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RESEARCH PAPER

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Community Perception and Practices of Post Slaughter Skin and Hide Quality Management in and Around Asella and Bekoji

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ABSTRACT

A major problem with the leather sector of Ethiopia is the low grade of hides and skins produced as a result of no enough attention paid to maintain the quality of raw hides and skins starting from the time of slaughtering to tanneries. This survey was carried out from December 2013 to March 2014 to assess community perception about quality keeping of skins and hides and their practices regarding slaughtering, flaying, managing and marketing of skins and hides that affect the quality of skins and hides in Asella and Bekoji. The result of this study showed that about 85% of slaughter men start flaying immediately after regormortis ceases. Even though the majority of individuals (76%) use curved knives for flaying, about 71% of slaughter men responded to cause knife cuts sometimes. About 40% of Asella and 22% of Bekoji slaughter men stated that they use skins and hides produced for cash income where as 28% of Asella and 44% of Bekoji slaughter men responded to use skins for cash income and hides mostly for house material making.

From those who sale skins and hides the majority (58%) provide their raw skins and hides to the market within 12 hours of slaughtering in fresh form.

The study revealed that most of slaughter men have a good awareness about post slaughter quality keeping of skins and hides. Thus, as a majority of them indicated, maximum care during flaying to avoid any flay cuts and marketing of skins and hides as soon as possible after slaughtering should be practiced to produce quality products and to prevent quality deterioration of skins and hides.

Key words: Skin, Hide, Salting, Post-Slaughter, Slaughter Men, Collection Centre, Abattoir, and Knife Cut.

INTRODUCTION

Ethiopia has 52.13 million cattle, 24.2 million sheep and 22.6 million goats. Annually 407,457 cattle, 3,313,454 sheep and 1,773,854 goats are slaughtered (CSA, 2012). Hides and skins, leather and leather products are supplied to domestic and export markets and contribute significantly to the Ethiopian economy by providing 14–18% of the foreign exchange earnings. These earnings, however, are but a small portion of the potential income in view of the huge animal resources available. The main constraints to increased utilization of hides and skins are low quality and lack of grading/selection of the raw hides and skins purchased (Alemu and Merkel, 2006). The quality of the hide or skin is to a large extent related to the amount of damage to the grain (or "outside") surface. The damage may be due to skin parasites that affect the live animal, related scratch, husbandry practices on the farm or in transport of the live animal (scratches, bruising, or dirt contamination); it may be due to damage during slaughter or removal of the hide; or it may be caused by inappropriate handling of hide and skins or inadequate preservation techniques (International council of tanners, 2014). Hides and skins obtained after flaying contain water to the extent of about two-thirds of their weight. The presence of moisture makes the hides and skins very liable to bacterial attack. Putrefying bacteria degrade the hides and

skins causing damage to both grain and flesh side of the pelt and leads to greater degree of degradation (CPCB, 2009). Post slaughter degenerative changes in the skins and hides are brought about by some bacteria or fungi normally present on the skins. Some enzymes within the skins have also damaging effect on the flayed skin. The skin of live animal is resistant to putrefactive bacteria. But on death, warmth and moisture promote bacterial growth and penetrations of them into skin tissue with their enzymes attacking inter-fibrillary proteins, cellular structures and then the protein fibers. Putrefaction causes weakening of reticular tissue, splitting of fiber bundles, and loss of cellular structure and breakdown of keratin (Rashid *et al.*, 2008). To avoid this, generally salt (30 – 40% on raw hide/skin weight basis) is applied on the flesh side of the hides and skins. The salt dehydrates the hides and skins to moisture content insufficient to support the growth of moulds and bacteria (CPCB, 2009). Curing is the temporary preservation of hides and skins from the time of flaying to processing in the tannery. It is essentially an attempt to prevent or at least to curtail bacterial decomposition of the skin protein during the time elapsing between slaughtering, flaying and processing in the tannery (Rashid *et al.*, 2008). Apart from putrefaction or staling, main damages in slaughterhouses according to Bultri (2012) and Zemene and Addis (2012) include: Butcher strain (mechanical damage

caused to hides/skins when they are pulled from the carcass), flay holes (a knife cut in the flesh side made by the butcher) and mis-shape (damage caused to a hide/skin resulting in the shape being abnormal), The consequences of 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. In addition to other hide and skin handling practices, correct methods of curing and the proper doses and the size of the grain of salt used as preservative are basic prerequisites for the production of good quality leather. Samad *et al.* (1984) observed that hides treated with (i)40% common salt, (ii) salt + 2% sodium carbonate, (iii) salt + 2% zinc chloride, (iv) salt + 1% naphthalene hadan inhibiting growth of predominant proteolytic bacteria like gram positive micrococci and bacilli and thus improved the condition of hide. This study was conducted in Asella and Bekoji to know the perception of the community about post slaughter skin and hide quality management and their practice in this regard. Therefore, the specific objectives of this study were

- 1) to assess the perception of all actors involved in hide and skin preparation on post-slaughter hide and skin quality management
- 2) To assess their practices towards the improvement of post-slaughter hides and skin quality.

MATERIALS AND METHODS

Study Area

The study was conducted in Tiyo (Asella as main town) and [Limu and Bilbilo](#) (Bekoji as main town) [woredas](#), from December 2013 to March 2014. Tiyo is a [woreda](#) in central [Ethiopia](#), located in the East [Arsi zone](#) of the [Oromia Region](#) about 175 kilometres south east of [Addis Ababa](#).

Asella town is found at 6° 59' to 8° 49' N latitude and 38° 41' to 40° 44' E longitude with an altitude which ranges from 2500 to 3000metres. It has a [subtropical highland climate](#). The warmest month of the year is April with an average temperature of 16.6 °C. In December, the average temperature is 13.5 °C. It is the lowest average temperature of the whole year. The average annual temperature in Asella is 15.1 °C. The average annual rainfall is 1147 mm (KARC, 2008).

[Limu and Bilbilo woreda](#) located in the East [Arsi zone](#) of the [Oromia region](#), its main town, Bokoji has a latitude and longitude of 7°35'N39°10'E with an elevation of 2810 m. It is the administrative centre of [Limu and Bilbilo woreda](#). This town is located 56 km south of [Asella](#) and 230 km southeast of Addis Ababa. The area has highland escarpment above 2400 meter. The mean maximum and minimum temperature are 28°C and 10°C, respectively. The annual rainfall is 700-1658 mm with a bimodal rainfall occurring from March to April (short rainy season) and from July to October (long rainy season) (<http://en.wikipedia.org/wiki/Bekoji>).

Study design and sample size

Study populations were stratified into all people who involved in homestead animal slaughter, abattoirs and local skin and hide collectors. The two woredas were selected purposively based on their accessibility. Similarly, four peasant Kebeles from Tiyo and five peasant Kebeles from [Limu and Bilbilo woreda](#) were selected based on their ease of accessibility. Respondent farmers / households were identified from the list provided by the local agricultural extension agents by using systematic random sampling until the required sample size was met. The sample size was determined by using the formula recommended by Arsham (2007) for

formal survey studies where $N = \frac{0.25}{SE^2}$ (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, 100 farmer respondents were selected (50 from each woreda). All abattoirs and collection centres (two abattoirs, four collection centres) and two key informants were also interviewed. Similarly observations were undertaken in abattoirs, collection centres and some selected sites.

Methodology

Questionnaire Survey: A cross-sectional study design was used by employing a structured questionnaire survey (annex). The questionnaire mainly focused on animal slaughtering practice, handling of skin and hides and constraints in the quality management of the products.

Observation: Observation which is the most primary source of data was conducted in abattoirs and skin and hide collection centres in Asella and Bekoji. During this observational study a number of factors including the nature of the slaughtering floor (smooth or grabbed), penetrations during slaughtering, method of flaying, soiling of the skin and hide, way of transporting skins and hides to the

market, ways of preservation and storage were well observed and recorded.

Data management and Analysis: The collected data was entered and managed in Microsoft Excel. Descriptive statistics was used to present the data. Statistical Package for Social Sciences (SPSS,) version 20 was used for data analysis.

RESULTS

Perception of the community about the importance and care of skin and hide

Type of product produced and its use for homestead slaughter participants:

The survey indicated that most of the product produced is cattle hide in both Tiyo (52%) and Limu and Bilbilo (62%). Similarly, in both Asella and Bekoji municipal abattoirs cattle, sheep and goats are slaughtered the latter being in very small number. The majority homestead slaughter men of Tiyo responded to use skins and hides produced mainly for cash income whereas the majority of Limu and Bilbilo slaughter men claimed to use skins mainly for cash income and hides for house material production (table 1). Respondents' perception on the importance of hide and skin for the country show that majority of them believe it is used for leather industries and very few said it could serve for foreign exchange earnings.

Table 1. Type of product commonly produced and its use for household respondents.

Parameters	Tiyo		Limu and Bilbilo	
	Freq.	percent	Freq.	Percent
Type of product				
Sheep skin	13	26	10	20
Cattle hide	26	52	31	62
Sheep skin and cattle hide	11	22	9	18
Importance of product for the owner				
For cash income	20	40	11	22
For house material making	16	32	17	34
For cash income & house material making	14	28	22	44
Importance of hide and skin for the country				
For leather industries	48	96	37	74
For foreign exchange earning	0	0	5	10
Do not know	2	4	8	16

Almost all the slaughter men interviewed (99%) have a good awareness about the perish ability of skins and hides. Hence they indicated different measures to be taken to prevent post slaughter deterioration of the quality of skins and hides produced. From the total respondents the majority listed measures such as avoidance of flay cuts, selling them fresh to reduce chance of putrifaction, keeping out of reach of dogs and cats and salting if selling is delayed and after being sold (Figure. 1).

Two collection centers respond that the frequency of flay cuts presented to their collection center was about 2% whereas one said to have encountered flay cuts in about 10% of the hides and skins presented and the other claimed as encountering the problem more

frequently (15% of the total skins and hides collected).

Post slaughter skin and hide quality management practices

Slaughtering ground and means of restraining

In Tiyo woreda about 48% slaughter men responded as slaughtering their animals on smooth ground by bedding eucalyptus leaves where as 30% of slaughter men state that they slaughter on smooth ground without bedding. The majority of slaughter men (72%) in Limu and Bilbilo are slaughtering on smooth ground by bedding eucalyptus leaves (table 2). On the other hand, all abattoirs confirmed the use of sufficient and appropriate slaughtering place with a smooth floor surface in their slaughtering halls.

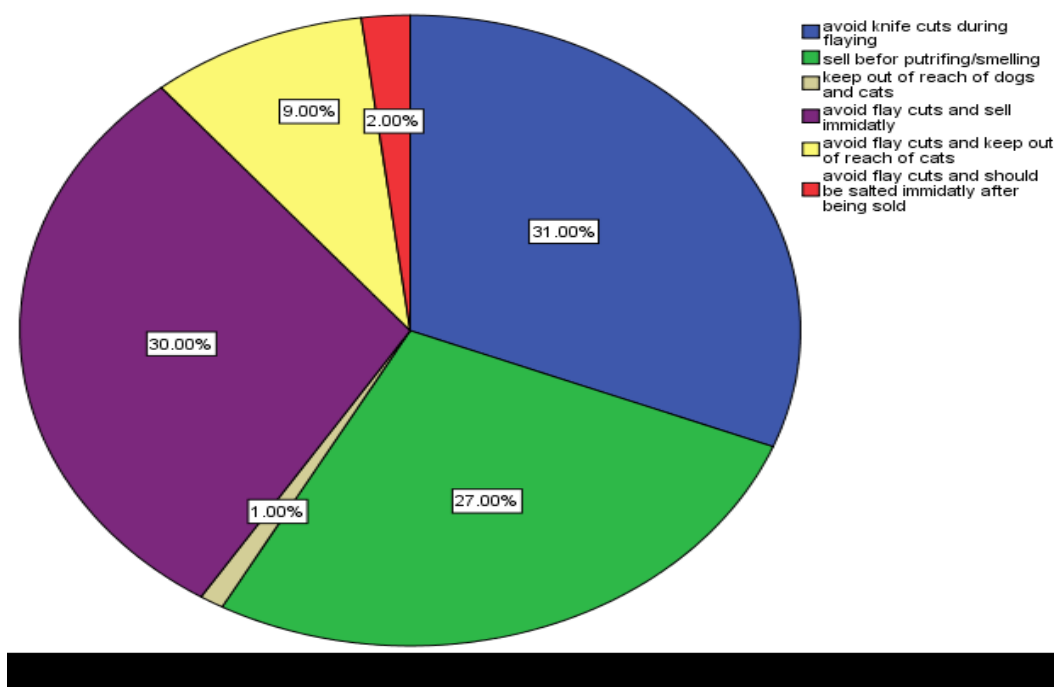


Figure 1. Perception of respondents on the precautions taken to keep skins and hides in good quality.

All homestead slaughter men responded to use rope casting method for cattle and firm hand grips on the legs and head for sheep as a pre slaughter restraining

method. In this regards, no one practices any of the stunning techniques to make the animal unconscious. On the other hand, all abattoir men interviewed said

that they hammer the forehead as a method for stunning cattle but sheep and

goats are restrained by holding legs together by hand.

Table 2. Type of slaughtering place on which homestead slaughtering takes place.

Slaughter site floor type	Tiyo		Limu and Bilbilo		Total	
	Freq.	%	Freq.	%	Freq.	%
On smooth ground without bedding	15	30	4	8	19	19
On smooth ground by bedding leaves	24	48	36	72	60	60
On rough ground by bedding leaves (eucalyptus)	11	22	10	20	21	21

Stage of flaying after slaughtering and habit of hoisting the slaughtered animal

Eighty five percent of the homestead slaughter men interviewed responded that they start flaying after regormortis has ceased. The remaining 15 percents claim that they start flaying of the animal after sufficient bleeding occurs which identified by the stoppage of blood oozing from the jugular vein. As it facilitates the bleeding process and results in complete bleeding of the animal within a short time, all the interviewed homestead slaughter men responded that they hoist sheep but not cattle. All slaughter men hoist sheep after the limbs and ventral areas including the sternum, brisket, flanks and inguinal areas are flayed. On the other hand, in all abattoirs, both sheep and cattle are hoisted after slaughter; in case of cattle by using hoisting pulley, after the limbs, sternum, brisket, flank and inguinal areas are flayed.

Flaying methods and experience of knife cuts on the skins and hides

Both the interviewed homestead slaughter men and abattoirs cut along the mid abdominal line (ripping) prior to flaying with a strait knife. About 70% of respondents who practiced homestead slaughtering responded to have caused knife cuts on hide and skins which may be single or multiple cuts in the same skin or hide while the rest claimed that they had

never caused any cuts on the skins and hides. Majority (76%) of slaughter men stated that they use a curved knife which has a blunt end, 13% use a strait one with sharp end and the remaining 11% responded to use both the curved and strait types of knives for flaying. Similarly, after the cadavers are hoisted abattoir slaughter men commonly use their fist and knife to facilitate flaying which is started after sufficient bleeding occurs. Even though they use curved knives with blunt end, they reported that they sometimes cause complete or partial knife cuts on the skins and hides. Seventy seven percent of the homestead slaughter men responded that they use their fist on the flaying process where as 23 percents claimed that they didn't use their fist to assist flaying. Even though the use of fist is more common after hoisting of the animal, sometimes it is used when the animal is on the floor as means to facilitate flaying of the animal.

Management of skins and hides after flaying

As presented in the graph, the majority of homestead slaughter men (58%) sell the skin/hide fresh within 12 hours of interval after slaughtering. Those selling skins/hides fresh from 24-48 hours account for **(15%) (Figure 2)**. These are the ones that are assumed to enter the formal market with their final destination

at tanneries whereas the remaining respondents provide their hide and skins for local market destination. On the other hand, all skins and hides produced by the abattoirs including those with knife cuts were reported to be salted and stored.

They salt hides within 2 hours of slaughtering and store in stores for about 2 months but skins are loaded immediately to the collectors who already have an agreement to receive regularly from them.

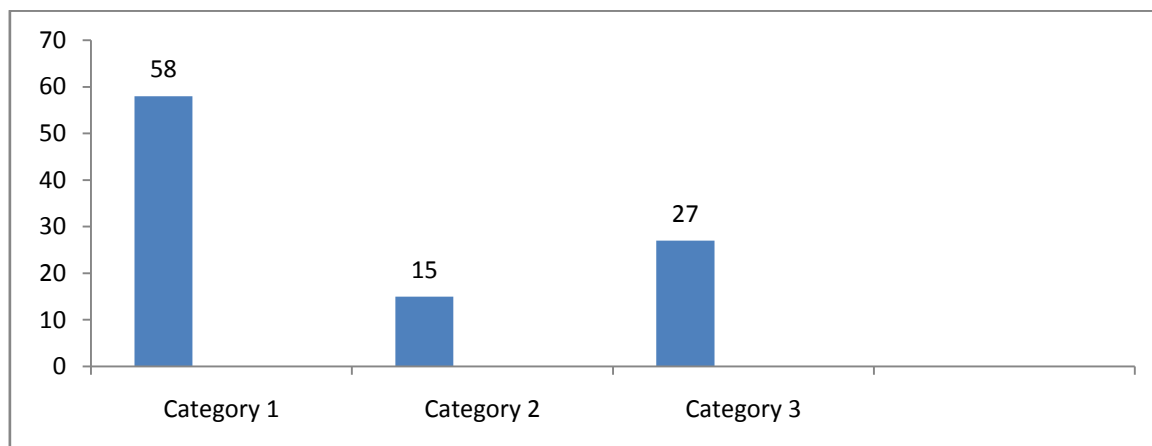


Figure 2. Practices being undertaken on skins and hides following flaying as responded by slaughter men.

Category 1; those selling skins/hides fresh within 12 hrs

Category 2; those selling skins/hides fresh from 24-48 hrs

Category 3; those drying skins/hides for house utensil making

This survey also indicated that the majority of homestead slaughter men from Asella (54.27%) sell skins and hides with flay cuts at a discount to collectors or middlemen where as more than 44% of respondents at Limu and Bilbilo reported that they keep it for local use after locally processed (table 3).

Table3. Measurements on skins and hides following knife cuts during flaying.

Management of hides and skins with flay cuts	Tiyo		Limu and Bilbilo	
	Freq.	percent	Freq.	Percent
Suture or cover with soft tissue and sell	8	22.86	7	18.42
sell at a discount to collectors /middlemen	19	54.27	14	36.85
Use it at home or sell it for local material production	8	22.87	17	44.74

Skin and hide quality management practices in collection centers and storage sites All collection centres collect both skins and hides. Half of the collectors state their customers were people slaughtering animals at home for household consumption or at backyard for collective use (“Kircha”). The other half reported that abattoirs in their respective district were also their hide and skin providers.

From homestead slaughters and kircha skins and hides reach them on foot by holding with containers like plastic bags. Since abattoirs slaughter animals in large number a high amount of skins and hides are produced daily. These produced skins are loaded daily by truck to collector’s storage sites where they are being salted and stored for 2 to 3 months until they are loaded to the tanneries (Figure 3).



Figure 3. Salting by sprinkling and storing of skins and hides in collection centres of Asella.

All collectors explain that when buying skins and hides they use criteria like size, absence of knife cuts, free from major skin lesions and mainly the freshness of the skin/hide. However, we have practically observed that three of the four collectors have never been found to use such criteria while purchasing the products. Rather they were found buying skins and hides which have shown signs of putrefaction/staling and multiple cuts at a

lower price than the actual market price for quality products (Figure. 4). This was followed by salting all skin and hides received within 12 hours of collection. However, for those with signs of putrifaction (bad smell) salting was done immediately after buying. All collected skins and hides have been reported to be stored for up to 2-3 months until sufficient number was accumulated for bulk transportation to tanneries.



**Figure 4. Putrefied skin with sever knife cuts from collection centres at Asella.
This skin has already been purchased at a lower price.**

All interviewed collectors complain that the main challenges in their business are delayed back payment from tanneries and fluctuation of the market price which hinders their competitiveness in the

business. They also declare that shortage of salt which was previously supplied by tanneries, illegal middlemen especially during holydays and lack of formal training about quality management of

skins/hides for their employs and for slaughter men in abattoirs are other constraints in their business. The presence of these problems was admitted by the respective Woredas agricultural offices during my survey. Most collectors complained that they have no enough working area and storage space and

during my visit, it was confirmed that working spaces were inadequate. Due to this shortage of working area they collect skins and hides on the roadside and hence collected skins and hides are exposed to dust and direct sunlight throughout the day until they are being transported to storage sites (Figure 5).



Figure 5. Skins and hides collected on the roadside subjected to dust and direct sun heat in Bekoji and Asella.

DISCUSSION

In order to improve the income gained from skins and hides better quality management practices should be conducted. Therefore, this survey was conducted with the objective of getting relevant information from individual slaughter men, abattoirs, collection centres and skin and hide development offices of Asella and Bekoji about their perception regarding post slaughter skin and hide quality management and practices they undertake to keep the quality of skins and hides starting from slaughtering to tanneries for processing. This study revealed that most of the respondents in the study areas perceive that hides and skins are important for cash income, making household utensils or for both locally and as an input to leather industry at national level whereas very few of them recognized their use for generating foreign currency for the country.

The fact that almost all the slaughter men interviewed had awareness about the perishability of skins and hides and some of the measures to be taken is encouraging. Selling hides and skins after significant delay without preservation predisposes to staling or putrefaction of the products. This has been observed from the questionnaire survey which requires attention.

Flay cuts were cited as one of the major problems affecting the quality of hides and skins. In this regards, the type of knife used may determine the frequency of such defects. Moreover, products with flay cuts and signs of putrefaction have been observed to be sold in many of the collection centres. In addition, despite the claim by the collection centres, measures to ensure the quality of hides and skins purchased has not been taken collectively suggesting that negligence from collectors side rather than lack of awareness is the major limiting factor in the quality

management of hides and skins supplied to tanneries. All homestead slaughter men responded to use rope casting method for cattle and firm hand grips on the legs and head for sheep as a pre slaughter restraining method. Falling from their standing position and attempting to escape after falling due to no stunning during rope casting, results in trauma caused by dragging which causes rubbed grain. Smoothness of the slaughtering ground eliminates or reduces this trauma (Mohamed *et al.*, 2002).

Hoisting is believed to facilitate the bleeding process and results in complete bleeding of the animal within a short time (Alemu and Merkel 2006). Bleeding should not only aim at draining blood off the carcass but also from the small arteries and veins of the skin/hide (Andrew, 2011). Teklay (2010) described that if carcasses is 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 vessels. The leather defect called "veiny" or "prominent blood vessel" arises from the eating away by bacteria of the fibrous region surrounding the veins. When the leather is glazed, it receives less pressure in the channelled areas and the blood vessel show up. In this regards, the absence of the practice of hoisting cattle carcass by homestead slaughter men predisposes incomplete removal of blood from the skin. Moreover, as complete removal of the hide from the carcass is achieved only after all the flesh and bones are cut off, it exposes the skin to mechanical damage. Use of fist is commonly practiced after hoisting and this reduce incidence of flay cuts as the skins are pulled off the carcass (Mohamed *et al.*, 2002).

After the animal is slaughtered they cut the skin along the middle line of the belly from the sticking wound to the tail and the four legs (ripping) using long strait

knives. This is in line with what Mohamed *et al.* (2002) proposed that initial opening cuts down the centre of the belly and the four legs 'Ripping' avoids bad pattern which is caused by indiscriminate ripping. The correct method of ripping ensures a uniform pattern, with bellies of equal width, well opened shanks and dewlap, a round butt and adequate tails. During ripping one long and straight incision is made from the jaw to the anus along the centre line of the belly first. Then four circular cuts around the shanks at the level of the knee and hock joint are made and two cuts on the inside of the forelegs, knees to the breast bone and two cuts on the back of each hock joint to a point midway between the anus and scrotum are made (ESGPIP, 2009).

Both abattoirs surveyed and visited was found having sufficient facilities including adequate slaughter hall, hoists, proper flaying knives, sufficient light and water. This is not in agreement with the study reported by Mohamed *et al.* (2002) that has identified that most animals in Sudan, Senegal, Tanzania and Zimbabwe are slaughtered in facilities which do not have adequate infrastructure (lack of piped water) or tools (hoists, proper flaying knives) required to ensure production of good quality hides and skins.

Collection centres were found moderately ventilated and free from infestation by insects. Hides and skins are prone to insect damage from the day they are stripped from the animal until they are first processed in the tannery. The most destructive of these insects which attack hides and skins are members of a beetle family. They are commonly known as the hide or leather beetle. All hides and skin prepared in tropical countries are most liable to this extensive destruction especially in warm and humid coastal areas, where conditions in store favours rapid multiplication of these larvae on

untreated skins. Another insect causing damage of similar nature is the white ant but the loss through destruction is not as serious as that of the hide beetle (Mohamed *et al.*, 2002).

All collection centres preserve skins and hides they collect by salting which is the best and recommended method of preservation. Salt is very concentrated, it penetrates the fibres and tissue layers of the skin/hide and captures the water contents in it and not favourable for bacteria to survive. Most collection centres re-use the salt due to the presence of salt shortage. This is in line with the study of Kudit *et al.* (2013) who reported that the re-use of salt method has been practice in some countries to recover and reuse salt swept from hides and skins, sometimes mixing with fresh salt. It must be recognized that the risk of contamination of fresh raw stock in this

way is high. It is practiced where salt is either considered too costly for economic use or is not readily available.

ANNEXURE

Questionnaire format to collect data on post slaughter skin and hide quality management

This questionnaire format is designed to gather information on the perception of the community about post slaughter skin and hide quality management and their practices in Asella and Bekoji in Oromiya regional state. After introducing the scope and the objectives of the study selected farmers will be asked for their full consent to participate in the interview. Only those willing to participate will be considered for the questionnaire survey. All information each respondent provides and his and her name will remain confidential.

General information

Respondent ID..... date.....Zone, -----woreda.....Kebele.....

A. On slaughter process

1. For those slaughtering for home/restaurant consumption

1.1. Which species of animals do you slaughter commonly? _____

1.2. How do you chose slaughtering place _____

1.3. How do you restrain your animal for slaughtering?

A) Small ruminant _____

B) cattle _____

1.4. Do you hoist the animal after slaughtering? A) Small ruminant _____ B) cattle _____

1.5. If your answer is yes to the above, at what stage of the slaughtering process? _____

1.6. On what kind of material do you hoist the animal? _____

1.7. Up to what stage you continue flaying before hoisting? _____

1.8. Do you pull the skin down the body after hoisting? _____

1.9. At what stage after slaughter that you start flaying? A) immediately after slaughter B) after regormrtis has ended C) after sufficient bleeding D) As convenient E) I do not mind

1.10. What kind of knife do you use for flaying? A) curved B) strait C) with sharp end D) with blunt end E) very sharp F) moderately sharp G) other information about the knife _____

- 1.11. Do you cut along the mid abdominal line to start flaying on the body part?

- 1.12. Do you use your fist for flaying? _____
- 1.13. Have you ever caused complete or partial knife cuts on the skin? A) never B) sometimes C) frequently
- 1.14. If you have caused knife cuts, what do you do with the skin? A) cover it with soft tissue/suture it and sale it B) sale it at a discount to collectors/middlemen C) sale it for local material production D) use it for home purposes
- 1.15. How important is the skin/hide for A) you? _____ B) for the country? _____
- 1.16. Do you know that skins/hides are perishable products? _____
- 1.17. What do you think should be done to keep them in good state?

- 1.18. After flaying, what will you do with the skin? A) sale it fresh(12 hours) B) sale it dried C) sale it fresh in 24-48 hours D) sale it after salting E) other specify _____
- 1.19. If you sale it dry, how do you dry it? A) on the ground B) on frames C) other specify _____
- 1.20. If you sale it, how do you transport it? A) in open air B) in containers/bags C) other specify _____

2. For abattoirs/slaughter slabs

- 2.1. Which species of animals do you slaughter commonly ?

- 2.2. Do you have appropriate slaughtering place?

- 2.3. Do you stun before slaughtering? _____
- 2.4. How do you restrain your animal for slaughtering?
A) Small ruminant _____
B) cattle _____
- 2.5. Do you hoist the animal after slaughtering? A) Small ruminant _____ B) cattle _____
- 2.6. If your answer is yes to the above, at what stage of the slaughtering process? _____
- 2.7. On what kind of material do you hoist the animal? _____
- 2.8. Up to what stage you continue flaying before hoisting?

- 2.9. Do you pull the skin down the body after hoisting? _____
- 2.10. At what stage after slaughter that you start flaying? A) immediately after slaughter B) after regormrtis has ended C) after sufficient bleeding D) As convenient E) I do not mind
- 2.11. Are your knives for flaying appropriate? A) yes B) yes but not sufficinet C) No we work with difficulty D) Other specify _____
- 2.12. What kind of knife do you prefer for flaying? A) curved B) strait C) with sharp end D) with blunt end E) very sharp F) moderately sharp G) other information about the knife _____
- 2.13. Do you cut along the mid abdominal line to start flaying on the body part?

- 2.14. Do you use your fist for flaying? _____
- 2.15. Have you ever caused complete or partial knife cuts on the skin? A) never B) sometimes C) frequently
- 2.16. If you have caused knife cuts, what do you do with the skin?

- 2.17. How important is the skin/hide for A) you? _____ B) for the country? _____
- 2.18. After flaying, what will you do with the skin? A) sale it fresh(12 hours) B) sale it dried C) sale it after salting E) give it to the owner _____
- 2.19. If you sale it dry, how do you dry it? A) on the ground B) on frames C) other specify _____
- 2.20. If you sale them, how do you transport then? A) _____

3. For Hide and skin collection centers

- 3.1. Which species of animals your common sources of hides and skin?

- 3.2. Who are your customers? A) home/Restaurants B) Kircha C) Butchers D) Abattoirs
- 3.3. How do they reach here with their products? A) on foot B) on horseback C) by car
- 3.4. What criteria do you use for buying the product? A) size/weight B) absence of knife cuts C) other quality criteria specify _____
- 3.5. Do you grade skin and hides? _____ on what basis?

- 3.6. Do fluctuating market price have an effect on the quality of the product _____
- 3.7. Do you by lower grade products at lower price? _____
- 3.8. How frequent is knife cuts encounter A) 1 in 10 B) 1 in 50 C) 1 in 100 D) other specify _____
- 3.9. Which form of the product is most commonly presented? A) fresh in 12 hours B) fresh in 12-24 hours C) fresh in 24-48 hours D) dried E) salted F) putrefied
- 3.10. What will you do with fresh skin you bought? A) sale it fresh B) sale dried C) sale it after salting D) other specify _____
- 3.11. If you dry it, how? A) on the ground B) on frames C) other specify _____
- 3.12. If you preserve/salt it, when/ A) immediately B) within 12 hours C) within 24 hours
- 3.13. Have ever rejected skin/hides because of quality reasons?__ How frequent it that? A) 1 in 10 B) 1 in 50 C) 1 in 100 D) other specify _____
- 3.14. What are common reasons of rejection? A) damage due to skin disease B) knife cuts C) not fresh/putrefied D) inappropriate drying E) undersize F) others specify _____
- 3.15. Where do you sale your product? A) tannery at _____ B) another collector at _____ C) other specify _____
- 3.16. How do you transport them? _____
- 3.17. How important is the skin/hide for
A) you? _____ B) for the country? _____

- 3.18. what are you challenges in the business? _____
- 3.19. do you have sufficient working and storage space ? _____
- 3.20. do you have sufficient equipments ? _____
- 3.21. How is the storage condition of skins/hides collected? A) Aerated B) non aerated
- 3.22. Is the storing house free from pests? A) Yes B) no
- 3.23. For how long do you store ? _____
- 3.24. How many personnel work in your center ? _____ are they sufficient ? _____
- 3.25. Do you and your personnel have appropriate training on hide and skin quality management ? _____
- 3.26. What training gaps do you have ? _____

CONCLUSION AND RECOMMENDATIONS

Hides and skins account for a significant portion of the value of livestock output and for some countries like Ethiopia it is an important source of foreign exchange earnings. However, it is generally observed that the full potential of hides and skins as a product is not realized because of several reasons, the most important being low quality of the product produced.

Good proportion of hides and skin produced may be of poor quality, especially those produced in rural areas outside organized slaughter houses, due to inappropriate slaughtering, flaying, collection and initial processing methods used leading to spoilage and rejection in the market. Most types of damage can be reduced or avoided altogether by better management of the animal or the hide. Curing which is practiced mostly in collection centres is the temporary preservation of hides and skins from the time of flaying to processing in the tannery.

Based on the above conclusions the following recommendations are forwarded.

- Since about 80% of the hides and skins in Ethiopia are produced in rural areas an extensive training and extension service is important in improving the quality of the raw materials entering the tannery industry.

- It is essential to create facilities and make available the tools and equipment necessary for improved collection and enhanced quality of hides and skins available.

- Bleeding off blood from a carcass should be carried out adequately.

- Flaying should not be carried out by any butcher, but by skilled flayers and the methods used generally give first priority to producing a good quality carcass and skin/hide. As soon as the skin/hide is removed (flayed) from the carcass it should be taken immediately from the slaughter-house floor where it is always a potential source of infection of the carcass by dirt, blood, dung and bacteria with which it is contaminated. It should immediately be removed and washed in a plentiful supply of cold water to remove dirt, blood, etc., and to cool it. It should be drained afterwards to achieve quality skin/hide for leather.

- Challenges in the business sector has to be addressed properly

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