) by cart

C) Vehicle D) on foot in open air

E) on foot in plastic bags F) other (specify) ----------

D. Respondent perception on hide and skin market chain

25. Did you sell Hides or Skins to market in the last three months? A) yes B) no

26. If yes, where did you sell your Hides or Skins?

A) To village market at_____

B) To woreda market at _____

C) To middlemen at _____

D) To collection center at_____

E) To local processors_____

F) Other (specify) ----------

27. In what state did you sell hides?

A) fresh B) sun dried C) salted

28. How much did you sell A) Sheepskin_____, B) Goat Skin _____C) hide_____ to local market or middlemen?

29. How much did you sell A) Sheepskin_____, B) Goat Skin _____C) hide_____ to collection center or local tannery?

30. Who fixes the price?

A) myself B) the buyer

C) national price D) negotiation

31. If negotiation, what is the basis?

32. Did you face difficulty in finding buyers when you wanted to sell? 1= yes 2= No

33. If yes, what is the reason:

A) Inaccessibility to market

B) Lack of price information

C) Low price offer

D) low quality product

E) Other (specify) ----------

34. Did you know the market price before you sell your Hides and Skins?

A) Yes B)No

35. If yes, how did you get price information of Hides and Skins in the market?

A) Broker B) personal observation

C) Other Hides and Skins traders D) mass media

E) friends/ Other producers ----------

36. What did you do, when the Hides and/or Skins you offered to the market were not sold?

A) Sell at lower price B) Sell or give to local processors C) discard it

37. What is the problem you encountered in hide and skin marketing?

A) fluctuating price

B) lack of competitive market

C) lack of price information

D) inability to provide the desired quality

E) Other (specify) ----------

38. What is your suggestion to solve each problem? _____

_____

_____

_____

III. Middle men/broker

A. General information

Respondent ID____ Woreda _____Kebele _____Date _____

1. Demographic Characteristics of the respondent

Age ----------

Gender ---------- Female = 0 Male = 1,

2. Respondent Education: A) Illiterate B) Primary school C) Reading and writing

D) secondary school E) Diploma F) Degree

3. How long have you been in Hides & Skins collecting?

A) < 1 year B)1-5 years C) 6-10 years D)above 10 years

4. When did you participate in Hides & Skins collection?

A) Every market day B) Every day

C) Only during holidays D) other (specify) ------

B. Respondent perception on hides and skin selection criteria

5. What criteria do you use to buy hides?

A) Size B) absence of flay defects

C) Weight D) absence of pre slaughter defects

E) freshness F) No criteria used

6. What determines best selling price for sheep and goat skin?

A) absence of defects such as flay cuts

B) absence of defects such as skin lesions and brands

C) color of the skin D) Freshness of the skin/hide

E) size F) weight

G) Breed of animal H) other specify_____

7. What determines best selling price for cattle/camel hide?

A) absence of defects such as flay cuts

B) absence of defects such as skin lesions and brands

C) color of the skin D) Freshness of the skin/hide

E) size F) weight (hide)

G) Breed of animal H) other specify_____

C. Respondent perception on post slaughter hides and skin management

8. Did you use any preservation method for hides and skins?

   A) Yes B) No

9. If yes, what preservation method did you use for Hides?

   A)Air dried B)Wet Salted C) Other (specify) ----------

10. If yes, what preservation method did you use for goat Skins?

    A)Air dried B) Wet Salted C) Other (specify) ----------

11. If yes, what preservation method did you use for sheep Skins?

    A)Air dried B)Wet Salted C) Other (specify) ----------

12. Have you ever discarded the hide or skin because of sever defect

    A)Yes B) No

13. What type of Hides do you buy?

    A) wet B) Sun dried C) Salted

14. What type of Skins do you buy? A) wet B) Sun dried) Salted

15. What will you do in most cases with the hide for selling?

    A) Sell it wet within six hours B) Sell it wet in 12 hours

    C) sell it wet in 24 hours D) sell it salted

    E) sundry and sell

16. Do you care for the hides & skins during transporting?

    A) Yes B) No

17. If you don't sell in 24 hrs, how do you store?

18. How did you transport the Hides from producer to market/tannery?

    A) Animal transport B) Vehicle

    C) on foot in open air D) on foot in plastic bags

    E) other (specify) ----------

19. How did you transport the Skins from producer to market?

    A) Animal transport B) by cart C) Vehicle

    D) on foot in open air E) on foot in plastic bags

    F) other (specify) ----------

D. Respondent perception on hide and skin market chain

20. From whom did you mainly purchase Hides & Skins in the last one year ?-----

A) Farmer B) Other collector

C) Hides & Skins Broker D) Butcheries

E) Other (specify, slaughter) –

21. Did you sell Hides or Skins to market in the last one month? A) yes B) no

22. If yes, where did you sell your Hides or Skins?

A) To village market at_____

B) To woreda market at _____

C) To middlemen/broker at _____

D) To collection center at_____

E) To local processors _____

F) Other (specify) tannery-------

23. Which type of Hide is highly demanded in the market in the last one month?

A) wet B) Air dried C) Salted D) Other (specify) ----------

24. Which type of goat Skin is highly demanded in the market in the last three months?

A) wet B) Air dried C) Salted D) Other (specify) ----------

25. Which type of sheep Skin is highly demanded in the market in the last three months?

A) wet B) Air dried C) Salted D) Other (specify) ----------

26. How much did you sell A) Sheepskin_____, B) Goat Skin _____C) hide_____ to local market or collection center?

27. How much did you sell A) Sheepskin_____, B) Goat Skin _____C) hide_____ to local tannery?

28. Who fixes the price? A) myself B) the buyer C) national price D) negotiation

29. Did you face difficulty in finding buyers when you wanted to sell? 1= yes 2= No

30. If yes, what is the reason:

A) Inaccessibility to market B) Lack of price information

C) Low price offer D) low quality product

E) Other (specify) ----------

31. Did you know the market price before you sell your Hides and Skins? A) Yes B)No

32. If yes, how did you get price information of Hides and Skins in the market?

A) Broker B) personal observation C) Other Hides and Skins traders D) mass media E) friends/ Other producers ----------

33. Did the price of Hides & Skins in this market vary from season to season? A) Yes B) No

34. If yes, what was the reason? A) Export price variation B) Factory/Tannery price variation

C) Wholesalers price setting D) Other (specify) ----------

35. When the price variation reaches high? A) During holidays B) Other than holidays C) Other (specify)

36. Did the supply of Hides & Skins in this market vary with season? A) Yes B) No

37. If yes, what was the reason? A) Price change B) Transportation problem C) Drought D) Disease incidence E) Other (specify) ----------

38. At what time of the year did Hides & Skins supply, demand and price reach their respective peak?

Time	Supply	Demand	Price
A. At festival period/holidays			
B. At wet time period other than holidays			
C. At dry time period other than holidays			
D. Other (specify) ----------			

39. What did you do, when the Hides and/or Skins you offered to the market were not sold? A) Sell at lower price B) Sell or give to local processors C) discard it

40. What is the problem you encountered in hide and skin marketing? A) fluctuating price B) lack of competitive market C) lack of price information D) inability to provide the desired quality d) Other (specify) ----------

What is your suggestion to solve each problem?_____

_____

_____

___

IV. Collection center

A. General information

Respondent ID____ Woreda _____Kebele _____Date _____

1. Demographic Characteristics of the respondent

Age ----------

Gender ---------- Female = 0 Male = 1,

2. Respondent Education: A) Illiterate B) Primary school C) Reading and writing D) secondary school D) Diploma E) Degree

3. How long have you been in Hides & Skins collecting?

A) < 1 year B)1-5 years C) 6-10 years D)above 10 years

B. Respondent perception on hides and skin selection criteria

4. How important is hide and skin in your opinion?

A) Personal profit for a living B) national importance

C) foreign currency generation D) other specify_____

5. What criteria do you use to buy hides?

A) Size B) absence of flay defects C) Weight

D) absence of pre slaughter defects E) freshness F) No criteria used

6. What criteria do you use to buy skins?

A) Size B) absence of flay defects C) Weight

D) Absence of pre slaughter defects E) freshness F) No criteria used

7. What determines best selling price for sheep and goat skin?

A) absence of defects such as flay cuts

B) absence of defects such as skin lesions and brands

C) color of the skin D) Freshness of the skin

E) size F) weight (hide)

G) Breed of animal H) other specify_____

8. What determines best selling price for cattle hide?

A) absence of defects such as flay cuts

B) absence of defects such as skin lesions and brands

C) color of the skin D) Freshness of the hide

E) size F) weight (hide)

G) Breed of animal H) other specify_____

C. Respondent perception on post slaughter hides and skin management

9. Do you use any preservation method for hides and skins? A) Yes B) No

10. If yes, what preservation method do you use for Hides?

A)Air dried B)Wet Salted C) Other (specify) --------

11. If yes, what preservation method do you use for goat Skins?

A)Air dried B) Wet Salted C) Other (specify) --------

12. If yes, what preservation method do you use for sheep Skins?

A)Air dried B)Wet Salted C) Other (specify) --------

13. Have you ever discarded the hide or skin because of sever defect

A)Yes B) No

14. What type of Hides did you sell in the last three months?

A) wet B) Sun dried C) Salted

15. What type of skins did you sell in the last three months?

A) wet B) Sun dried C) Salted

16. If you sold wet, after how long following buying?

A) within 12 hours B) within 24 hours C) within 48 hours

17. If you sold salted, after how long following buying?

A) within a week-2weeks B) within 2-4 weeks C) within 5 weeks and above

18. How hide and skin before processed is stored?

19. Did you apply did you apply the storage room with bactericide or fungicides or insecticides for your hide and skin inorder to control the growth of mold of the infestation of insects?

20. What is the optimum temperature of the storage room?

21. What is the storage time for your hide and skin?

22. Do you care for the hides & skins during transporting?

A) Yes B) No

23. How did you transport the Hides to local tannery or next collection center?

A) Animal transport B) Tracks C) other (specify) ----------

24. How did you transport the Skins to local tannery or next collection center?

A) Animal transport B) Tracks C) other (specify) --------

D. Respondent perception on hide and skin market chain

25. From whom did you mainly purchase Hides & Skins in the last three month?

A) Farmer B) Other collector C) middlemen

D) Butcheries E) Other (specify) –

26. Did you sell Hides or Skins in the last three months?

A) yes B) no

27. If yes, where did you sell your Hides or Skins?

a) Tannery (Name and address) ----------

b) Regional wholesalers (Name and address) ----------

c) Other (specify) ----------

28. Which type of Hide is highly demanded in the market in the last three months?

A) wet B) Air dried

C) Salted D) Other (specify) ----------

29. Which type of goat Skin is highly demanded in the market in the last three months?

A) wet B) Air dried C) Salted D) Other (specify) ----------

30. Which type of sheep Skin is highly demanded in the market in the last three months?

A) wet B) Air dried C) Salted D) Other (specify) ----------

31. How much did you sell sheep skin: A) wet_____, B) salted _____C)sundried_____

32. How much did you sell Goat skin: A) wet_____, B) salted _____C) sundried_____

33. How much did you sell cattle hide: A) wet_____, B) salted _____C) sundried_____ ?

34. Who fixes the price?

A) myself B) the buyer C) national price D) negotiation

35. Did you face difficulty in finding buyers when you wanted to sell? 1= yes 2= No

36. If yes, what is the reason:

A) Inaccessibility to market B) Lack of price information

C) Low price offer D) low quality product

E) Other (specify) ----------

37. Did you know the market price before you sell your Hides and Skins? A) Yes B)No

38. If yes, how did you get price information of Hides and Skins in the market?

A) Broker B) personal observation

C) Other Hides and Skins traders D) mass media

E) friends/ Other producers ----------

39. Did the price of Hides & Skins in this market vary from season to season?

A) Yes B) No

40. If yes, what was the reason?

A) Export price variation B) Factory/Tannery price variation /setting

C) Wholesalers price setting D) Other (specify) ----------

41. When the price variation reaches high?

A) During holidays B) Other than holidays

C) Other (specify)

42. Did the supply of Hides & Skins in this market vary from season to season?

A)Yes B) No

43. If yes, what was the reason?

A) Price change B) Transportation problem

C) Drought D) Disease incidence

E) Other (specify) ----------

44. At what time of the year did Hides & Skins supply, demand and price reach their respective peak?

Time	Supply	Demand	Price
A. At festival period/holidays			
B. At wet time period other than holidays			
C. At dry time period other than holidays			
D. Other (specify) ----------			

45. What did you do, when the Hides and/or Skins you offered to the market were not sold? A) Sell at lower price B) Sell or give to local processors C) discard it

46. What is the problem you encountered in hide and skin marketing?

A) fluctuating price B) lack of competitive market

C) lack of price information D) inability to provide the desired quality

E) Other (specify) ----------

What is your suggestion to solve each problem? _____

Annex 2. Storage room for hide and skin in Shashemene and Arsi Negele

Storage room for hide and skin in Shashemene

Storage room for hide and skin in Arsi Negele,

Annex 3. Total livestock population in West Arsi zone of Oromia regional state 2006/2007 E.C

No	Woreda	Cattle			sheep	Goat	Horse	donkey	mule	Poultry			Bee hives		
		Local	exotic	Total						local	Improved	Total	Local	transitional	modern
1	Arsi Negele	250768	10101	260869	65953	126087	14911	34200	1848	104091	3030	107121	9654	2179	1000
2	Shashemene	233960	10160	244120	69828	105156	7625	30331	197	119376	18626	138002	14600	3316	1562
3	Shala	209000	1000	210000	18713	60000	2416	22270	1500	80733	1259	81992	11000	560	252
4	Siraro	169032	1080	170112	34620	48670	3123	20836	75	115567	366	115933	13000	1400	296
5	Kofele	187700	9987	197687	126590	3171	28155	9500	790	47608	1309	48917	10862	2114	409
6	Kore	233510	10490	244000	107390	4544	36724	7134	1026	150000	1748	151748	7643	1244	155
7	Gedeb hasasa	230000	8365	238365	170096	20449	32858	19460	655	107441	4781	112222	6482	572	178
8	Dodola	135104	10024	445128	68867	36832	44437	20100	1263	50793	2253	53046	12544	2000	240
9	Adaba	275014	6640	281654	110067	38787	33994	16511	10886	58725	2142	60867	14825	1548	323
10	Kokosa	318844	1030	319874	105256	8612	33000	6950	1869	14499	576	15075	13500	2500	135
11	Nensebo	262888	1243	264131	57709	24608	28538	3090	4000	25361	1698	27059	32000	2781	396
12	Wondo	74180	1180	75360	16212	7068	1000	11066	308	50000	500	50500	3528	400	148
	Total	2880000	71300	2951300	951301	483984	266781	201448	24417	924194	38288	962482	149638	20614	5094

Source: (West Arsi zone livestock development and health office, 2006, 2007 E.C)

Annex 4. Hide and skin production in woredas of West Arsi Zone of Oromia regional states in 2006 E.C

Woreda	Type	plan	Achievement
Dodola	Hide	2459	2425
	Sheep skin	11,000	10670
	Goat skin	6000	6107
Kore	Hide	2250	10210
	Sheep skin	10,000	10089
	Goat skin	4500	121
Kokosa	Hide	2200	1979
	Sheep skin	14,000	12147
	Goat skin	1000	841
Kofele	Hide	4550	790
	Sheep skin	21,000	24770
	Goat skin	2500	1727
Shala	Hide	1383	1137
	Sheep skin	1000	857
	Goat skin	12000	9872
Arsi negele	Hide	4422	6023
	Sheep skin	10,000	8059
	Goat skin	12,000	6890
Ged bassassa	Hide	2000	2671
	Sheep skin	8000	6122
	Goat skin	3000	2269
Adaba	Hide	2588	2144
	Sheep skin	22,000	23,378
	Goat skin	8000	9263
Shashemene	Hide	4500	4390
	Sheep skin	14,000	13,915
	Goat skin	12,000	11,734
Siraro	Hide	960	541
	Sheep skin	1000	1569
	Goat skin	542	885
Nensebo	Hide	1250	1317
	Sheep skin	2000	2255
	Goat skin	5000	4884
Wendo	Hide	1115	931
	Sheep skin	2000	1663
	Goat skin	5000	3809

Source: (West Arsi zone livestock development and health office, 2006, 2007 E.C)

Annex 5. Hide and skin production in woredas of West Arsi Zone of Oromia regional states from in 2007 E.C

Woreda	Type	plan	achievement
Dodola	Hide	2569	2455
	Sheep skin	7800	8150
	Goat skin	2864	1821
Kore	Hide	813	365
	Sheep skin	3250	2720
	Goat skin	875	123
Kokosa	Hide	885	866
	Sheep skin	6791	6505
	Goat skin	1266	1192
Kofele	Hide	2192	754
	Sheep skin	8000	20245
	Goat skin	1664	1014
Shala	Hide	1690	1357
	Sheep skin	2110	1532
	Goat skin	8125	6484
Arsi Negele	Hide	1600	1658
	Sheep skin	2800	3000
	Goat skin	2800	2700
Ged bassassa	Hide	2600	1501
	Sheep skin	8666	6139
	Goat skin	1300	1066
Adaba	Hide	1140	1352
	Sheep skin	5172	20190
	Goat skin	2927	6585
Shashemene	Hide	5500	16426
	Sheep skin	16000	23473
	Goat skin	11000	17313
Siraro	Hide	920	1611
	Sheep skin	2000	2384
	Goat skin	6664	3719
Nensebo	Hide	820	719
	Sheep skin	2708	2904
	Goat skin	2855	2605
Wendo	Hide	739	710
	Sheep skin	1960	1828
	Goat skin	3296	2938

Source: (West Arsi zone livestock development and health office, 2006, 2007 E.C)

Annex 6. Grading of raw cattle hide in relation to mass

Origin of skin	**Classification**	**Categories by mass, kg**		**Code**
		Fresh	Salted	
Cattle hide	Light	5.5to10.8	5.2 to 8.3	00
	Medium	10.9to16.5	8.4to12.6	01
	Heavy	16.6to21.9	12.7to16.8	02
	Extra heavy	22 and above	16.9 and above	03

Annex 7. Grading of raw sheep and goat skin in relation to mass

Origin of Skin	**Classification**	**Categories by mass, g**		**Code**
		Fresh	Salted	
Sheep and Goat skin	Extra light	1500 and below	750 and below	00
	Light	1510 to 1800	760 to 900	01
	Medium	1810 to 2100	910 to 1050	02
	Heavy	2110 to 2400	1060 to 1200	03
	Extra heavy	2410 and above	1210 and above	04

Annex 8. Grading of raw sheep and goat skin in relation to size

Origin of skin	**classification**	**Categories by size, dm^2**	**Code**
Sheep and Goat skin	Extra small	20 and below	00
	Small	20-40	01
	Medium	40-65	02
	Large	65-90	03
	Extra large	90 and above	04