

Review paper

Current Status, Marketing and Transportation of Beef Cattle in Ethiopia

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Beef production systems in Ethiopia are generally subsistence-oriented and productivity is very low. Accordingly, low productivity of the animals and absence of market-oriented production systems are described as the main constraints of livestock production in the country. In Ethiopian, for the demand of live animals and meat, there are different opportunities like domestic consumption, official exports, and high demand for animals by the export abattoirs. However, various internal and external factors are described under the challenges of beef animal and meat marketing system in Ethiopia and it includes absence of market information system, absence of promotional activities, prevalence of diseases, traditional production systems, illegal export trade, and lack of infrastructure. Transporting animals by dedicated trucks avoid stress, injuries, weight loss, and deterioration of body condition and death associated with poor transport. Moreover, currently, there are no rules and regulations that prohibit transporting animals by ordinary trucks under poor conditions. From this review it has been recommended that major diseases should be controlled, legal channels, market infrastructure, and service facilities along borders and implementation of strategies with neighboring countries for legalizing trade should be developed. Livestock transportation facilities, improved slaughterhouse, livestock resting sites, and storage and quarantine facilities at required sites should be present.

Keywords: Animal welfare, Beef cattle marketing, Transportation, Illegal trade

INTRODUCTION

Ethiopia has a cattle population of about 60.39 million heads and the majorities (98.24%) of them are local breeds, which are found in rural areas under traditional production system (CSA, 2018). Although Ethiopia owns large numbers of cattle population, its potential has not been fully utilized (Negassa et al., 2011). Despite the contribution of livestock to the economy and smallholders' livelihood, the production system is not adequately market-oriented (Eyob and Zewudu, 2016).

In Ethiopia, both legal and illegal marketing systems operate at different magnitudes. Most livestock sales are related to farm households, cash needs, and commercial orientation. However, cattle sales are also induced by fear of theft and insecurity. The current knowledge on

livestock market structure, performance, and price is poor and inadequate for designing policies and institutions to overcome the problems in the marketing system. Besides, the current knowledge on the marketing orientation of livestock in the study area is also poor with a lack of scientific information. In MorenaJiru district, oxen are majorly used for drought power are put into feedlots for a certain period to improve their body condition. Afterward, the oxen are moved to the nearby market and sold at the higher price as demonstrated by the farmers that kept oxen under traditional feedlot conditions for 1-2 years and ultimately sold them for 45-55 thousand in Ethiopian Birr (2566 and 927 US dollar). This study helps to improve the supply of quality fattened animals to the market and aims at improving the marketing systems of fattened cattle so that the buyers and sellers can directly meet (Getachew et al., 2017). The transport to markets is mostly by foot, due to lack of suitable vehicles, and there has been research performed

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on how many animals die and get injured during transport (Bulitta, 2012). Furthermore, transport conditions and level of vibration has a direct impact on the behaviors an animal expresses and the changes of stress hormones (Bulitta et al., 2012). The ranges of behaviors that an animal expresses are good indicators of how the animal copes with certain situations. If a behavioral change is observed, i.e. the animal refuses to move in a high extent, it may indicate what the problem is and wherein the situation improvement is needed (Aradom, 2012). In general, the objective of this paper is to review the current status, marketing, and transportation of beef cattle in Ethiopia.

THE ROLE OF LIVESTOCK PRODUCTION IN ETHIOPIA

Livestock has diverse functions in the livelihood of farmers in the mixed crop-livestock systems in the highlands and pastoralists and agro-pastoralists in the lowlands of Ethiopia. In terms of contribution to the national economy, livestock contributes about 16.5% of the Gross Domestic Product (GDP) and 35.6% of the agricultural GDP and currently the subsector supports and sustains livelihoods for 80% of rural population (Metaferia et al., 2011). Cattle contribute about 80% of GDP that comes from livestock (Tefera, 2011). The meat and livestock sector in Ethiopia contributes 14% to national exports. Livestock also plays an important role in providing export commodities, such as live animals, hides, and skins to earn foreign exchange to the country. On the other hand, draught animals provide power for the cultivation of smallholdings farms and for crop threshing and are also essential modes of transport to take holders and to convey their agricultural products. Livestock also confers a certain degree of security in times of crop failure, as they are a "near-cash" capital stock. Also, livestock provides farmyard manure that is commonly applied to improve soil fertility and also used as a source of energy (CSA, 2014).

Although Ethiopia owns large numbers of cattle population, its potential has not been fully utilized. In both crop-livestock and agro-pastoral systems, animal traction ranked first, followed by milk and reproduction. Meat consumption was about 8 kg per year (Tsegaye and Mengistu, 2013). The total quantity of beef produced in 2004 and 2008 was estimated at 294,336 and 380,000 tons, respectively (Negassa et al., 2011).

Livestock Production Systems in Ethiopia

Highland Crop-livestock Production System

This system is generally found in areas where the altitude ranges between 1500 and 3000 meters above sea level (masl). The area has adequate rainfall and moderate temperature and is thus suitable for grain production. The

integration of crop and livestock is high in most areas. The integration is low in the perennial crop-livestock system (Coffee growing areas) in south Ethiopia where animals are of minor importance (Zewdie, 2010). The estimated rural population in the system is about 55 million, and possibly 80% of cattle (about 40 million heads) in small herds (averaging 2-4 cattle and about 4 sheep and/or goats). Cattle are used primarily for draught power (oxen are 40-50% of the herd) and dairy (dairy cows are 25% of the herd). Meat production is secondary and thought to involve mainly old and unproductive animals such as retired draught oxen. The same author stated that diminishing pasture lands in highland systems, as a result of expanding croplands, and the heavy reliance of livestock on crop residues and aftermath grazing is an important trend (Gebremariam et al., 2013).

Lowland Pastoral Production System

The pastoral population occupies a disproportionately large area of Ethiopia and produces much more than its share of national livestock output (Ameha, 2011). Estimated that pastoralists use 60% of the country's land area, though exact figures of the pastoral livestock population in Ethiopia are unknown (Behnke and Metaferia, 2011). The livestock population of the pastoralists makes up 30% of the nation's cattle, 70% of the goats, sheep, and all camels in the country (Solomon et al., 2014).

In the Ethiopian context, a pastoral system of production is characterized by annual precipitation which is less than 500 mm and altitude below 1500 m.a.s.l. In this production system, livestock are maintained as a primary activity. About 50% of the household's revenue comes from livestock or more than 20% of household food energy is derived directly from livestock or livestock-related activities. Range land is the main land resource (IPMS, 2010).

Beef Cattle Management

Feeding and Nutrition

The main objectives of any livestock industry in the conversion of feeds which are either inedible by man or surplus to is immediate requirement into animal products. Major constituents of feed for farm animals originated from plants. Plant by-products and animal sources such as fish meal and milk of recent another source added into the list is a non-biological source such as urea from nitrogen. However, most feed for livestock may be classified into two major types' roughage and concentrates. Roughages are characterized by a relatively large amount of crude fiber and relatively large but varying quantities of carbohydrates, crude protein, fat and little quantities of water. The nutrient requirement of the beef cattle will depend on the age rate of gains

expected and in the case of cows whether or not they are suckling a calf. The nutritional requirements depend on both the age and the extent to which they are being used for breeding purposes. Generally, the value of any feed in a ration is determined largely by how well the ration is the balance of feeding more of any nutrient than the animal requires is wasteful. Beef cattle require nutrients mainly for three purposes that is for maintenance, growth, production and reproduction (Gebreselassie, 2018).

Health Care of Beef Cattle

The incidence of disease in beef cattle is low when compared with the disease rate of the other important species of livestock. Nevertheless, losses do occur and may be of considerable importance in individual herds. A substantial number of microorganisms cause disease in livestock and are classified as viruses, bacteria, mycoplasma, ricketts, fungus and parasites. The common noticeable disease in beef cattle production are a natural, brucellosis, Foot and mouth disease, bovine tuberculosis, and rabies. The most important future about a notable disease is that owner or the person in charge of an animal suspected as by noticeable disease must immediately report his suspension to the responsible bodies (Gebreselassie, 2018).

Breeding of Beef Cattle

Beef breeds are generally noted for early maturity, high quality. Meat that is seen as a marbled appearance due to the deposition of fat between the muscle fibers, a high percentage of carcass minimum offer. There are two types of breeds. These are Tropical and Temperate breeds. Tropical breeds of cattle are divided into humpless cattle and humped cattle. Zebu, Borena, and seanga cattle are the representative breeds of tropical cattle. Most of the temperate breeds of cattle include breeds for beef purposes. These include a Borden Angus, Birhama, Galloway, polled Herford, Simmental etc. each of the beef breeds do have their own adaptation and characteristics different environment (Gebreselassie, 2018).

Beef Marketing System

Marketing involves all activities involved in the production, flow of goods and services from point of production to consumers. Marketing includes all activities of exchange conducted by producers and middlemen in commerce to satisfy consumer demand. All business activities facilitating the exchange are included in marketing. Livestock marketing involves the sale, purchase or exchange of products such as live animals, and livestock products of milk, meat, skins, wool and hides for cash or goods in kind (Addis, 2017).

Formal Market System

The Marketing of livestock and livestock products is an important activity all over Ethiopia. Livestock are generally traded by 'eye-ball' pricing and weighing livestock is uncommon. Prices are usually fixed by individual bargaining and depend mainly on supply and demand, which is heavily influenced by the season of the year and the occurrence of religious and cultural festivals. Ethiopia's livestock supply is heavily influenced by the severity of the dry season (Tesf, 2016).

The livestock marketing structure follows a four-tier system (Negassa et al., 2011). In which different actors involved in buying and selling of beef cattle in the market system. The main actors of the 1st tier are local farmers and rural traders who transact at farm level with very minimal volume, 1–2 animals per transaction irrespective of species involved. Some traders may specialize in either small or large animals. Those small traders from different corners bring their livestock to the local market (2nd tier). Traders 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 and butchers from terminal markets come to buy animals. In the terminal market (4th tier), big traders and butchers transact larger number of mainly slaughter type animals. From the terminal markets and slaughter houses and slabs, meat reaches consumers through a different channel and a different set of traders/business brokers are major actors in many livestock markets in Ethiopia (Addis, 2017). Acting as intermediary price negotiators between buyer and seller (except in markets where scales are used and prices are fixed) and keeping a commission from the sale of the animal. Although they are often criticized for creating a communication gap between buyer and seller, in many instances brokers are useful intermediaries (Duguma et al., 2012).

Informal Cattle Market

In Ethiopia, both legal and illegal livestock marketing systems are operating at different magnitudes. Small farmer exporters and traders are the major actors in the illegal cattle marketing system while medium- to large scales licensed exporters are dominantly operating in the legal system. Most cattle sales are related to farm households' cash needs and commercial orientation. However, cattle sales are also induced by fear of theft and insecurity (Belete et al., 2010). Illegal cross-border trade is carried out in the eastern, western and southern and northwestern border lands of Ethiopia. Few medium to high-quality female animals are also exported, which are used for slaughtering in Sudan or for live animals re-export to Egypt, Libya and Yemen. Most of the borders are characterized by arid and semi-arid agro-ecologies

Where livestock play a dominant role in household livelihoods. Eastern Ethiopia/Somaliland cross border livestock trade accounts for the largest share among the four borders in terms of the volume and value of export from Ethiopia and port of Berber is the main outlet for livestock exports (Shewangizaw et al., 2014).

Beef Cattle Value Chain

The meat and live animal value chain describes and analyzes the market factors, value chain performance against key metrics, product flow, core actors and their transactional and collaborative relationships, incentives for investment, inputs and services, other supporting actors, enabling environment, and gender concerns. The Ethiopian meat and live animal value chains have developed through time into a series of complex constituents involving various actors that include producers, collectors, small private and cooperative fatteners/feedlots, various (and in some places, numerous) middlemen, livestock trading cooperatives, individual traders and exporters (AGP-LMD, 2013).

Livestock Market Structure

Different studies conducted in the highland of Ethiopia showed that livestock account for 37–87% of total farm cash income of farmers. Despite the contribution of livestock to the economy and to smallholders' livelihood, the production system is not adequately market-oriented. There is little evidence of the strategic production of livestock for marketing except some sales targeted to traditional Ethiopian festivals. The primary reason for selling livestock is to generate income to meet unforeseen expenses. Sales of live animals are taken as a last resort and large ruminants are generally sold when they are old, culled, or barren. In the highlands, large numbers of cattle are kept to supply draft power for crop production whereas prestige and social security are the predominant factors in the lowland pastoral (Eyob and Zewudu, 2016).

The export market is relatively old but highly variable depending on the production condition of the country, change in consumer preferences and greater demand for high-quality products with adequate guarantees of food safety. The livestock market is structured so that the marketable livestock from the major producing areas reaches to the final consumer or end-user passing through complex channels along the supply chains involving various actors in livestock product marketing, broadly classified as: livestock producers, traders, processors, retailers, food service providers, and consumers. Private and public livestock inputs and service providers are other important market actors (Birhanu, 2016). Livestock marketing operations are generally small-scale family businesses. The live animals are either transported in trucks or herded over long

distances to feedlot operators, export abattoirs, or major markets. These final market destinations are far away from supply sources, and the transportation costs associated with getting live animals to markets can result in significant weight loss and even death; stock routes are characterized by lack of adequate feed, water, and resting places. It can be argued that long supply channels lead to high costs and reduce the competitiveness of live animal or meat exports (Eyob and Zewudu, 2016).

Animal Welfare

Animal welfare is a worldwide issue that is under more focus now than ever before. The western countries outline strict animal welfare regulations and organizations are fighting for animals' rights in a society where economics is often deemed the most important factor. In Ethiopia, there are no animal welfare regulations or any constitution that protects animals from suffering. However, there are six or seven organizations that work for animals' welfare, and the first was established as early as 1954. Still, they have not yet accomplished the main objectives of their work to implement animal welfare, but it is under progress and hopefully ready within near future (Bekele, 2009). There are a variety of aspects affecting an animal's welfare and therefore a unified definition of the desirable welfare state has not yet been adopted. However, the term animal welfare can be looked at from three different perspectives are: The biological state: describes welfare of an individual as good when the animal is healthy and grows and reproduces well, The affective state: stresses the potential for animals to suffer or to have positive experiences, The natural state: explains differences between captive animals and the wild state where they origin from, and to what extent they can express natural behaviors (Mellor et al., 2009).

From the animals' point of view, the most important aspect is how it manages to cope with environmental stressors. When behavioral and physiological stress responses are let down to maintain homeostasis, the animal will likely express chronic stress. Symptoms of this can be injurious behavior to themselves e.g. self-mutilation or chronic activation of the autonomic nervous system. This will result in lowered animal welfare. However, there is still a lack of guidelines and regulations for animal welfare in Ethiopia (Bekele, 2009). The five freedoms were outlined in the 1970s in England and have since then been a fundamental basis for animal welfare all over the world are Freedom from Hunger and Thirst: by providing constant access to freshwater and a diet to maintain full health and vigor, Freedom from Discomfort: by providing an appropriate environment including shelter and a comfortable resting area, Freedom from pain, injury or disease: by prevention or rapid diagnosis and treatment, freedom to express normal behavior: by providing sufficient space, proper facilities and company of the animal's kind, freedom from fear and distress: by

ensuring conditions and treatment which avoid mental suffering (FAWC, 2011).

Animal Transport

The mixing of cattle during transport may cause them to fight with each other, which in turn is an important behavioral measure of welfare during transport. Similarly, cattle that were regrouped on a stationary vehicle expressed higher frequencies of exploratory behaviors, sexual behavior, and were head-butting each other more as compared to resting values (Josefine, 2013). The mortality occurrences during transport can be used to give information about welfare during transport. Broken bones are categorized as extreme injuries and are mostly caused by personnel without sufficient training expertise, who intend to move animals but do it in an unnecessarily cruel way. Although measurements on live animals are good indicators of the transport situation, information on dead animals is needed to make improvements. Bruising and lesions can be scored to downgrade carcasses, and meat quality problems such as dark, firm, dry (DFD) meat can be detected. The different behaviors that an animal expresses are good indicators of how the animal is coping with the situation. If behaviors change, i.e. animal refuses to move, or animal freezes or vocalize, it may indicate where in the situation there is a problem. Apart from behavioral measurements, physiological measurements are usually performed. This involves measuring heart rate, body temperature and hormonal changes (Josefine, 2013).

This can be used for indicating poor welfare and can be used to prevent problems associated with transport (EFSA, 2004). Furthermore, injuries on animals are shown to increase if the vehicle is poorly constructed or simply if they are hit by the handler. Some factors that influence animal welfare during handling and transport are: The attitudes of stakeholders and their driving skills, laws and codes of practice, genetic differences between breeds, and different selection pressure, The design of the vehicle for transport and design of equipment used for loading, The stocking density of animals and mixing of unfamiliar animals, payment of persons working with animals, The actual physical condition such as temperature, humidity and risk of disease transmission, the methods used during handling, loading and unloading (Aradom, 2012).

The transportation of indigenous *B. Indicus* breeds during the hot-dry season in Nigeria was associated with multiple stress factors. These were shown to affect the health, productivity and market value of animals. Additionally, this study emphasized that the different levels of expressing behaviors were a combination of breed, production and management of animals and finally, it has been shown that transport conditions, level of vibration on the vehicle, behaviors the animal

expresses and changes of stress hormones, contradict animal welfare to a great extent (Bulitta, 2012).

Beef Cattle Transport in Ethiopia

The most common way of transporting animals in Africa is by foot since there is a great lack of vehicles with sufficient capacity and walking animals by foot often leads to injured, dead or stolen animals, which were investigated by Bulitta (2012) who found that 7.6% of animals died, 6-9% got injured and 2.8% were stolen. Furthermore, he found that lameness and injuries such as swelling of legs commonly occur. This has also been proven to be a problem when animals are transported by vehicle and also alludes to the problems which accompany a lack of rest, water and feed (Aradom, 2012).

Large proportion of the livestock reach markets by trekking all, thus, the supply of live animals from the producers to the different categories of markets (primary, secondary and terminal markets) and slaughter houses in the country is mainly carried out either by trekking or trucking or combination of both. Trekking is used widely to take live animals from the producers to the primary and secondary markets. On the other hand, trucking is largely used to transport animals from the secondary to terminal markets; from secondary markets to feed lots; and from feed lots to the port for export. Both methods of transporting live animals and associated constraints (Gebremariam et al., 2013).

CONCLUSIONS

Despite the contribution of livestock to the economy and to smallholders' livelihood, the production system is not sufficient. The most common transport system was by foot to markets. The time of transport varied considerably dependent on origin and distance to the markets the stakeholders who work on markets and with transport of animals need education, and animal welfare legislation in Ethiopia needs to be established and animal welfare at markets in Ethiopia is poor and that transport conditions are insufficient. Suggested improvement for the future are the education of stakeholders, establishment of animal welfare regulations, and use of appropriate vehicles when transporting animals and lastly to make sure that animals will get feed, water and rest during transportation. All cattle fattening systems in Ethiopia are output of the farmers from beef cattle per head is low, so in general, this system must be prove the behavioral and adaptability of the farmers change through teaching and seeing new technology from the neighbor area and foreign countries.

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