

Condition of Hide and Skin Production and Major Affecting Factors in Selected Districts of Western Oromia, Ethiopia

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Abstract

The study was conducted in selected districts of West Shoa, Horro Guduru Wollega and East Wollega zones mainly focusing on hide and skin diseases, external parasites and other factors known to affect hide and skin. A Cross-sectional study with purposive and multistage sampling techniques was used to select the sample sites and farmers. Six districts were purposively selected from these zones representing the different agro-ecologies and two peasant associations from each district were selected for the study. The three agro-ecologies addressed were: highland (Horro and Chaliya), mid-altitude (Sibu Sire and Bako Tibe), and lowland (Arjo Gudatu and Wama Bonaya). A total of 127 farmers were interviewed. A semi-structured questionnaire was developed and used for the study. Data was analyzed using the Statistical Package for Social Sciences (SPSS version 14.0). The result indicated that the mean average livestock ownership of the households in study areas was: 9.06 ±0.68, 5.29±0.55, 4.26±0.62, and 6.47± 0.51 heads of cattle, sheep, goats and chicken, respectively. Diseases (57.5%), land scarcity (25.9%) and feed shortage (12.6%), were major livestock constraints reported. Majority of respondents (93%) in mid and low altitude of the areas indicated that *Trypanosomiasis* and *Pasteurellosis* were the most important diseases. We suggest capacity building for farmers and extension staff in areas of health services, vaccination and feeding of animals, improved production and productivity of hide and skins.

Keywords: Bako; Ethiopia; hide and skin; Oromia; small ruminant

1. Introduction

Livestock production in generates about 45% of the agricultural GDP, 25% of total GDP (IGAD, 2010) without considering the contribution of livestock in terms of manure and transport services. More than 85% of farm cash income is also generated from livestock sector (Benin *et al.*, 2006). Ethiopia has about 54 million cattle, 25.5 million sheep, 24 million goats, 1.91 million horse, 6.75 million donkeys, 0.35 million mules, 0.92 million camels and 50.38 million poultry. Of the total cattle population of the country, about 98.8 % are indigenous breeds or types while hybrid and exotic breeds accounted for about 0.94% and 0.11%, respectively (CSA, 2013). According to same report, about one million small ruminants were slaughtered in the year 2012/13 in the country (CSA, 2013). From this one can understand the huge amount of skins produced in the country. 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. About 80% of the hides and skins in Ethiopia are produced in rural areas, where animals are produced under extensive system.

Ethiopia being one of the countries with large livestock base in the world has been one of the suppliers of hide and skin to different consumers for nearly a century. Products exported from Ethiopia are known to have unique characteristics in compactness in fiber and utilization for different leather products (Girma, 2003). Despite the numerical importance of livestock in Ethiopia, their production and productivity is constrained by many factors among which poor management including diseases (Tembely, 1998). Hence, animal disease is one of the limiting factors for the production of ruminants (Mucuthi and Munei, 1996). Quality defects of hides and skin not only arise from improper treatment during and before slaughter, but also during the lifetime of the animal. Infectious diseases and ecto-parasites account for a considerable proportion of damaged hides and skins (Zewdu, 1995).

About 50% of processed hide and skin are said to be downgraded because of the defects incurred mainly before slaughter. Thus , protection of hide and skin quality deterioration might be incorporated into improved herd/flock management systems that should be developed primarily for hides and skins diseases and other factors that result in quality deterioration and hence end up with severe economic losses (Kassahun *et al.*, 1991).

Even though different works have been documented on the general production systems of ruminant animals in western Oromia, no or limited works were conducted on hides and skins. Therefore, the current work was done to study major factors affecting hide and skin quality in selected districts of western Oromia.

2. Materials and Methods

2.1 Study site selection and sampling techniques

Cross-sectional study with purposive and multistage sampling technique was used to select the sample sites and farmers. Representative zones (West Shoa, Horro Guduru Wollega and East Wollega zones) were selected purposively from within the formal mandate of the center based on their small ruminant population. Six districts were purposively selected from these zones representing the different agro-ecologies. Two peasant associations (PA) from each district were selected for the study. Three agro-ecologies were addressed in the current study, namely: highland (Horro district from Horro Guduru zone and Chaliya district from west Shoa zone), mid-altitude (Sibu Sire and Bako Tibe districts both from east Wollega zone), and lowland (Arjo Gudatu and Wama Bonaya districts both from east Wollega zone). Both the districts and PAs selection were done with the assistance of the respective development workers and PA managers.

2.2 Data collection

A semi-structured questionnaire was used for the interviews. The questionnaire was pre-tested before the final administration. Brief explanation about the general objective of the study to each respondent was done to reach on consensus. Researchers and technical assistants of Bako Agricultural Research Center conducted the interview. The questionnaire was administered in afan Oromo though it was written in English and it was mainly focused on hide and skin production, diseases, external parasites and other factors known to be responsible for hide and skin quality deterioration. A total of 127 farmers (about 10 farmers from each PA) were selected and interviewed. Informal discussion was also made with few hide and skin traders and animal health workers of the respective districts about defects they frequently encounter on raw hide and skin and the presence of clinical cases of diseases and parasites of hide and skin in the surveyed areas.

2.3 Data management and analysis

The filled questionnaire were checked for inconsistencies and coded before entry in to the computer. The Statistical Package for Social Sciences (SPSS, 2004 version 14.0) was used to analyze the data.

3. Results and Discussions

3.1 Socioeconomic characteristics of the households

An average age of respondents was 39.66 ± 1.22 ranging from 18 to 75 years. Family size ranges from 2 to 20 persons with an average family size of 7.35 ± 0.28 people. Land holding/household of the interviewed farmers ranged from 0.25 to 16.5 hectare and per household average was about 2.8 ± 0.22 hectares indicating that about 74% (2.06 ± 0.15 hectare) of the available land per household was allocated for crop production (Table 1). According to respondents, grazing lands have been decreasing from time to time due to population growth resulting in competition of the swampy and grazing lands for crop production. Previous research finding also indicated that the average land holding/household in the current study areas was 2.3 hectare (Solomon *et al.*, 2005).

Table 1. Socio-economic characteristics of the households in the study areas

Characters	N	Min	Max	Mean	SD
Age of respondents (yr)	127	18	75	39.676	13.83
Family Size (number)	127	2	20	7.35	3.21
Land Holding (ha)	119	0.25	16.5	2.8	2.45
• Crop Land (ha)	117	0.25	10	2.06	1.69
• Grazing land (ha)	85	0	5.50	0.96	0.84
Education level of respondents	N	%			
• Illiterate	31	24.4			
• Attended primary school	76	59.8			
• Attended secondary school	20	15.7			

N=number of households, yr=year and ha= Hectare, SD= standard deviation

According to the respondents (79.52%), the major sources of income in the area were crop and livestock production (Table 2). Other income sources include off-farm activities such as working as daily worker or activities like buildings.

Table 2. Major source of income of households

Source of income	Frequency	Percentage (%)
Crop then livestock	101	79.52
Livestock then crop	22	17.32
Employed then crop	2	1.6
Employed then livestock	1	0.8
Off farm activities	1	0.8
Total	127	100

The mean average livestock ownership of the surveyed households in study areas were: 9.06 ±0.68 head of cattle, 5.29 ±0.55 head of sheep, 4.26 ±0.62 head of goats and 6.47± 0.51 head of chicken (Table 3).

Table 3. Livestock ownership of the households

Species	Frequency	Min	Max	Mean	SD
Cattle	127	1	60	9.06	7.7
Sheep	56	1	20	5.29	4.12
Goat	23	0	15	4.26	2.98
Poultry	96	1	30	6.47	5.03
Donkey	44	1	4	1.77	0.77
Mule	12	1	7	1.5	1.73
Horse	21	1	20	3.67	4.3
Dog	70	1	6	1.84	1.21
Cat	71	1	6	1.21	0.67
Bee colony	36	1	20	6.36	4.7

SD= Standard deviations

3.2 Seasonal calendar of the study area

Prevalence and epidemiological characteristics of diseases and life cycle of parasites of animals can be influenced by change or seasonal fluctuation of environmental temperature, humidity and rainfall. Knowledge of such phenomenon is very crucial in designing strategic prevention and control of diseases and parasites. Respondents categorized months of the year into two main seasons: namely; dry and wet seasons. However, their commencement and endings vary mainly between the lowlands and the high lands (Table 4). According to respondents, dry season extends from October to May in the highlands (Horro and Cheliya districts) and from October to April in the lowland districts (Arjo Gudatu and Wama Boneya districts). Majority of the respondents (55.1%) reported that wet season starts at May and ends in September; while about 34 % of the respondents indicated that wet season starts at April and ends in September; and still very few respondents believe that wet season extends from May to December (Table 4). However; generally the dry season extend from October to May while the wet season extends from end of May to September.

Table 4. Description of the two main Seasons (Dry Season and Wet Season) in the area

Season	Months of the year	N	Agro ecology			Percent (%)
			Highland	Midland	Lowland	
Dry	October – May	56	31.5	7.9	4.7	44.1
	December - May	41	0	15	17.3	32.3
	October – April	21	0	10.2	6.3	16.5
	January – May	9	0	3.1	3.9	7.1
	Total	127	31.5	36.2	32.3	100
Wet	May-September	70	0.8	29.1	25.2	55.1
	April- September	43	30.7	1.6	1.6	33.9
	May- December	14	0	5.5	5.5	11
	Total	127	31.5	36.2	32.3	100

N=number of households

3.3 Main livestock production constraints in the area

There are many factors which hinder the production and productivity of livestock in the area and they varied from area to area depending on agro-ecology. Respondents indicated that the main constraints livestock production in the areas were diseases (57.5%), land scarcity (25.9%) and animal feeds (12.6%) were some the major livestock production challenges in the study areas. The magnitude of livestock diseases varied from agro-ecology to agro ecology. Prevalence of the different livestock diseases was more serious in lowland and mid altitude districts than in highland districts (Table 5). On the other hand, the problem of land scarcity and shortage

of animal feeds were more critical in the high land and mid-altitude districts than in the lowland districts. It was also reported that lack of improved breeds or genotypes, poor livestock management practices and seasonal fluctuation of feeds were also important problems in the study areas.

Table 5. Main livestock production constraints

Main Constraints	N	Agro-ecology			Total %
		High land	Mid land	Low land	
Prevalence of different Livestock Disease	73	12.6	19.7	25.2	57.5
Land scarcity for livestock production	33	9.4	10.2	6.3	25.9
Shortage of animal feed (grazing land)	16	7.1	4.7	0.8	12.6
Lack of improved breed of animals	3	0.8	1.6	0	2.4
Unimproved livestock management practices	1	0.8	0	0	0.8
Climate change and drought	1	0.8	0	0	0.8
Total	127	31.5	36.2	32.3	100

N=number of households

Almost all the respondents were complaining the presence of animal health problem constraining animal production in the areas. According to respondents from the tsetse infested lowlands *Trypanosomiasis (gandi)* and *Pasteurellosis (gororsa)* were accountable for about 47.6% of health problems followed by Black Leg and Anthrax which were accountable for about 16% (Table 6). On other hand, the majority of respondents (93%) both from the mid- and low-land areas such as Bako Tibbe, Sibbu Sire, Boneya Boshe and Arjo Gudatu, reported that *Trypanosomiasis* and *Pasteurellosis* were the most important animal health problems in their areas. Fasciollosis, gastrointestinal parasites, lice, foot and moth diseases, mastitis and bloating were reported as most important diseases for livestock production in the highlands (Horro and Cheliya districts).

Table 6. Common livestock health problems by agro- ecologies

Common Livestock Diseases	N	Agro-ecologies			Total %
		High land	Mid land	Low land	
Trypanosomiasis and Pasteurellosis	60	3.2	22.2	22.2	47.6
Blackleg and anthrax	20	11.1	4.0	0.8	15.9
Fasciollosis and Trypanosomosis	12	6.3	3.2	0	9.5
Ecto-parasites and Anthrax	11	0.8	3.2	4.8	8.7
Pasteurellosis, Fasciollosis	7	2.4	1.6	1.6	5.6
GIT parasite and Bloat	6	4.8	0	0	4.8
FMD and Mastitis	3	0	1.6	0.8	2.4
Ecto-parasite and Leech	3	1.6	0	0.8	2.4
Mastitis, Ecto-parasite and Black leg	2	0	0.8	0.8	1.6
Leech, Anthrax, Pasterollosis	2	1.6	0	0	1.6
Total	126	31.7	36.5	31.7	100

N=number of households

3.4 Hide and skin diseases of ruminants in the areas

The majority of respondents (74%) were conscious that diseases and parasites contribute for defect of hide and skin before the animal is slaughtered. Common hide and skin diseases found in the areas were: lumpy skin disease (40%), mange mite and alopecia (33.1%) and locally known as 'goga qunchasa or citto' (9.4%). The latter is a fungal and bacterial skin disease. About 6.3% of the respondents reported that these problems are more serious in animals with poor body condition caused due to nutritional deficiency and debilitating chronic diseases like *Trypanosomiasis (Gandii)*. Lumpy skin disease was major problem in all the three agro-ecologies, but it was more pronounced in mid- and lowlands than in the high land districts.

Table 7. Diseases of hide and skin in study areas

Hide and Skin Disease	N	Agro-ecologies			Total %
		High land	Mid land	Low land	
Lumpy skin disease (LSD) "Bobocoqaa"	51	11	15.0	14.2	40.2
Unknown skin lesions or cases	42	14.2	10.2	8.7	33.1
Local abscessation (tick bite and infected traumatic wound)	14	3.9	3.9	3.1	11
Fungal/bacterial skin disease (<i>cittoo & gogaa quncisaa</i>)	12	2.4	3.1	3.9	9.4
Nutritional deficiency and emaciation due to	8	0	3.9	2.4	6.3
Trypanosomiasis (Gandii)					
Total	127	31.5%	36.2%	32.3%	100

N=number of households

3.5 Hide and skin parasite in the area

Ecto-parasites are among the major factors affecting quality of hide and skin in our country. Respondents listed major ecto- parasites that affect their animals according to their potential damage and prevalence in their areas. More than 70% of the informants complained that tick was the major ecto-parasite affecting ruminant animals and thus deteriorate the quality of hide and skins. Ticks infestation was reported in all districts covered in the current study. Lice infestation was the second most important external parasite mentioned by the respondent farmers particularly in the highlands and mid-altitude areas. Others such as mange mite lesions and biting flies, were also reported as important factors affecting skin and hides quality (Table 8). According to respondents, skin and hides quality deterioration caused by ticks was about 47% in mid-altitude areas; 39% in lowland areas and 13% in highland areas. On the contrary, skin and hides quality deterioration caused by lice infestation was higher (20.6%) in the highlands than in the mid- and lowland areas.

Table 8. Lists of Hide and Skin parasite mentioned by respondent farmers

Common ecto-parasites of hide and skin	N	Agro-ecology			Total %
		High land	Mid land	Low land	
Ticks infestation	89	9.5	33.3	27.8	70.6
Lice infestation	32	20.6	2.4	2.4	25.4
mange mite lesions	4	1.6	0.8	0.8	3.2
Biting flies	1	0	0	0.8	0.8
Total	126	31.7	36.5	31.8	100

N=number of households

3.6 Other factors affecting hide and skin quality in the study areas

There are many factors other than disease and parasites that adversely affect the quality of hide and skin. Respondents indicated that flaying defects and poor husbandry practices are some of the most important non biological factors responsible for rejection of hide and skin in their areas. Damage caused by these non-biological factors was estimated at 44% by respondents (Table 9).

Table 9. Non-biological factors of hide and skin defect

Non biological factors	N	Agro-ecologies			Total %
		High land	Mid land	Low land	
Flaying defects(flay cut, poor bleeding, bruises)	56	19.7	12.6	11.8	44.1
Poor husbandry practices (excessive sticking, brand marks, yoke marks, horn rakes)	52	10.2	19.6	11	41
No knowledge on other factors	15	1.6	2.4	7.9	11.8
Poor preservation(storage)	4	0	1.6	1.6	3.1
Total	127	31.5	36.2	32.3	100

N=number of households

The present finding indicated that disease and parasites (76.8%) are the most important factors affecting hide and skin quality followed by non-biological factors (flying and poor husbandry practices) (Table 10).

Table 10. Comparison of Causes of defect of Hide and skin depending on agro-ecology

Causes of defects	N	Agro-ecologies			Total %
		High land	Mid land	Low land	
Disease and parasite	96	21.6	28.8	26.4	76.8
Non biological factors	28	9.6	7.2	5.6	22.4
Unknown	1	0	0.8	0	0.8
Total	125	31.2	36.8	32	100

N=number of households

Informal discussion was made with few hide and skin traders and animal health workers found in the study areas about defects they frequently encounter on raw hide and skin and prevalence of diseases and parasites. Almost all of the interviewed actors indicated that they often encounter with very thin hide and skin, cut skins and hides (holes), scratches and deformities. Animal health workers were also agreed with traders and they attributed causes of skin and hides quality problems to lack of skill on the farmers side in undertaking improved husbandry and disease protection and management of sick animals.

3.7 Veterinary service and perception of farmers on hide and skin care

The average distance of veterinary clinic or animal health service provision centers from farmers' homes was about 5 kilometers. Small ruminant producers complained shortage of animal health service delivery (shortage or lack of drugs in the health posts) than the distance of the health centers. Duguma et al. (2013), who conducted survey in Horro districts, also reported that veterinary clinics are available in some of the areas, but have not

necessarily drugs and equipment to treat sick animals. Both farmers and health workers indicated that there is no regular vaccination scheme against common animal diseases. According to the respective health workers, shortage of budget for the purchase of veterinary drugs, shortage of clinical equipment and lack of diagnostic laboratory services were the main obstacles they encountered to improve animal health. According to Duguma et al. (2013) the Oromia Livestock and Health Agency (OLDHA) allocates some amount of money (about 40,000 ETB and above) as revolving fund to districts for the purchase of veterinary drugs. According to the authors some of the districts do not properly use the money due to various reasons.

About 73% of the respondents reported that they give pre-slaughter care during the life time of the animal for animals' welfare and other reasons than protecting quality of hide and skin (Table 11). About 24% of the respondents, do not have any knowledge about the welfare of animals and thus do not care for hide and skin defects made during the lifetime of animals.

Table 11. Pre-slaughter care of hide and skin and awareness on animal welfare

Pre-slaughter Care for the animal	Frequency	Percentage (%)
Care for the live animal and welfare	91	72.8
No care for the live animal and welfare	33	26.4
No idea	1	0.8
Total	125	100

The majority of the respondents indicated that the prevalence of hide and skin diseases is more important in cattle than in small ruminants (Table 12). About 82.5% of the informants' believed that cattle are the more affected than small ruminants, may be due to lack of knowledge or ignorance. Based on our observation during the survey work, small ruminants are the most neglected animal species in the study areas. For instance, preferential treatments in terms of supplementary feeds are given to lactating cows and ploughing oxen as compared to small ruminants. Only 12.5% of the respondents reported that both cattle and small ruminants are affected by hide and skin diseases.

Table 12. Species of ruminants more affected by hide and skin diseases

Species	Frequency	Percentage (%)
Cattle	99	82.5
Equally affected	15	12.5
Sheep and goat	6	5
Total	120	100

External parasites are the most important challenges in the study areas due to the climatic suitability of the area for the development and multiplication of parasites. Spraying/dipping of animals for the control of external parasites in the areas was assessed through the questionnaire survey. About 88% of the respondents knew and used to practice spraying of animals for the control/ treatment of ecto-parasites. About 44 %, 28%, 25% and only 3% of the interviewed farmers spray their animals for the control/treatment of ecto-parasite when the animal is severely infested with ecto-parasite, twice in a year, once in a year and spray their animals every month respectively (Table 13).

Table 13. Frequency of animal spraying practices/annum

HHS response	Frequency	Percentage (%)
Spraying when the problem arise	52	43.7
Spraying twice in a year	33	27.7
Spraying Once in a year	30	25.2
Spraying monthly	4	3.4
Total	119	100

4. Conclusions and Recommendation

Capacity building of farmers in improved animal husbandry practices (improved feeding, housing and health care) and extension agents are crucial to improve the quality of ruminant animals and thus skin and hides. Raising public awareness on the damage inflicted by ecto-parasites and skin diseases are also important. Public awareness on methods of flaying, preservation and handling of skins need strong attention. Generally, improved feeding, health services, transportation, storage and marketing of hide and skins have paramount importance for the economic benefit from the targeted commodities (hide and skins).

5. References

- Benin, S., Ehui, S. and Pender, J., 2006. Policies for livestock development in the Ethiopian highlands. In: Strategies for sustainable land management in the East African highlands. Washington D.C.: International Food Policy Research Institute, doi:10.2499/0896297578 Pp141 – 164.
- Central Statistical Agency (CSA), 2013. Agricultural sample Survey. Livestock and Livestock Characteristics, Addis Ababa, Ethiopia, Statistical Bulletin 417.

- Duguma G., Degefa K., Jembere T., Temesgen W., Haile A., Duncan, A.J. and Legese G., 2013. Value chain analysis of sheep in Horro district of Oromia Region, Ethiopia, Addis Ababa: ICARDA. <http://hdl.handle.net/10568/35373>
- EPA (Ethiopian Privatisation Agency). 2002. (Web accessed on 05-Apr-2006: <http://www.telecom.net.et/~epa/Sectors/leather.html>).
- Girma M. 2003. Opportunities and challenges of Hide and Skin Trade in Ethiopia. Livestock marketing in Authority, Addis Ababa, Ethiopia. Proceeding of the tenth Annual conference of the Ethiopian society of animal production (ESAP) held in AddisAbaba, Ethiopia, August 21-23, 2003Pp 49-59.
- Hirpa, A., Abebe, G., 2008. Economic significance of sheep and goats. In Yami, A., Merkel, R.C. (eds), Sheep and goat production handbook for Ethiopia. Ethiopian Sheep and Goat Productivity Improvement Program (ESGPIP), pp 1-4.
- IGAD, 2010. The Contribution of Livestock to the Economies of IGAD Member States. IGAD LPI Working Paper No. 02 – 10.
- Kassahun A., Getachew G., Zelalem A., Nigussie A. and FItcher I.1991. Small Ruminant production in Ethiopia: Constraints and future prospects third national livestock improvement conference 24-26 May, 1989. Addis Ababa, Ethiopia, Pp.37-48.
- Mulugeta H., Tasfaye M., Getachew W., Getachew T.and Teshome Y.1991. The significance of helminth parasites in livestock production.IAR, proceedings of the third National Livestock Improvement Conference 24-26 May, 1989. Addis Ababa, Ethiopia, Pp.49-53.
- Solomon Abegaze, Gameda Duguma, Ulfina Galmessa, Biranu Soboka and Fikiru Terefe. 2005. Small ruminant production system in east wellega and west shewa zone.
- Tembely T. 1998. Small Ruminant production in Ethiopia. Prospects for improving productivity. Proceedings of the fifth annual Conference of the Ethiopian Society of Animal Production (ESAP) Addis Ababa,Ethiopia. Pp.82-90.
- Zewdu K. 1995.Hide and Skin in Ethiopia. Proceedings of the second annual conference of the Ethiopian Society of Animal Production (ESAP) Addis Ababa,Ethiopia. Pp.6-14.