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Review on Small Ruminant Production, Marketing and Constraints in Ethiopia

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Abstract
This study reviews the small ruminant production, marketing and constraints with the aim of delivering summarized and synthesized information for the beneficiaries and users. Small ruminants are integral part of livestock keeping in Sub-Saharan Africa that are mainly kept for immediate cash sources, milk, meat, wool, manure, and saving or risk distribution. There are about 25 million heads of sheep and 22 million heads of goats in the country, playing an important role in the livelihood of resource-poor farmers. In Ethiopia, sheep and goats account for about 90 % of live animals/meat and 92 % of skin and hide export trade value. In Ethiopia, sheep and goats are maintained in two broad production systems namely mixed, and pastoral and agro-pastoral farming systems. The livestock marketing structure of Ethiopia follows a four-tier system. These tiers are local farmer and rural traders or assemble local market, secondary market and terminal markets. Small ruminant productions are highly influenced by feed shortage, disease and parasites, water shortage and market fluctuation. Depending on this review it is important to use modern production systems with improved technology in urban area and in rural area improve traditional system through feed supplementation and better health care.
Keywords: small ruminants, production, constraints, Ethiopia.

1. Introduction

1.1 Back ground

Small ruminants are integral part of livestock keeping in Sub-Saharan Africa (SSA) that are mainly kept for immediate cash sources, milk, meat, wool, manure, and saving or risk distribution (Kosgey, 2004). Small ruminants also have various social and cultural functions that vary among different cultures, socio-economies, agro-ecologies, and locations in tropical and sub tropical Africa.

Sheep and goats are among the major economically important livestock in Ethiopia. There are about 25 million heads of sheep and 22 million heads of goats (CSA, 2009) in the country, playing an important role in the livelihood of resource-poor farmers. In Ethiopia, sheep and goats account for about 90 % of live animals/meat (CSA 2008-9) and 92 % of skin and hide (Adane and Girma2007) export trade value. Small ruminants are important contributors to food production in Ethiopia, providing 35% of meat consumption and 14% of milk consumption (FAO2004).Sheep and goats contribute a quarter of the domestic meat consumption; about half of the domestic wool requirements; about 40% of fresh skins and 92% of the value of semi-processed skin and hide export trade. It is estimated that 1,078,000 sheep and 1,128,000 goats are used in Ethiopia for domestic consumption annually (Adane and Girma, 2008).Sheep and goats provide about 12% of the total livestock products consumed and 48% of the family income generated at farm level. In Ethiopia, sheep and goats are accountable for about 25% of the domestic meat consumption and 58% of the national annual hide and skin production (Zelalem and Flecher, 1991). The sheep enterprise in the Ethiopian highland crop and livestock system is the most important form of investment and cash income and provides social security in bad crop years (Getachewu and T., 2008).

Small ruminants are playing an important role in the economy of farmers in the high lands of southern mixed farming system of Ethiopia (GetahunLegesse2008). Attempts to improve the performance of small ruminants under the prevailing condition must take into consideration their specific purpose in the production system and their potential under varying management levels (Otte and Chilonda2003).

Sheep have greater environmental adaptability, shorter production cycles and faster growth rates, ease of management, low investment capital and low feed requirements as compared to large ruminants (FAO, 2002). They are important protein sources in the diets of the poor people, help to provide extra income and support survival for many farmers in the country (Solomon 2008; Markos, 2006). The traditional production systems under which the local sheep are kept are complex and diverse. However, sheep provide meat in all parts of the country contributing towards human nutrition and the economic requirements of communities (Ewnetu et al. 2006).

Small ruminant population of Ethiopia is one of the largest in Africa (IBC, 2007). Most of the small ruminant population of the country is kept by smallholder farmers and small ruminant production in the country is traditional (EARO, 2001a). According to Moti et al. (2009) citing Pingali (1997), subsistence agriculture may not be a viable activity to ensure sustainable household food security and welfare. Commercialization of smallholder agriculture is an indispensable pathway towards economic growth and development for developing

countries relying on the agricultural sector. In Ethiopia, the small ruminant production system in different agro-ecological zones is not studied fully and farmers' needs and production constraints have not been identified (EARO, 2001a). Improvement in small ruminant productivity which is low in Ethiopia (EARO, 2001a) can be achieved through identification of production constraints and introduction of new technologies or by refining existing practices in the system.

Livestock production and productivity and producers' benefits from livestock production are far below expectations. There are also variations in the performance of different breeds of sheep and goats (small ruminant) in Ethiopia. The lack of up-to-date and location specific information on production and marketing systems is often a major limitation to productivity and production improvement endeavors in sheep and goats in Ethiopia (Ayele et al., 2003). Understanding the response/performance of small ruminant under farmers' management, production characteristics, identifying constraints and opportunities and designing workable production strategies are required in order to improve livestock productivity and market success of producers. There are a number of challenges and obstacles (constraints') limiting the success and profitability of small ruminant production system in Ethiopia. Therefore, a comprehensive literature review on the current status of small ruminant production in the country seems to be appealing. There is a need for reviewing the production system, production performance and constraints of small ruminant production. Moreover, information's on either weak sides or the success stories of small ruminant production including its socioeconomic contributions could be used by beneficiaries.

1.2 Objective

1.2.1 General objective

- To review on production systems, marketing and constraints of small ruminant production systems.

1.2.2 Specific objectives

- To review on small production systems in Ethiopia
- To review on marketing systems of small ruminants in Ethiopia
- To review on constraints of small ruminant productions in Ethiopia

2. REVIEW

2.1. Small production systems in Ethiopia

Livestock production system and the relative importance and potential for increased production by livestock species in varied areas differ markedly due to differences in resource endowment, climate, population, disease incidence, level of economic development, research support and government economic policies (Beets *et al.*, 1990). In Ethiopia, sheep and goats are maintained under two broad production systems (Tembely, 1998; EARO, 2000).

2.1.1. Mixed crop-livestock farming system

Mixed farming system is predominantly found in highland agro-ecological zones where the climatic factors are conducive for farming of crops and raising livestock. This system is generally found in areas where the altitude ranges between 1500 and 3000 masl. The area has adequate rainfall and moderate temperature and is thus suitable for grain production. In this production system, livestock and crops are maintained as complementary enterprises. The average land size per household is often less than two hectares (Solomon *et al.*, 2008). Consequently, farming is mainly subsistence in nature. The relative importance of livestock products and services within species has not been properly quantified. In this production system, goats are kept by smallholders and herded with sheep and other livestock. In these mixed species grazing systems, goats complement cattle and sheep rather than compete with them for feed, because of their inherent ability to eat a wider variety of plant species (Lebbie, 2004). These mixed herds usually freely graze on communal pastures and seasonally on fallow crop land with no extra-supplement and receive minimum health care. However, due to the increasing population pressure in areas with this production system, free grazing is becoming limited and goats are now tethered, reflecting the challenge of procuring sufficient feed in this system (FARM Africa, 1996). According to Peacock (2005) in highland agro–ecology, as in central Ethiopia, increased human population has led to decreased farm size and a gradual shift from keeping large to small ruminants, mainly goat and sheep.

In mixed crop-livestock production system which mainly seen in central highland of the country, small ruminant production is characterized by low productivity due to nutritional stress and internal and external parasites (Tembely, 1998; EARO, 2000).

Sheep and goat in Ethiopia are kept under traditional extensive systems with no or minimal inputs and improved technologies, which results in characteristically low productivity. They are virtually kept as scavengers, particularly in the mixed crop–livestock systems. Sheep and goat are largely produced in mixed crop– livestock. Small flock sizes predominate in the highland mixed crop–livestock systems because of land and capital limitations (Solomon et al, 2008).

2.1.2. Agro pastoral and pastoral system

According to Solomon et al. (2008) in the agro-pastoral system, human pressure on natural resources is relatively lighter than that observed in higher altitudes. Land holding per households was higher than in the mixed farming system. Livestock are important components of the farming system. Crops are produced for both subsistence and market. In pastoral and agro–pastoral production systems, which are found in arid and semi-arid agro–ecological zones within altitudes below 1500 masl goats, are kept by nearly all pastoralists, often in mixed flocks with sheep, freely grazing or browsing in the rangelands.

Arid and semi-arid zones comprise 55% of the area of sub-Saharan Africa, supporting 50– 60% of the livestock and 40% of the people in that area (Silanikove, 2000). However, as arid and semi-arid agro–ecology zones receive low moisture most of the year and feed is scarce in the dry season, pastoralists move their animals from place to place in search of feed and water. Such a management strategy helps them survive the dry season with minimum losses. This production system is associated with the purely livestock based nomadic and transhumance pastoral production systems based largely on range, primarily using natural vegetation. In the lowlands of Ethiopia, livestock is comprised of large flocks and herds of sheep and goats, cattle and camels mainly transhumant, where only surplus are sold at local markets or trekked to major consumption centers. Extensive livestock keeping is the backbone of the economies of the lowlands (EARO, 2000).

The Pastoral and agro-pastoral systems which are found in the lowlands are characterized by extensive production based largely on the rangeland (Tembely, 1998; EARO, 2000). Sheep and goat are highly produced in pastoral and agro pastoral systems. Relatively larger flocks are maintained in the lowland (agro) pastoral systems. The major feed resources for sheep and goats include grazing on communal natural pasture, crop stubble, fallow grazing, road side grazing, crop residues, browses, and non-conventional feeds (household food leftovers, weeds, crop tillers and fillers). Production of improved forages, improvement of low quality feed sources such as crop residues and supplementary feeding (except fattening) is almost non-existent (Solomon et al, 2008).

2.2. Marketing systems of small ruminants in Ethiopia

Ethiopia adopted an Agricultural Development-led Industrialization (ADLI) strategy, which initially focused on food crops and more recently, the country has added market orientation to this strategy (Berhanu *et al.,* 2006). Increased availability and utilization of appropriate technologies, an effective and efficient service delivery system and, sustained demand for the agricultural outputs are critical in such market-oriented agricultural development efforts. However, the infrastructural development is also rather limited which is a major bottleneck, only 17% of the rural population lives within 2 km of an all season road and only 0.4% has access to electricity (World Bank, 2006).

Potential production and market opportunities for small ruminant meat have not been exploited because of scant knowledge of small ruminant demand patterns (Ehui et al., 2000). An important aspect of production and its response to demand and supply is knowledge of markets and marketing systems. To shift production from subsistence to a more commercial outlook is especially important to describe and intervening aspects of marketing infrastructure and facilities, market channels and outlets, buyer preferences for live animals and their meats, major market players, government intervention and role of the private sector (Devendra, 2007).

2.2.1 Structure and performance of small ruminant markets

According to Ayele et al. (2003) the livestock marketing structure of Ethiopia follows a four-tier system. The main actors of the 1st tier are local farmers and rural traders/rural assemblers who transact at farm level. Those small traders from different corners bring their animals to the local market (2ndtier). Traders/wholesalers purchase a few large animals or a fairly large number of small animals for selling to the secondary markets. In the secondary market (3rd tier), both smaller and larger traders operate and traders (wholesalers or retailers) and butchers from terminal markets come to buy animals. In the terminal markets (4th tier), big traders and butcher (wholesalers or retailers) transact larger number of mainly slaughter type animals. Consumers get meat through purchase of the animals from terminal markets and slaughters at home or they may get meat from markets or they may access from butchers who process the meat via abattoirs.

Marketing of sheep and goats is characterized by strong seasonality and subject to fluctuation. Demand and price increases during festival periods. Factors affecting market supply, as measured by the number offered, include high demand during religious festivals, lambing season, quality and quantity of grazing, as well as cash needs for crop inputs and, later, for food purchase before harvesting (EARO, 2000).

2.2.2. Marketing of small ruminant skins

In a production to consumption chain, attention also needs to be given to by-products (skins) from meat production that have considerable economic value, but their collection, processing and use are underestimated (Devendra, 2007). The livestock sub sector in Ethiopia makes a significant contribution to export earnings-second only to coffee largely earned from hides and skins, and leather (Steele, 1998; Zewdu, 1998) with the current development scenario in the country. However, this trend might have changed and up-to-date statistics is

not available. Based on annual off-take rates of 30% for sheep and 36% for goats the potential of sheep skins and goat skins production in 1998/99 is estimated to be 14 and 13 million US$, respectively (ILRI, 2000). With the existing extensive network of traders and sub-agents of hides and skins marketing system in Ethiopia (Zewdu, 1998), the amount of skins actually reaching the central market and, eventually the tanneries, is reduced by about 5-10% for sheep skins and about 30-40% for goat skin (Zewdu, 1998; Ahmed, 2000).

The raw material for the leather industry is mainly derived from local areas of the country where basic amenities for slaughtering (slaughtering, ripping and flaying procedures) and subsequent marketing are either non-existent or limited. Additional sources include slaughter slabs, municipal slaughterhouse, the limited number of export abattoirs, and meat product processing plants (Zewdu, 1998; Ahmed, 2000).

The lacks of price incentive to the primary producer, illegal cross-border trade, and competition from rural tanners are impediments to the improvement of hides and skins collection and quality. Defects including flay-cuts, purification, improper shape, branding, scratches, diseases and parasites, as well as storage and transport conditions, down-grade the quality of the raw material. Subsequently, the leather and leather products are also affected with the ultimate depressing effect on prices obtained locally as well as on the export market (Zewdu, 1998; Ahmed, 2000). The marketing of skins starts at the producer/consumer level and passes through a chain of middlemen until it reaches the tanneries (Ahmed, 2000). The marketing chain is principal from primary producer (rural farmer and pastoralist) to rural markets; to small dealers and agents/collectors; to town traders and shed owners (where the hides and skins are frame-dried and/or wet-salted); to the big traders in Addis Ababa and finally to tanneries (Zewdu, 1998; Ahmed, 2000). The tanneries can be supplied directly from the slaughter premises, regional big traders or Addis Ababa big traders as well. The tanneries process the skin received from their suppliers either in the green (fresh), air-dried or wet salted states to semi-finished or finished stages for both local and exports markets (Ahmed, 2000).

2.3. Constraints of small ruminant productions in Ethiopia

2.3.1 Feed shortage

Lack of adequate feed resources as the main constraint to animal production is more pronounced in the mixed crop-livestock systems, where most of the cultivated areas and high human population are located (Sisay, 2006). The problem of good quality and quantity feeds observed in lowlands where pastureland seems relatively abundant. There is a great seasonal variation of quality and quantity of feed resources in most part of the country. According to Alemayahu (1998), there is excessive supply of feed during the rainy season which is usually followed by a deficit in grazing in the following dry season. On the other hand, the allocation of more land for crop production resulted in availability of crop residues as alternative feed, particularly in the smallholder livestock production system. In central rift valley, feed shortage was reported as one of the limiting factors in small ruminant productivity (Abule, 1998). In these areas where there are few rainy months with limited rainfall of erratic nature feed production for small ruminants is inadequate. However, goats thrive due to their browsing nature. In southern part of the country, although the degree of shortage varies within farming systems/agro-ecologies feed shortage is reported as a major constraint for small ruminant production (Endeshaw, 2007; Tsedeke, 2007; Getahun, 2008).

According to Dhaba et al (2012), the dry season extends from 3- 6 months during which chronic feed shortage occurs (mid January to mid April). Feed shortage is one of the limiting factors of livestock production in the most parts of the country because of seasonal feed availability and poor quality of feeds. Animals have to walk great distances in search of fodder and water during dry seasons. The quality of available forage is low and browse species which provide higher levels of proteins and energy are sparsely grown.

According to Belete (2009) feed shortage in both seasons (dry and wet) limits productivity of small ruminants and it was further worsened due to the absence of awareness and practice of feed conservation techniques. Moreover, forage development has been given less attention in most part of Ethiopia.

According to Yenesew et al. (2013) there was feed shortage problem both during the dry and the rainy seasons. Feed shortage occurs in the dry season from February to May and in the rainy season, from July to end of October as most of the land will be covered by food crops during this season. On average, there was a deficit of 0.7 ton DM feed per household per year. As there was feed shortage problem during the rainy season in the highland areas, some farmers have allocated private grazing lands from their landholdings to their livestock.

2.3.2 Health constraints

Another serious constraint for small ruminant production in Ethiopia has been the high prevalence of diseases and parasites. This causes high mortality amongst kids and lambs, diminishing the benefits of their high reproductive performance (Solomon *et al*., 1995; Yohannes *et al*., 1995; Solomon and Gemeda, 2000; Markos, 2006). Tsetse flies, with the highest infestation in the humid and sub humid zones, are also major problems in these areas. Further losses are caused by abortions and stillbirths (Getahun, 2008; Markos, 2006). Other diseases that have limited the productivity of small ruminants in Ethiopia include pneumonia, Contagious Caprine Pleuropneumonia, Ecthyma, Caseous Lymphadenitis and Brucellosis. Individually, these diseases might not

constitute serious problems, but combinations of them or their occurrence under marginal conditions could result in serious losses (Markos, 2006; Tsedeke, 2007).

According to Belete (2009) diseases and parasites hamper small ruminant production by causing high mortalities especially among suckling animals. Diseases and parasites cause reduction of productive and reproductive performance of small ruminant production.

2.3.3 Water shortage

Water shortage is also reported as limiting factor in most lowland areas to a limited extent in mid altitudes. In eastern, north-eastern and south-eastern part of the country there is critical shortage of water; however, small ruminants are somehow adapted to these agro-ecologies through their physiological adaptation mechanisms.

According to Belete (2009) water shortage and drought were occurs due to relatively smaller rainfall and has shorter rainy seasons in most of goat producing areas of the country.

2.4.4 Marketing constraints

The indigenous sheep and goat are year round breeders and mating is not controlled. However, the current off take rate is very low (Markos, 2006); with an average carcass weight of about 10kg, which is the second lowest amongst Sub-Saharan African countries (FAO, 2004). In Ethiopia, the marketing of livestock and livestock products is underdeveloped. The major problems are the traditional management systems which are not market oriented, underdeveloped marketing systems and poor infrastructure, poor financial facility, and presence of cross-border trade (Azage *et al.,* 2006, Berhanu *et al*., 2007)

3. Conclusion

Small ruminants are integral part of livestock keeping in Sub-Saharan Africa that are mainly kept for immediate cash sources, milk, meat, wool, manure, and saving or risk distribution. Sheep and goats are among the major economically important livestock in Ethiopia. There are about 25 million heads of sheep and 22 million heads of goats in the country, playing an important role in the livelihood of resource-poor farmers. In Ethiopia, sheep and goats account for about 90 % of live animals/meat and 92 % of skin and hide export trade value. In Ethiopia, sheep and goats are maintained in two broad production systems namely mixed, and pastoral and agro-pastoral farming systems. Mixed farming system is predominantly found in highland agro-ecological zones where the climatic factors are conducive for farming of crops and raising livestock. In pastoral and agro–pastoral production systems, which are found in arid and semi-arid agro–ecological zones small ruminants are kept by nearly all pastoralists, often in mixed flocks with sheep, freely grazing or browsing in the rangelands. The livestock marketing structure of Ethiopia follows a four-tier system. These tiers are local farmer and rural traders or assemble local market, secondary market and terminal markets. Small ruminant productions are highly influenced by feed shortage, disease and parasites, water shortage and market fluctuation.

4. Recommendation

Depending on the review I recommend the following things to improve small ruminant production and to increase marketing channel for it.

- It is important to use modern production system with improved technology in urban area and in rural area improve traditional system through feed supplementation and better health care.
- Make market channel to increase marketing of small ruminants and its products.
- Producer should use feed storage systems for dry seasons and cultivate forages through irrigation.

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