Impact of Major Ectoparasites on Hides and Skins in Ethiopia

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Abstract: The livestock population of Ethiopia is estimated about 56.71 million cattle, 29.33 million sheep, and 29.11 million of goats. In the country skins from small ruminants and hides from large animals are important economic products contributing for the largest share to the total and agricultural export commodities. So, this paper is engraved with the objectives of highlights the impacts of ectoparasites on hides and skins in Ethiopia as well as to indicate the available control measures against these ectoparasites. Even though Ethiopia has very good potential to produce substantial quantities of hide and skins, their quality is very low. In this regard about 35% of sheep and 56% of goat skin rejected due to ectoparasitic damage and due to this effect about one quarter to one third of all the skins processed at tanneries are unsuitable for export. Trade in hides, skins, leather and leather manufactures have been in a great growth at an average of about 12% over the last 30 years, reaching to around USD 53.8 billion in early 2000. As a result of this, leather has been at the core of Ethiopia's economy since many years. In addition, it has a large contribution to the leather industry in the country. Now a day poor health and poor productivity of animal due to parasitic infestation has considerably become the major stumbling block to the potential of livestock industry as well as causes serious economic loss to small holder farmers, the tanning industry and the country as a whole through mortality of animals, decreased production, down grading and rejection of skin and hide. Therefore, it is concluded that impact posed by external parasitic infestation such as (mites, lice, ticks and flies) on animals during their life time is more serious and significant. So improved veterinary extension services, effective parasite control strategies, continuous awareness creation and training on farming to livestock holders are suggested to enhance the quality of skins and hides.

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1. Introduction

In Ethiopia the Livestock sector provides an opportunity for further development. These livestock sector is major contribution in to the overall economy and contributes 19% of GDP and 16-19% of the foreign exchange earnings of the country (Alemnesh, 2015). Cattle, sheep and goats are important source of income for agricultural community and are also one of Ethiopia's major sources of foreign currency through exportation of live animals, meat, hide and skin (Dessie *et al.,* 2010). The total cattle population of Ethiopia is about 56.71 million cattle. Moreover, about 29.33 million sheep and 29.11 million goats are estimated to also be found in the country which is one of the largest and most diverse in Africa (CSA, 2014/15).

Livestock in Ethiopia provides draught power, income for farming communities and pastoralists, means of savings and investment, and is an important source of foreign exchange earnings for the country (Belachew, 2005). Moreover, the livestock sub-sector is the second major source of foreign currency through export of live animals and hides and skins (FAO, 2005). However in recent years, this rank has been relegated to fifth level mainly because of rejection and down grading inflicted on hides and skin defects mainly due to infestation by external parasites (Kassa, 2006). Consequently, an increasing trend of livestock populations shows the country has substantial resource potential to attract investment and consequently foster the development of the leather industry (USAID, 2013).

Skins from small ruminants and hides from large animals are important economic products contributing for the largest share to the total and agricultural export commodities (Ayele *et al*., 2003). The current utilization of hides and skins in Ethiopia is estimated to be 45% for cattle hide, 75% goat skin and 97% sheep skin with expected off take of 33%, 35% and 7% for sheep, goats and cattle, respectively (Mohammed, 2000).

Therefore, the diseases are important among all livestock constrains. Ectoparasites are organisms, which inhabit the skin and hide for various periods. Ectoparasites commonly mange mites, lice, keds and ticks are widely distributed in all agro-ecological zones in Ethiopia, causing serious economic loss in small holder farms (Kumsa *et al.,* 2012). They are also one of the most important causes of loss in production and mortality of animals in various part of the country

through decrease in production and reproduction, down grading and rejection of skins and hides (Yacob *et al*., 2008).

Though Ethiopia has very good potential to produce substantial quantities of hide and skins, the quality of the hide or skin is to a large extent related to the amount of damage to the grain (or outside) surface (ESGPIP, 2009). In this regard it is estimated that about one quarter to one third of all the skins processed at tanneries are unsuitable for export due to various defects (Ahmed *et al*., 2016). It was reported that 35% of sheep and 56% of goat skin rejections in Ethiopia are attributed to ectoparasites (Kassa, 2006).

As a report indicated from the Ministry of Agriculture and Rural Development of Ethiopia in 2005 the control program against ectoparasites and skin diseases have been designed in all regions in Ethiopia and it is still ongoing, this activity has been started such regions of the country in 2010. However, it is generally observed that the full potential of hides and skins as a product is not realized in Ethiopia because of several reasons, the most important being low quality of the product produced with consequent poor demand in both domestic manufacturing industries and in the export market is ectoparasite defects (MoARD, 2009). Therefore all these considered as national and regional emphasis given to the control programs against ectoparasites, the problem seems to be still alarming, and questioning on the efficiency of this control program in the area. Therefore the objectives of this paper are:

- To highlights the impacts of ectoparasites on hides and skins in Ethiopia.
- To indicate the available control measures against ectoparasites.

2. Importance of Skins and Hides in Ethiopia

In Ethiopia hides and skins are important livestock products providing income for the poor people living in the rural areas of the country. They are supplied to domestic and foreign markets. Since they have significant economic importance, much effort is needed to improve the quality and increase the quantity so that there will be effective and efficient utilization. Hides and skins are meat by-products and there is still little consideration given to the care required for the collection and processing of the hides and skins in to high quality leather (Abaineshe, 2014).

The livestock production system is virtually traditional and contributes to both subsistence and cash generation. They are only selling or slaughtered animals at an advanced age, or in case of urgent need (Ayele *et al.,* 2003). Cattle, sheep and goats are important source of income for agricultural community and are also one of Ethiopia's major sources of foreign currency through exportation of live animals, meat, hides and skins (Dessie *et al.,* 2010).

Presently, Ethiopia's leather industry is in the forefront of the leather sector development within the eastern and southern Africa region. In the national GTP I plan, it was planned to increase skins and hides production from 44.7 thousand ton in 2010/11 to 103 thousand tones at the end of the plan period (2015). In addition hides and skins are the basic raw materials for the leather industry. Currently about 33 tanneries in Ethiopia produce all forms of hides and skins and finished leather and leather products for the domestic and export markets (LIDI, 2015). The capacity to process hides and skins, particularly for raw sheep and goat skins greatly exceeds domestic supply. These tanneries have an average daily soaking capacity of 107,850 pieces of sheep skin, 51,550 pieces of goat skin and 9,800 hide (USAID, 2013). 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, 2007).

Hides and skins contribute much to the export earnings from the livestock sector. In addition, it has a large contribution to the leather industry in the country. Ethiopia has been exporting hides and skins in the past 100 years (Girma, 2003). Trade in hides, skins, leather and leather manufactures have been in a great growth at an average rate of about 12% over the last 30 years, reaching to around USD 53.8 billion in early 2000. As a result of this, leather has been at the core of Ethiopia's economy since many centuries. About 80% of all hides and skins entering the formal market are from rural areas where they are collected by private traders. The remaining 20% are derived from slaughtering facilities in major towns and cities (FAO, 2010).

Hides and skins change hands several times before they reach the tanneries, since traders collect them in small quantities over a large geographic area. The leather tanneries in Ethiopia obtain most of the hides and skins from collectors and traders. Larger tanneries equipped with machines and the required facilities buy semi-processed products from other tanneries and this leads to improvements in the leather value chain. The leather industries buy raw materials from the tanneries and produce various types of finished leather products; both for domestic use and export purposes (i.e. shoes, gloves, garments, and other articles of leather) (USAID, 2013).

Skins and hides quality is primarily defined by the absence of damage to the grain layer of the skin and hide. Therefore, the quality of finished leather is related to a number of surface and structural defects that hides and skins acquire during the life of the animal, slaughtering, storage and transportation are highly significant in reducing the importance of hide and skin (Hadly, 2001).

The Ethiopian government's policies targeted at fostering value - added local processing that have met with some successes at the expense of Ethiopian tanneries. Some small local tanneries stopped exporting or greatly reduced their exports due to the new policy. Such tanneries then started selling semi - processed leather to other tanneries in order to survive (Abebe and Schaefer, 2013). The major regions that supplies sheepskin are Amhara, Oromia, SNNP, and Addis Ababa accounting for 34.5%, 32.9% 16.6% and 7.9% of the central market sheepskin supplies and 45%, 26.4% and 11.7% of the goatskin originate from Amhara, Oromia and SNNP regions respectively (Mahmud, 2000).

In the meantime, Ethiopia has seen a significant increase in foreign investment in leather processing and manufacturing since 2004. By relaxing control measures, the government suspended the ban on new foreign investment in tanneries for several years, because local tanneries were not advanced enough to process up to the crust level. For instance, foreign direct investment from China to Ethiopia increased from USD 0.43 million in 2004 to USD 58.53 million in 2010 in the leather sector (Brautigam, 2011).

Ectoparasites significantly affect the quality of hide there by affecting the economy of Ethiopian farmers as well as international market. However, poor health and productivity of animal due to disease has considerably become the major stumbling block to the potential of livestock industry (Bekele *et al.,* 2011). Now a day parasitism represents a major obstacle to development and utilization of animal resource among ectoparasites which are significantly affect the quality of skins and hides (Rony *et al.,* 2010).

3. Major Ectoparasites Causing Defects on Hide and Skin

Ectoparasites are organisms that live on the surface of animals upon which they depend for food, shelter and other basic needs to survive (Anderson, 2004). It has been observed that ectoparasites do not only have direct effects on their host, but they may also transmit pathogens, there by acting as vectors of diseases (Parola *et al.,* 2001). Ectoparasites generally affect the health of animals and the quality of hides and skin. The leather industries have suffered great loses over the years because of infestation of animal skin (ESGPIP, 2010)**.**

In Ethiopia ectoparasites in ruminant causes serious economic loss to small holder farmers, the tanning industry and the country as a whole through mortality of animals, decreased production, down grading and rejection of skin and hide (Tikit and Addis, 2011). As a result of their activity ectoparasites may have a variety of direct and indirect effects on their hosts. Ectoparasites commonly tick, mite and lice affect the host species by the inflammation and the infection they inflict on the skin and by their effect on the physiology of the animals as well as through transmission of different diseases (Bekele *et al.,* 2011).

Ectoparasites also have transmission ability for many infections due to blood sucking habit. Skin damage is the most important cause of losses in livestock industry (Tadesse *et al.,* 2011). Skin problems caused by lice, keds, mange mites and ticks are among the major defects during the life of animals that reduce skin qualities and results in rejections (Tefera and Abebe, 2007). Up to 65% of the defect that lead to decline of the quality occurs while the animal still alive and a considerable portion of these impacts are directly associated to skin disease initiated by external parasites (Ahmed *et al.,* 2016).

Over the last 10 years in Ethiopia, there are indications that the quality of raw material has deteriorated with an increasing number of reject grades and the appearance of skin disease called "ekek" that is mainly due to lice, keds, and mange infestations (Hailu, 2010). For instance, as a report indicated from mojo export tannery in Ethiopia in 2011, from a total of 401 (205 sheep and 196 goats) fresh pelts observed for presence of ectoparasites before processing, 64.4% and 35.7% had biting louse in sheep and goat skins, respectively. Similarly, 45.8% and 54.25% sucking louse were found in sheep and goat pelts, respectively. Other ectoparasites include 50% of tick in both species and 100% sheep keds found in sheep skins only, as illustrated in Table 1 (Worku *et al.,* 2011).

Table 1: Prevalence of ectoparasites in sheep and goat skins from mojo export tannery.

Species	Tick (%)	Sucking louse (%)	Biting louse (%)	Sheep ked (%)
Sheep	10 (50.0)	11 (45.8)	56 (64.4)	26 (100)
Goat	10 (50.0)	139 (54.25)	31 (35.7)	0
Total	20 (4.9)	24 (6)	87 (21.7)	26 (6.5)

Source: (Worku *et al*., 2011)

3.1. Tick Infestation

Ticks are blood sucking ectoparasites of mammals and birds. There are two main families of ticks include the Ixodidae (hard) ticks and Argasidae (soft) ticks are known to transmit the widest variety of pathogens of any blood sucking arthropods such as

bacteria, rickettsiae, protozoa and viruses which favors the emerging of various skin disease (El-Kammah *et al.,* 2001). According to (Venededoe, 2002) about 850 species of ticks have been described worldwide and they cause the greatest economic losses in livestock production.

In Ethiopia tick and tick borne diseases cause considerable losses to the livestock economy, ranking third among the prevalent parasitic diseases, after trypanosomes and endoparasitism (Zeleke and Bekele, 2004). Tick damage hides and skins and interfere with meat and milk production. The most commonly known tick borne diseases are Anaplasmosis, Babesiosis, Theileriosis and Heart water; ticks also cause non-specific symptoms like anemia, dermatitis, toxicosis and paralysis (Solomon *et al.,* 2001). Tick bite may damage host at the site of attachment causing local injury, which may predispose to secondary bacterial infestation. The lesion caused during feeding may predispose to myiasis also at slaughter the value of hide and skin may be reduced (Taylor *et al.,* 2007).

Their effects are various including reduced growth, milk and meat production, damaged hides and skins, transmission of tick-borne diseases of various types and predispose animals to secondary attacks from other parasites such as screwworm flies and infection by pathogens such as *Dermatophilus congolensis*, the causative agent of streptothricosis (ESGPIP, 2010).

Recently, reports from different areas of Ethiopia indicated that highest overall prevalence of ticks infestation are, 16% in sheep and 29.7% in goats from Tigray region (Mulugeta *et al.,* 2010) and 57.6% in goats from three agro-ecological zones of southern rangeland of Ethiopia (Asnake *et al*., 2013).

3.2. Lice Infestation

Lice are small, flat-bodied insects with legs modified for grasping hairs. There are two main types: chewing lice rasp at the skin and hair; sucking lice penetrate the skin and suck on blood (Pugh, 2002). According to (Tefera and Abebe, 2007) lice infestation in Ethiopia is the most frequently reported and the most important skin disease of small ruminants this is because lice are found to be the cause of cockle. Lice populations on animals are greater during the rainy months. Lice are easily overlooked because of their small size. They can multiply very fast before being discovered. By this time, the animal might be too anemic and emaciated and difficult to recover. An allergic skin hypersensitivity reaction due to lice is another cause for "Cockle" in processed sheep skins (Kassa, 2006).

Lice infestations manifest as a chronic dermatitis characterized by constant irritation, itching, rubbing and tagging and biting of fleeces. Infestations can cause considerable losses from unthriftiness, retarded growth and damaged wool and leather. There are reports of a seasonal pattern to the occurrence of cockle/"ekek"; being higher during or just after the wet or rainy season (Tadesse *et al*., 2011).

In Ethiopia the highest prevalence was recently reported in sheep from Assela by (Hailu, 2010), who identified *Linognathus* species (75.5%) and *Bovicola ovis* (67.1%). Other reports were *B. ovis* in sheep 15.3 and 27.9% in goats, *Linognathus ovillus* (27.9%) from Tigray by (Mulugeta *et al.,* 2010). However, this is a lower result when we compared to the report of (Hagos *et al*., 2013) that the prevalence of cockle lesion on *Bovicola ovis* infested group of sheep pelts in Wukro, Sheba tannery, Tigray Region was 100%.

3.3. Flies Infestation

3.3.1. Cutaneous myiasis

Myiasis is the condition resulting from infestation of the living skin of sheep by the larvae of blowflies. Affected animals are restless, show excessive tail twitching and foot stamping. The most commonly affected area is soiled wool around the tail, but other parts of the body including the feet may be involved (Barbara and David, 2003). Blowflies, flesh flies and botflies are the three major categories of flies commonly responsible for causing myiasis (Roger and Weaver, 2011). The larvae cause great damage to the hides and skin of livestock and affect the appearance of the final leather as well as have the potential to cause death in affected animals (CFSPH, 2006).

3.3.2. Sheep ked

Keds are a wingless fly that parasitizes sheep and causing skin irritations that results damage to the skin and can produce an allergic hypersensitivity reaction in the skin of sheep and considered as major cause of cockle/"ekek" and are visible on the skin surface of affected animals (Tekle, 2008). Although the degree of infestations usually encountered cause only the resulting scratching, biting, and rubbing themselves against fences, stones, shrubs, and other things causes severe damage to the skin and wool. Furthermore, both sexes are blood feeders and feed several times each day and therefore very heavy infestations may cause severe anemia (Urquhart *et al.*, 1996).

In Ethiopia, few works are available on ecological distribution of sheep ked. Recent reports on sheep ked of small ruminants indicated that the parasite is most common in sheep mainly in cooler high altitudes. Other reports were in sheep 65% from Assela highlands (Hailu, 2010); 19.1% from Mekele midlands (Mulugeta *et al*., 2010); 14.2% from central highlands of Oromia regional state (Kumsa *et al*., 2012) and 20.14% from Gondar highlands (Tewodros *et al*., 2012). The commonly, identified species of keds was *Melophagus ovinus* and infestation of sheep with *M. ovinus* leads to the development of cockle and those results in downgrading and rejection of skins.

For instance recent reports indicate that the prevalence of cockle lesion on *Melophagus ovinus* infested group of sheep pelts in Wukro, Sheba tannery, Tigray Region was 92.5% (Hagos *et al.* (2013).

3.3.3. Warble flies

Warble flies occur in dry, arid regions and are generally absent in moist regions. This is due to the fact that moist soil is not conducive to the growth of larvae into flies and damage to the skin of animal is due to migratory larvae. There are two species of warble fly (heel fly); *Hypoderma bovis* and *Hypoderma lineatum*. Both lay eggs on the hair of the lower legs. Emerging larvae penetrate the epidermis and migrate subcutaneously to the skin of the back, which they puncture for breathing holes, and then encyst. Encysted larvae in the sub dermal tissues produce smooth skin swellings known as warbles. Over a period of 4–6 weeks, warble larvae undergo three molts, the light-cream to dark-brown third-stage larvae then emerging through the breathing hole to fall to the ground to pupate. In a late third-stage larva has been manually expressed onto the skin, over the anterior chest. A cluster of five larval breathing holes, with larvae feeding beneath, is present in the skin, dorsal to the lumbar spine and losses due to warbles arise from damage to the most valuable part of the hide, from reduced grazing due to fear of the adult fly (Roger and Weaver, 2011).

3.4. Mange Mites

Mange mites are common in Ethiopia and therefore are reported from many regions and different agro climates (Table 2). Most ectoparasitic mites spend their entire lives in intimate contact with the host. High temperature, humidity and sunlight favor mange mite infestations as well as dramatic increases in mite populations occur more commonly in animals in poor condition and more often seen at the end of winter or in early spring. Based on the reports so far, mange mites are most prevalent in four national regional states of Ethiopia namely, Amhara, Oromia, Tigray, and Southern Nation and Nationalities regional states (Asnake *et al.,* 2013).

There are four main genera of mange mites which cause disease in ruminants: Demodectic mange (follicular mange), Sarcoptic mange (barn itch), Psoroptic mange (body mange, ear mange and the sheep scab) and Choroptic mange (tail mange, leg mange and the scrotal mange). Mange mites are the major causes of skin diseases and that affect ruminant production in many areas of Ethiopia. The infestations by these mites are called acariasis and can result severe dermatitis, Known as mange (Urquhart *et al.,* 2006). In cattle and goat, Demodectic mange causes significant damage to the hide and skin rarely death that may result from secondary bacterial infection (Radostits *et al.,* 2007). Mites multiply preferably under the skin and damage the hide (FAO, 2005).

Table 2: Overall prevalence of mange mites in different agro climate.

Agro Climate	Prevalence %
Lowland	2.9
Midland	1.4
Highland	1.2

Source: (Assfaw *et at.,* 2015)

Among ectoparasites, mange mites are most common which parasitize different domestic and wild animals. They spent their lives on the animal body by feeding on blood, lymph, skin debris and inject subcutaneous secretion while puncturing the skin, damaging the skin surface as well as cause tremendous losses of skin through downgrading and rejections (Teshome, 2002).

Sarcoptic scabiei var. *caprae* and *Sarcoptic scabiei* var. *ovis* have a wide geographic distribution in many goats and sheep rearing in arid and semi-arid areas of Ethiopia, and it is more commonly seen in goats than sheep. In Ethiopia, they are widely distributed in lowland mainly (Asnake *et al.,* 2013), low and midlands (Kumsa *et al.,* 2012) as well as central midland part of the country (Yacob *et al.,* 2008). The highest prevalence of sarcoptic mites observed in sheep and goats were 30.32% in Tigray (Kedir, 2000) and 57.6% in Southern Ethiopia (Asnake *et al.,* 2013), respectively. While Mites of the genus *Psoroptes* cause psoroptic mange in sheep and goats. In sheep, its prevalence is found greater than in goats. Recent studies indicate that in Ethiopia, psoroptic mange is most common among small ruminants in lowland areas of north (Kassa, 2006; Mulugeta *et al.,* 2010) and South (Dessie *et al.,* 2010) as well as central lowland areas (Yacob *et al.,* 2008).

Demodectic mange has been reported in sheep (*Demodex ovis*) and goats (*Demodex caprae*). The highest prevalence was 6.8% in goats by (Mulugeta *et al.,* 2010) in and around Mekele, followed by 2.83% by (Asnake *et al.,* 2013) in southern Ethiopia. While Chorioptic mange mites are common in cattle and the condition is often referred to as leg mange or foot mange because of the distribution of the lesions, which are usually limited to the lower limbs extending up the limbs to affect the scrotum in males or udder in females and characterized by the production of crusts and flaking especially on the backs of the feet. It causes the downgrading of skins to the tanneries (ESGPIP, 2009).

4. Economic Importance of Skin and Hide Defects

The Ethiopian tanning industry has long complained about the grades of hides and skins, which resulted in poor quality of processed hides and skins.

This, therefore, creates a serious problem for competition in international markets through the export of processed hides and skin. Almost all commercial tanneries have indicated rejections of 20-24% of purchased skins from sheep and goat, which has resulted in a loss of USD 6.9 million (Belachew, 2004). Tanneries state that currently only 10 to 15% of harvested skins qualify for top grades, with the rest downgraded and rejected mainly due to deterioration of skin quality due to ectoparasitic skin diseases and various defect (ESGPIP, 2009).

For instance, the economic impact of tick infestations is estimated about 7 billion USD and over 55 thousand USD annual loss was made in the world and Ethiopia respectively due to rejection and downgrading of hides and skins (Tadesse *et al.,* 2011). In addition to this tanneries reported that about 35% of sheep skin and 56% of goat skin are rejected due to external parasites and skin disease. In this regard the estimated economic loss due to this rejection is around 25.8 million USD annually, which is quiet a significant loss to the economy (Yacob, 2013).

According to (Amsalu *et al.,* 2000*)* the estimated economic loss due to drop in quality of sheep and goat skin is around USD 14 million per year. Whereas from the report of (Tefera and Abebe, 2007) one year (2002/2003) data analysis conducted in Dessie and Kombolcha tanneries indicate that 70 % of downgrading and rejection on pickled sheep pelts and 42 % of downgrading and rejection on wet blue goat pelts were due to cockle. Accordingly the annual economic losses due to cockle in Kombolcha and Dessie tanneries excluding processing and overhead costs is calculated to be around USD 1.6 million for pickled sheep pelts and around USD 0.6 million for wet blue goat pelts. The economic loss due to cockle would have been much higher than this, if clinically mange affected skins which are selected by farmers, collectors and skin and hide traders had entered the tanneries (Kassa, 2005).

Moreover, in Ethiopia livestock potential was lagging behind to play its part more in hastening the country's economic development for long. For instance, the overall performance of the sector during the first growth and transformation period was lower than its target and it was planned to earn about 496.5 million USD, but the actual earning was 132.86 million USD which is a quite significant economic loss (Ethiopian Herald, 2016). Therefore, skin diseases caused by lice, keds, ticks and mange mites; are among the major diseases of ruminants causing serious economic loss to small holder farmer, the tanning industry and the country as a whole (Tefera, 2004).

5. Control and Prevention of External Parasites.

A number of different control methods are available to farmers to prevent and/or treat ectoparasites. Commonly there are three classes of compounds available for the treatment and prevention of external parasitic infestation; organophosphorus compounds e.g. diazinon, synthetic pyrethroids e.g. flumethrin and high cis-cypermethrin and macrocyclic lactones e.g. ivermectin and doramectin (Barbara and David, 2003).

Ticks are treated and controlled with acaricides only where ticks are present in large numbers. If tick numbers are not large, do not use acaricides, in this case, it is possible to kill them by hand using a needle or thorn. Shear the animal's hair and then use an insecticide such as Amitraz and solutions can be sprayed on the animal, used as a dip or pour-on. Knapsack spraying is the most practical method if more intensive control measures are needed for a small number of animals. However acaricides are toxic to people as well as animals and care should be taken to prevent any possibility of dip fluid being drunk, or contaminating ground water (Sileshi and Desalegn, 2008). Where as in case of lice infestation spraying or dipping with acaricide is effective and should always be carried out twice as a treatment and control for lice. The first time to kill the lice currently on the body and the second, 14 days later, to kill lice hatching from eggs present at the first treatment, because there is no insecticides which affect eggs of lice so far (Tekle, 2008).

Shearing of the wool in case of sheep keds, spraying or dipping with insecticide after shearing also will destroy flies. In addition flies can also be controlled by organophosphorous dips, certain synthethic pyrethroids and other pour-on products (Merck veterinary manual, 2016).

However the treatment and controlling of mites are almost similar for all species of mites and which is infected sheep should be dipped with acaricide and ivermectin injection is also effective. Newly introduced animals are the main sources of infection for a flock. Therefore, these animals must be checked carefully and possibly treated before being introduced into the new flock (Sileshi and Desalegn, 2008).

Moreover, majority of ectoparasitic infestation can be prevented and controlled through clean animal houses regularly, remove grass/plants around the barn, all litter and discarded wool must be collected and burnt or deposited out of animal contact, if external parasites are seen on an animal, it should be treated immediately to prevent transmission to others, all animals introduced to a farm must be treated immediately upon arrival to avoid the spread of new parasites on to the farm, rotate the land where livestock graze and if the above measures are not effective, treating the animals with appropriate pesticide or insecticide is indicated (ESGPIP 2010).

6. Conclusion and Recommendations

Despite the large livestock population in Ethiopia their contribution in economy is less than expected mainly because of the presence of many external parasitic infestations of ruminants which have great impact on their health and product. Skins from small ruminants and hides from large animals are important economic products contributing for the largest share to the total and agricultural export commodities. Conversely, about one quarter to one third of all the skins processed at tanneries are unsuitable for export due to various defects where majority of defects are due to parasitic infestation during the existence of animals. Majority of the tanneries state that only 10 to 15% of harvested skins qualify for top grades, with the rest downgraded and rejected mainly due to parasitic infestation. For instance, the estimated economic loss due to drop in quality of sheep and goat skin is around USD 14 million per year. Moreover, during the first growth and transformation plan, Ethiopia was planned to earn about 496.5 million USD from hide and skin sector but the actual earning was radically reduced to 132.86 million USD which is a great losses to the economy.

Therefore based on the above conclusion, the following points are recommended:

♦ To reduce the impacts of ectoparasites effective parasitic control measure should be applied by animal health services.

♦ Continuous awareness creation programs should be launched for farmers and livestock holders on farming as well as housing of their animals.

♦ Improved veterinary extension services should be distributed to the whole areas of Ethiopia to prevent skin and hide defects due to external parasitic infestation.

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