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Review: Sheep and Goat Meat Production Constraints in Ethiopia

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ABSTRACT

The annual meat production from small ruminants is relatively small compared to the number of heads and serves as a source of food, manure, raw materials, cash income, and foreign exchange earnings and has social and cultural values. The live stock sub sector contributes about 45% of the agricultural GDP and 16% of the national Gross Domestic Production (GDP) (IGAD, 2010). However, the current levels of contributions of the livestock sector in Ethiopia, is very low. The amount of foreign exchange earnings from livestock and livestock products are also much lower than would be expected, given the size of the livestock population (Berhanu et al., 2006). Marketing and infrastructure that affect the livestock potentials (Addisu, 2015) Abattoirs provide information on the epidemiology of diseases on livestock, to know to what extent the public is exposed to certain zoonotic diseases and estimate the financial losses incurred through condemnation of affected organs and carcasses.

Keywords: *meat, organ, production, sheep, goat, zoonotic, diseases, livestock, market.*

INTRODUCTION

The livestock population of Ethiopia is currently estimated at 57.83 million cattle, 28.89 million sheep, 60.51 million poultry, 29.7 million goats, excluding nomadic areas (CSA, 2015/16). The annual meat production from small ruminants is relatively small compared to the number of heads and serves as a source of food, manure, raw materials, cash income, and foreign exchange earnings and has social and cultural values. The live stock sub sector contributes about 45% of the agricultural GDP and 16% of the national Gross Domestic Production (GDP) (IGAD, 2010). However, the current levels of contributions of the livestock sector in Ethiopia, is very low. The amount of foreign exchange earnings from livestock and livestock products are also much lower than would be expected, given the size of the livestock population (Berhanu *et al.*, 2006). Marketing and infrastructure that affect the livestock potentials (Addisu, 2015) Abattoirs provide information on the epidemiology of diseases on livestock, to know to what extent the public is exposed to certain zoonotic diseases and estimate the financial losses incurred through condemnation of affected organs and carcasses.

Determination of the cause and magnitude of organ and carcass condemnation in these animals at abattoirs and proper evaluation of associated economic loss are needed where economic realities often determine the type and scope of preventive measures to be used. Currently the overall livestock production constraints in Ethiopia are feed shortages, livestock diseases, and low genetic potential of indigenous livestock and lack of marketing infrastructure and water shortages. Abattoirs played an important role in surveillance of various zoonotic diseases, and it allows for all animals passing in to human food chain to be examined for unusual signs, lesions or specific disease (Alton *et al.*, 2010).

The contribution of meat and meat by-products export to GDP is growing but not to its potential

as it is observed in a number of reports. On the other hand, there are more many abattoirs which produce meat for local consumption at different locations with different capacity and facilities but with poor standards. However, the export of meat on sheep and goat origin were not without challenges in Ethiopia.

Meat Production in Ethiopia

According to FAOSTAT (2013), total meat produced in 2012 reached 659,305 tones, indicating a compounded annual growth rate of 2.3 percent between 2000 and 2012. Despite the fact that Ethiopia has the tenth largest livestock population in the world, the production of meat is still low and contributed only about 0.2 percent of the world total meat production, of which most is sheep and goat meat. This ranked Ethiopia the 55th largest meat producing country in the world.

Over View of Sheep and Goat Production System in Ethiopia

In Ethiopia, various sheep production system categories are practiced, namely highland sheep-barley system, mixed crop-livestock system, pastoral and agro-pastoral production system, ranching, and Urban and peri-urban (UPU) sheep production system (Solomon *et al.,* 2008). The mixed crop-livestock production system is based on limited communal and/or private grazing areas and the use of crop residue and stubble. The pastoral production system is based on extensive communal grazing whereas agro-pastoralists are characterized by a combination of both pastoral and mixed crop-livestock production (Asfaw *et al.,* 2011). While contributing significantly to meat production in Ethiopia, present production levels of sheep from such subsistent type of production systems is far below their potential. As a result, meat production is estimated at about 3.5 kg per sheep per year in the population and 10 kg per sheep slaughtered. Both values are very low when compared with those in neighboring countries that have small ruminant population's 50–75% less than Ethiopia Amha (2008). Likewise, The average carcass weight of Ethiopian sheep and goats is 10 kg which is the second lowest in sub Saharan Africa And also according to the report of Solomon (2014) goat production system in Ethiopia similar with sheep production system, is classified in mixed crop-livestock system, pastoral and agro- pastoral system urban and peri-urban production system.

Contribution of Small Ruminant in Ethiopian Economy

Small ruminants, found all over the world, are particularly concentrated in dry areas such as the sub tropics and seasonally dry tropical regions and make a significant contribution to the farm economy in mixed farming systems. In rural areas, which are too dry for cropping, where steppes and ranges are found, they are the main source of income for the population (Rodriquez, 1997, Belete, 2013). According to Hirpa and Abebe (2008) Small ruminant 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 of the country. They represent only 7% of the average total capital invested in livestock in the mixed crop-livestock production system, while they account on average for 40% of the cash income earned by farm households 19% of the total value of subsistence food derived from all livestock production and 25% of total domestic meat consumption. Sheep and goats production is an important activity for smallholders, particularly for resource poor farmers in many parts of Ethiopia.

They are widely reared in a crop-livestock farming systems and are distributed across different agro-ecological zones of the country. They provide their owners with a vast range of products and services such as immediate cash income, meat, milk, skin, manure, risk spreading or management and social functions (Adane and Girma, 2008). According to CSA (2015), the main sheep and goat producing regions are Oromia (34.2%sheep and 27% goats), Amhara (33% sheep and 20% goats), SNNP (16% sheep and 17.5% goats) and Tigray (6.2% sheep and 15% goats). Small ruminants are mainly kept for income generation in many parts of Ethiopia to obtain cash income for household expenses, such as buying grains for household consumption, buying agricultural inputs such as fertilizer and seed and paying the medical and school expenses of household members They are also considered as investment and insurance to

provide cash sources for purchase of farm inputs and house expenses (Urgessa *et al.*, 2012; Zemeda, 2016).

Meat Consumption in Developing Country

Demand for food of animal origin in developing countries is expected to double by the year 2020 (Delgado *et al.*, 1999). Enhanced by increases in urbanization, population and income growth, such demand will create markets for animal products and encourage commercialization of livestock production (Delgado *et al.*, 1999). The extent of this commercialization depends on the consumption of the products by consumers. Meat consumption behavior is the deciding factor for the development of the livestock sector in general and small ruminants in particular (Thammi Raju and Suryanarayana, 2005). Consumption of sufficient meat is a rare extremity in most developing countries. Developed countries consumed a consistent level of 77 kg of meat per capita annually, while developing countries struggled to maintain a diet with only 25 kg of meat per capita annually Ethiopians remained slightly below the meat intake of all low-income countries consuming 9kg per capita annually (Tesfaye, 2007). Beginning from ages of comparable 6.2.and 6 months, respectively male goat and sheep are slaughtered for family consumption.

According to the finding of (Tsedeke, 2007) 7.1 and 7.7 month respectively for kid and lambs are slaughtered for family consumption. And also Meat processing industry is on the rise in Ethiopia even though the sector is still much less than it should be given the resource potential. Currently there are about 15 export slaughter houses including 8 under establishment and more than 29 abattoirs serving the local market (AACCSA, 2015).

Meat Quality and Chemical Composition

Meat quality is important for consumers when it comes to making purchasing decision, the quality is a combination of chemical, microbial and sensorial attributes (Madruga et al., 2009). Meat from goats has gained acceptance mainly because of its lower fat content than beef and lamb meat. Therefore, it requires low-heat and slow cooking to preserve tenderness and juiciness (Madruga et al., 2008).

Compared to sheep, goat meat tends to be less tender, with high shear force values and collagen content (Webb *et al.*, 2005). High pH values (>6.00) for goat muscles compared to the pH values of muscle from other species, have been found in many studies (Webb *et al.*, 2005). Carcass composition is another important aspect of meat quality and is normally assessed by amount of physical dissected tissues (muscle, fat and bones) or chemical analysed constituents i.e. protein, fat, water and ash (Moran and Wood, 1986). Several studies have been conducted to compare chemical composition of sheep and goats at the same slaughter weight, age or under similar feeding management (Santos *et al.*, 2008). It has been found that, goat meat is characterized by low intramuscular fat and higher moisture content (Babiker *et al.*, 1990; Mahgoub and Lodge, 1998) at comparable ages and slaughter weight. Generally key determinant of meat quality is pH the ultimate pH is determined 24 hours post-slaughter, using a pH meter. Good quality meat usually has a pH of 5.4–5.7. The muscle of a living animal has a pH of 7.1. The extent to which pH is lowered after slaughter depends on the amount of glycogen in the muscle prior to the animal's death. And Meat color is an important parameter in meat quality. Color is also greatly affected by muscle pH At a high pH, muscle has a closed structure and, hence, appears dark and the meat tends to be tough. Meat color is also affected by diet (Ameha, 2006).

Small Ruminant Marketing in Ethiopia

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). There is an increase in demand of Ethiopian small ruminants both for local and export markets (Azage *et al.*, 2006).

Some studies showed that smallholder farmers mainly keep small ruminant as a source of income (Getahun, 2008) which may indicate higher demand for small ruminants. 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 (2nd tier). 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.

Status of Small Ruminant Export Market

Preferred small ruminant breeds: According to abattoirs and live animal exporters, the Ethiopian sheep and goats breeds most preferred in the Middle East market are the Black Head Somali and Afar sheep. The Borena/Somali and Afar are among the most preferred goat breeds. The preferences to these breeds may have been due the breeds' lowland background, their adaptation of the buyers to the conformation of the animals and the taste of the meat. However, when there is high demand and the abattoirs are unable to fulfill orders for specific breeds; other breeds of small ruminants are also slaughtered and exported (ESGPIP, 2011).

Operational export abattoirs**:** As of early 2011, there are seven functional export abattoirs involved in exporting small ruminant chilled meat. Two abattoirs (HELIMEX and ELFORA) are located in Debre Zeit, 45km from Addis Abeba and three abattoirs (Luna, Modern and Organic) are located in Modjo, 85 km from Addis Abeba. The ELFORA abattoir in Metehara is located (170 km from Addis Abeba) and the Abergele abattoir is in Mekele, 700 km from Addis Abeba (EMDTI, 2010; ESGPIP, 2011).

Small Ruminant Export

Livestock and livestock products export are among the major earners of foreign exchange for the Ethiopian economy. Of the total number of live animals exported 19% was sheep. In sheep and goat marketing system, 95% of the exported animals were sheep (Hailemariam, 2009). Nearly all Ethiopian live sheep and goat are exported to Saudi Arabia and United Arab emirate. This indicates live animals export from the country lack diversified export destinations. Additionally, Ethiopian market share and absolute exports to the Saudi market have declined in recent years while the share of the competitors increasing. As the country has the largest number of livestock in Africa, It has much to gain from the growing global market for livestock products. The proximity of Ethiopia to the Middle East and their adaptation to the indigenous animals are some of the advantages for the Ethiopian export market (Belachew and Jemberu, 2003). However, the international market for meat has become more competitive and the meat traders have had to adopt improved practices in production, processing and packaging of meat. Market requirements also differ both in sizes of carcass and the level of fatness of the carcass. Thus the legal export of both live animal and processed meat is thus constrained due to shortage created by the illicit export. According to Daniel, (2008) the estimated annual illegal flow of livestock through boundaries reaches as high as 320,000 cattle. This being the potential for export, the actual performance has remained very low, leaving most (55 to 85%) of the projected livestock off take for the unofficial cross-border export and the domestic market.

According to the finding of Legese (2008) a large percentage of the live sheep and goat and meat exported from Ethiopia originates from Afar pastoral area Ethiopia export of meat of which most is chilled sheep and goat carcasses in 2011 was much less than 1% of the total volume of global meat exports, which was estimated at USD 105 billion (USAID, 2013). However, this is the result of the last decade in which time the country has built markets in several African and Middle Eastern countries including, United Arab Emirates, Saudi Arabia, Angola, Egypt, and Bahrain.

Opportunities of Ruminant Meat Export Market from Ethiopia

The following points include opportunities meat export in Ethiopia: Large and small ruminant population with diverse genotypes, proximity to the Middle East market, high Government

support and interest at all levels, the coming in to being of Integrated, agro-industrial Park in Ethiopia at strategic locations to give one stop shopping service and to harmonize the products from the development wing with manufacturing, increasing number of export abattoirs in Ethiopia with big investment opportunities, the beginning of livestock registration and traceability systems at pilot level, the coming into being of Ethiopian Government is the interest to Ethiopian meat observed from Chinese government side and other countries, the presence of meat strategy and Livestock Master Plan studies as guiding documents and the consensus reached among most African countries for intra- African integration which will open the new avenue for trade relationship. The fast and sustainable economic growth which has got a spill over effect for the development of the manufacturing sector including the meat sub-sector.(Eshetie, Hussien, Teshome, & Mekonnen, 2018)

Opportunities of Small Ruminants and Future Prospects Production in Ethiopia

Meat type sheep and goats consume 3% dry matter of their body weight (Alemu, 2008). Sheep and goats have higher survival rates under drought conditions compared to cattle. Moreover, because of their reproductive rates, flock numbers can be restored more rapidly. Sheep and goats are widely adapted to different climates and are found in all production systems. They also have lower feed requirements compared to cattle because of their small body size. This allows easy integration of small ruminants in to different farming systems (Adane and Girma, 2008). Small ruminants have short generation cycles and high reproductive rates, which lead to high production efficiency.

Challenge of Small Ruminant Production in Ethiopia

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. 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 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. According to Belete (2009) water shortage and drought occurs due to relatively smaller rainfall and shorter rainy seasons in most of goat producing areas of the country. The major problems are the traditional management systems which are not market oriented, underdeveloped marketing systems poor infrastructure, poor financial facility and presence of cross-border trades (Berhanu *et al.*, 2007).

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