
BEEF CATTLE FATTENING PRACTICES, CONSTRAINTS AND FUTURE POTENTIALS IN ETHIOPIA: A REVIEW

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ABSTRACT

Cattle are one of the main livestock production components in Ethiopia wherein 70 % of its populations are engaging in traditional cattle production. Next to coffee export, cattle substantially contribute to Ethiopian foreign currency exchanges. The objectives of this review were to synthesize available information on recent cattle fattening practices, challenges and future perspective in Ethiopia. Various methods of fattening practices, feeding systems and feed treatments are conducted by the farmers to feed cattle, reduce the length of fattening period and boost profits. The review identified that feed shortage, shortage of initial working capital, disease and output market and shortage of land as the major constraints of cattle fattening in Ethiopia ranked 1st, 2nd, 3rd and 4th respectively. The political reforms and peaceful relationships among the neighboring and Middle East countries fostering market accessibility for fattened cattle. The use of mobile drone technology to supply vaccines and establishment of agro-processing industries could also significantly shift the traditional fattening to a market-oriented commercial fattening system and enhance the production capacity of the meat industry.

Keywords: Beef cattle, Fattening practice, Constraints, Potentials, Ethiopia

INTRODUCTION

In Ethiopia, livestock provides multiple functions including as source of quality food and as industrial raw materials (FAO, 2015). The livestock sector in Ethiopia play significant contribution to the economy accounting for 45 % of the agricultural gross domestic product, 18.7 % of the national gross domestic product and between 16 – 19 % to the total foreign exchange earnings of the country (Eshetie *et al.*, 2018). However, the livestock sector contribution to the country economy remains disproportionately low due to low productivity of the animals. The estimated average live weight of cattle is 250 kg with 14 % offtake rates and carcass weight is 110 kg with 44 % dressing percentage due to multifaceted challenges related to production, husbandry and marketing (MARD, 2010; AGPLMD, 2013).

The cattle population in Ethiopia was estimated to be 59.5 million among which 99 %

were local cattle and 1 % were cross breeds (CSA, 2017). Cattle are a very common asset in Ethiopian households and 70 % of the total population depend on cattle for their livelihoods and the country produces about 1 million tons of beef per year valued at USD 5.1 billion (ASL, 2018). The annual contribution of ruminants to meat production in Ethiopia was estimated to be over 3.2 million tones representing over 72 % of the total meat production (Issack *et al.*, 2017), from which beef accounted for over 70 % of the total red meat production and over 50 % of the total meat output in Sub-Saharan Africa (Wabalo and Anja, 2018). According to Bachewe *et al.* (2017) in Ethiopia the consumption expenditure on Animal Source Foods (ASF) increased by 13.4 % in 2011 from which beef accounted for 42 %. Bachewe *et al.* (2017) noted that the value of exported of meat products increased from 18 million USD in 2005 to 107 million USD in 2015 due to the increase in international livestock trade.

Beef cattle fattening is a common practice in Ethiopia and special attention was given by the government to boost red meat supply through cattle fattening (Agmas and Adujna, 2018). Accordingly, cattle fattening is an increasing business at different scales in Ethiopia. Various research activities in cattle fattening have been conducted over the years to fill the production gaps, identify the challenges and opportunities of cattle fattening and support needs of the sector. Therefore, there is a need to review and avail information on cattle fattening for those who wish to engage on small or large scale cattle fattening as well as on commercial feedlot enterprises in Ethiopia. Therefore, this review aimed at reviewing the existing cattle fattening practices; identify current challenges and future opportunities to improve the existing traditional beef cattle fattening system and shift to commercial feedlot system.

MATERIALS AND METHODS

A comprehensive internet search of literature on small or large scale cattle fattening as well as on commercial feedlot enterprises in Ethiopia was undertaken using Google Search. Literatures recovered were analyzed in pros and relevant cited tables and figures adopted.

RESULTS AND DISCUSSION

Overview of Meat Production and Consumption in Ethiopia: Cattle meat production in Ethiopia increased from the year 2002 (0.35 million metric tons) to 2007 (0.36 million metric tons) but there has been a slight decrease between the year 2007 – 2012 from 0.36 to 0.34 million metric tons (Lam *et al.*, 2016) while in Brazil 7.14, 9.30 and 9.31 million metric tons and in China 4.85, 5.85 and 6.31 million metric tons of cattle meat was produced by the year 2002, 2007 and 2012 respectively.

Cattle, goats, sheep, camel and poultry are used as the resource base for meat production in Ethiopia. Pork meat is not commonly eaten by the people and camel meat consumption is most common around Afar and Somali regional state of the country where

camel is one of the main animal kept by the local people. This constrain is because of various religious, cultural believes and economic status of the people (Seleshe *et al.*, 2014). Sheep are widely common and are high in demand and consumed by society especially during holidays and festivals (Legese *et al.*, 2014).

According to Desiere *et al.* (2018), the per capita meat consumption of Ethiopians was 9 kg/year/individual. Similarly, Eshetie *et al.* (2018) reported per capita meat consumption of 8.4 kg as the least next to Eritrea (6.7 kg) as compared to Kenya (16.1 kg), Sudan (19.7 kg), Angola (20.2 kg), Congo (22 kg), Central African Republic (31.7 kg) and Niger (34.3 kg). Recently Ritchie (2019) reported that the average annual meat consumption of Ethiopian was 7.0 kg, while that of Rwandans and Nigerians were 8.0 kg and 9.0 kg respectively. This is 10 times less than the average European meat consumption of between 80 and 90 kg of meat/person/year which indicated that meat consumption is still a luxury in low-income countries like Ethiopia, while USA, Australia and Argentina are the top meat eating countries in the world. In the year between 2013 – 2028 domestic meat production is expected to cover only 54 % of the meat required for domestic consumption and still there will be a gap of about 46 % of meat between production and consumer demand (Shapiro *et al.*, 2015).

According to CSA (2015), 52.93 % of beef and 90.04 % of mutton/goat meat were consumed in the household, and 33.18 % and 3.42 % were sold for export in the country. Bachewe *et al.* (2018) showed that the net commercial offtake rate of cattle was 3.3 % which was less than goats (9.7 %) and sheep (7.7 %). The volume of meat and meat products exported from Ethiopia is shown in Figure 1 covers between the year 2013/14 (3742.98 million metric tons) to the 2nd quarter of 2017/18 (4428.50 million metric tons) (NBE, 2018).

In Ethiopia the per capita consumption for beef, pork, poultry and sheep was 2.4, 0, 0.5 and 1.2 kg, respectively (Table 1). These values are far below the average of most African countries.

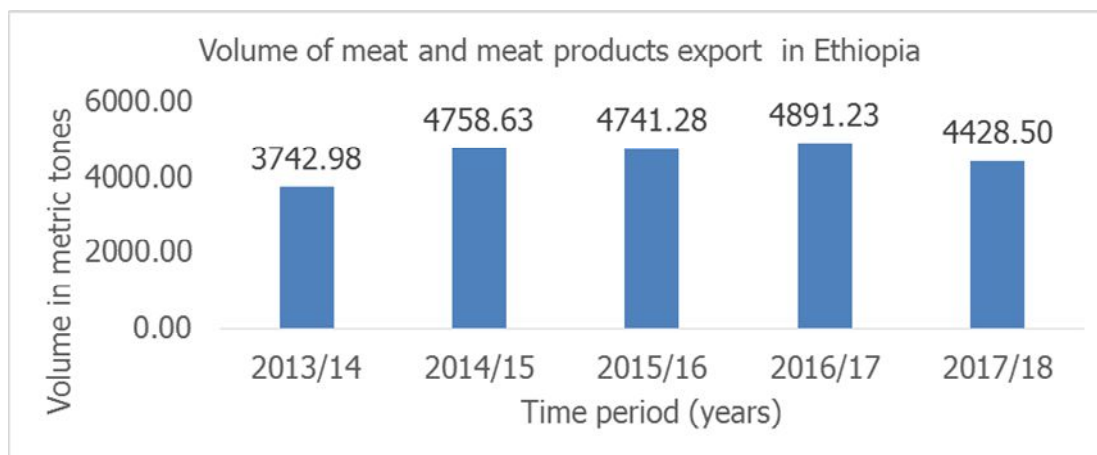


Figure 1: The volume of meat and meat products export between the year 2013/14 – 2017/18. Source: NBE (2018)

Table 1: Consumption of beef and other livestock meat for African countries (kg/capita, 2017)

Country/Location	Beef and Veal	Pork Meat	Poultry meat	Sheep meat
Algeria	3.9	0.1	6.3	7.1
Egypt	9.3	0.2	9.2	1.3
Ethiopia	2.4	0.0	0.5	1.2
Ghana	0.8	0.8	6.1	1.5
Nigeria	1.6	1.1	0.9	2.3
South Africa	11.0	3.4	32.8	3.0
Zambia	9.0	1.5	2.6	0.5

Source: OECD/FAO (2018)

Beef is popular both in the highland and lowland areas of Ethiopia and consumption occurs according to availability and will increase gradually over the next ten years and is expected to be 8 % and 21% higher than in developed and developing countries respectively by 2027. In per capita terms, beef consumption in the developing world remains low relative to developed countries, at about 1/3rd in volume terms (OECD/FAO, 2018).

Between 2010 – 2050, the consumption of beef was projected at 53 % with 1.07 % annual growth rate was higher than for other livestock products (ASL, 2017). Low per capita income of people (29 %) still leaving below 2 USD/day, high domestic meat prices (recently 10 – 11 USD/kg depending on quality), very limited number of commercial feedlots, religion (43 % of the population is Christian orthodox fasting for around 200 days/year), consideration of ownership of too many cattle as a status symbol among the pastoralist community (Lam *et al.*, 2016; ASL, 2017) are the main reasons for low level of meat consumption in Ethiopia.

Beef Cattle Production and Population in Ethiopia:

There is no specialized beef cattle breeds and production systems in Ethiopia like that of commercial/intensive cow-calf, stocker and finisher beef production systems found in USA, Australia, Canada and other European countries (Agus and Widi, 2018). In Ethiopia cattle breeds are multipurpose type with majority found in the mixed crop-livestock production system (Gebremariam *et al.*, 2013). The commercial feedlot system, peri-urban small-scale fattening, backyard fattening in the mixed crop-livestock system, the pastoral/agro-pastoral livestock production system were the existing production systems identified based on the level of input, source of animal, feed resources and marketing conditions (Gebremariam *et al.*, 2013; CSA, 2017). Grazing is the most common source of feed with limited use of crop residues in the agro-pastoral production system in the lowlands and crop residues are the most important source of animal feed in the mixed crop-livestock system in the highlands (Reddy and Kanna, 2015).

According to CSA (2017) the population of cattle in Ethiopia were in the age group of < 6 months (4.53 %), 6 months – 1 year (3.93 %), 1 – 3 years (7.44 %), 3 – 10 years (27.48 %), > 10 years (1.14 %) for males and < 6 months (5.07 %), 6 months – 1 year (4.52 %), 1 – 3 years (9.31 %), 3 – 10 years (35.47 %), > 10 years (1.12 %) for females in Ethiopia.

Beef Cattle Fattening Practices in Ethiopia

Source and selection experience for fattening of cattle: There are various cattle fattening practices conducted in different parts of Ethiopia based on the source of animals, age, breed, sex/type (Table 2).

Table 2: Cattle fattening practices from various parts of Ethiopia

Sources of fattening cattle	Variables		Location/region	Source
	Age groups	Sex/type		
Local farmers and Brokers	Medium and old	Male	Mekelle, Tigray	(Gebremichael <i>et al.</i> , 2017)
Farm gate and purchased from local producers	Old	Oxen, old cow and Bull	Wollega, Oromia	(Beyene and Fufi, 2017)
Farm gate	Mature and much older animals	Majority male and less female	Central, Southern	(Wolde <i>et al.</i> , 2014)
Farm-gate, primary and secondary market	old and unproductive oxen	Bull and steer (male)	Somali	(Fikru, 2015)
Farm gate	Mature and old	Majority male and less female	North Gondar Zone, Amhara	(Mekuria, 2016)
Farm gate	Young, mature and old	-	Wolaita Zone, Sothern	(Wabalo and Anja, 2018)
local market and farm gate	Old and matured oxen, young bull and culled cow	Majority of castrated male and less non-castrated	Gamo Gofa Zone, Southern	(Guyo, 2016)
Farm gate and from market	culled oxen	Culled oxen (castrated) and unproductive animals	East Gojjam Zone, Amhara	(Belay, 2009)

NB: Young (2-4 years' age), Mature (5-7 years' age), Old (> 7 years' age); fattening cattle were local cattle breed

Smallholder and commercial producers in the country used multiple selection criteria for fattening of cattle, which includes breed type, physical appearance (frame size), age, health and initial price, body condition, coat color and horn size as the major ones. A study conducted by Teklebrhan and Urge (2013) in East Shoa Zone of Oromia region, cattle fattening operators purchased the animals by the type of breed, frame size, age, health and initial price. While a study by Amistu *et al.* (2016) in Hadiya Zone in Southern region, the cattle selected for fattening purpose were based on health condition, physical appearance, age, sex and color. Guyo (2016) in Gamo Gofa Zone, southern region stated that the selection criteria of fattening cattle were frame size, health, body condition, coat color and price. A study

conducted by Ahmed *et al.* (2017) in Dessie and Kombolcha towns, Amhara region reported that the peri-urban cattle fatteners considered the age group of cattle (about 4 ½ years old cattle are selected). In north Gondar zone, Amhara region, coat color and castration were the primary and secondary selection criteria for cattle fattening (Mekuria, 2016). Anteneh *et al.* (2010) reported that mature animals were used for fattening but color was not used as selection criteria.

Cycle and duration of cattle fattening practice:

The duration and cycle of cattle fattening vary depending on the quality and availability of feed, management system, breed type, body condition as well as seasonal fluctuations of market demand due to religious and other holidays in the year. According to the

study conducted by Beyene and Fufi (2017) in Guduru and Hababo Guduru districts of Oromia region, the majority of the duration of fattening were 3 – 4 months (September – December) while, 5 – 6 months (December – May) were less in percentage. Wabalo and Anja (2018) in Damot Pullassa district, Southern region showed that the length of fattening period <3 month accounted for 30 %, 3 – 6 month accounted for 50 % and >6 month accounted for 20 %. Guyo (2016) indicated that body condition of the animals was the most common criteria used to decide the length of fattening period and it took 3, 5 and 6 months in the mid altitude, lowland and highland agro-ecologies, respectively. Cycle of fattening animals was once per year (highland), twice per year (lowland) and thrice per year (mid-altitude). The variation of fattening period and cycle in the year were associated with the availability of feed, supplements used, climate situation, market demand and body condition of the animals at the initial stage before starting the fattening business.

According to Taye and Lemma (2009) in Wolayta zone, southern region, majority of the producers fatten two times per year, one and three times per year was also practiced in the area. Teshager et al. (2013) in Ilu Aba Bora Zone, Oromia region showed that cattle were fattened for duration of 4 – 9 months, 10 – 15 months and > 16 months, while the frequency of fattening during the year was thrice, twice and once respectively.

Supporting findings by Gebremichael et al. (2017) in Mekelle, Tigray region showed that the age of cattle used for fattening were young (1 – 2 years), medium (3 – 4 years) and old (>4 years). In addition, the sources of cattle for fattening were mostly from local farmers than from brokers. The source of cattle for fattening in Dessie and Kombolcha towns were mostly from their own farm and few cattle were bought from nearby markets. This report was similar to the report of Fikru (2015) for sources of cattle for fattening in Somali region.

Potential feed resources and feeding practice for cattle fattening: The availability of feedstuff is highly related with the agro-

ecology, location, season, the level of fattening enterprise and land availability, the type of farming system and other related factors. Grazing and crop residues are the major feed resources and improved feed was the least available feed resources for livestock production in Ethiopia (Figure 2).

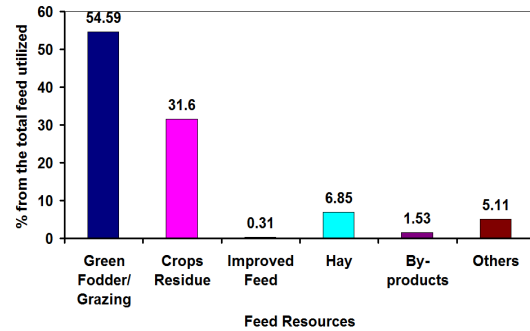


Figure 2: Livestock feed resources and proportion in Ethiopia (CSA, 2017)

According to Dadi et al. (2017) in East Shoa Zone, cotton seed cake, wheat bran, maize flour and noug seed cake were used as a feedstuff for small and large scale commercial feedlots. While a study by Amistu et al. (2016) in Lemmo district, in southern region, natural pasture, crop residue from maize stover and teff straw, stalker and improved cultivated forage crops, and maize grain were the main feed resources for cattle fattening. Cut-and-carry grass feeding system and grazing were the major feeding practices used by the producers in the district. Worku et al. (2016) in Jimma Zone reported that grazing land and crop residues were the mostly available feed resources for fattening cattle. Chopping, wetting, grinding, boiling and roasting were also practiced for feed processing and feeding of cattle in Jimma Zone. Alemayehu et al. (2016) in South Omo reported that crop residue, hay, false banana, local beverage byproducts were the major feed sources used by farmers for fattening cattle which was in lined with the findings of Anteneh et al. (2010) who reported that communal grazing, crop residues of chickpea, lentil, rice, beans, field pea, finger millet and crop aftermath were the common feed resources for cattle fattening in Fogera district, Amhara region.

A recent study by Wabalo and Anja (2018) in Damot Pullassa district, reported that

green and dry maize were used as supplementary feed along with boiled maize and haricot bean, green and dry haricot bean, wheat bran and root and tuber of crops. Tolera (2012) reported that crop residues, cut-and-carry grass, boiled maize, haricot bean grain, thinning or whole crop maize, sweet potato vines, root tuber and household wastes were the major feed resources used for backyard cattle fattening in Wolayta zone. According to Fikru (2015) in Harshin district, natural pasture, grain by-product and crop residues were the major feeds used in fattening cattle.

According to Wolde *et al.* (2014) in central southern region, crop residues and natural pasture were the major feed resources used as basal diet for fattening cattle. This report was in agreement with the study of Tonamo (2016) who reviewed literatures on the use of natural pasture, crop residue, and crop aftermath as the major feed resources in Ethiopia. Also whole or plant parts, enset (false banana), sweet potato vine, root tuber, sugarcane, mineral soils, coffee residue, beverages and improved feeds especially napier grass, concentrate and wheat bran were the common supplementary feeds for cattle.

This review was supported by Worku *et al.* (2016) in Jimma zone, which reported that grazing land and crop residues were the major feed resources used to fatten cattle. Salt,

kitchen waste and coffee by-products were used as a supplementary feed for cattle. Bean straw, noug seed cake, chickpea, wheat bran, wheat straw and teff straw were the feed sources used for fattening cattle in North Gondar Zone (Mekuria, 2016). A recent study by Tadesse *et al.* (2017) in Western Hararghe, observed that thinning of maize, sorghum crops, local grass and weeds were the dominant feed resources used in the wet season and maize and sorghum stover, teff and barely straw and grass hay were the major feed resources available in the dry season. In this area, the cattle fattening system is called the Hararghe highland system and cattle farmers practiced majorly the cut-and-carry grass feeding. They also used various treatment methods to improve the intake and digestibility of feeds for animals such as chopping of green stalk and dried stover of maize and sorghum, wetting the chopped stover with salty water, wilting leguminous crops, cooking cereal seeds, mixing agro-industrial by-products with straw and other indigenous practices were common in these areas and in Jimma zone as mentioned by Duguma and Janssens (2016).

Current Challenges for Cattle Fattening in Ethiopia: Various constraints were identified and ranked by different scholars in the country as shown in Table 3.

Table 3: Identified constraints of beef cattle fattening practice in different parts of the country

Challenges	Rank	Location (zone/region)	Source
Feed scarcity	1	East shoa Zone, Oromia	(Dadi <i>et al.</i> , 2017)
Market fluctuation	2		
Animal Health	3		
Shortage of feed	1	Hadiya Zone, Southern	(Amistu <i>et al.</i> , 2016)
Lack of good management	2		
Scarcity of land and drought	3		
Shortage of feed	1	Mekelle, Tigray	(Gebremichael <i>et al.</i> , 2017)
Shortage of land	2		
Market problem	3		
Disease and absence of veterinary service	1	Somali	(Fikru, 2015)
Road for transportation	2		
Poor market information	3		
Feed shortage	1	Jimma Zone, Oromia	(Worku <i>et al.</i> , 2016)
Initial capital	2		
Disease	3		
Low market price of the product	1	South Omo Zone, Southern	(Alemayehu <i>et al.</i> , 2016)
High price of feeds	2		

Diseases and parasites	3		
Scarcity of feed	1	Wolaita Zone, Southern	(Wabalo and Anja, 2018)
Shortage land	2		
Lack of proper selecting of fattening animal	3		
Lack of initial capital	1	Central Zones, southern	(Wolde <i>et al.</i> , 2014)
Lack of credit provision	2		
lack of quality and quantity feed	3		
Lack of initial capital	1	North Gondar Zone, Amhara	(Mekuria, 2016)
Shortage of feed and water	2		
Insufficient land	3		

Shortage of feed, initial capital for fattening investment, animal health and marketing problems were the major issues analyzed by the author based on the findings of the researchers. Similar findings by Belay and Negesse (2018) in Burie Zuria District, North Western Ethiopia ranked feed, limited knowledge and poor genetic potential of cattle as 1st, 2nd and 3rd respectively as the major challenges for cattle fattening in Ethiopia. This review was similar to report in an earlier study by Gobena (2017) who stated that feed shortage, diseases and parasites, drought and shortage of grazing land were the major constraints challenging cattle farmers in Ethiopia. A similar review by Asresie and Zemedu (2015) implicated low supply of feed and poor quality of feed resources as the main critical problems challenging livestock producers in Ethiopia.

Potentials and Prospects of Cattle Fattening in Ethiopia: The high demand of animal products and the establishment of various agro-processing plants and huge industrial parks for processing and sale of processed livestock products, the expansion of urbanization, peaceful political relationship among east African countries and middle eastern countries will open an excellent market opportunity (NEPAD, 2013; Wolde *et al.*, 2014; Weldesilassie *et al.*, 2017). Especially with the two-decade-long cold war between Ethiopia and Eritrea ending and signing of a peace agreement in July 2018 and the reopening of trade ties (IFPRI, 2019) will have a positive economic impacts. The Single African Air Transport Market System (Agenda 2063 Flagship Project) among 21 African countries (SAATM, 2017) and the new railway transport system will open new doors to solve the

transport and marketing problems of livestock and their products across African countries (Olingo, 2015).

Recently, drones were launched by Ministry of Innovation and Technology, Ethiopia to address vaccines delivery problems to areas which lacks infrastructure and will solve the delivery of medications to these areas and thus reduce animal disease (Tesfaye, 2018). Investment opportunities primarily given by the government of Ethiopia for foreign investors from different countries, the establishment of processing, storage and packing plants and compound feed producing companies are important for future growth of the beef industry (ATA, 2016). Very suitable agro-ecologies for various livestock breeds and the ongoing roadmap on red meat production by the government starting from breed improvement and multiplication projects is also another opportunity to maximize the productive potential of indigenous cattle breeds through identifying quality meat traits (Shapiro *et al.*, 2017). Similarly, there are 13 sugar factories established in the country (ESC, 2018) which can also produce by-products such as molasses for supplementation and as livestock feed to solve the feed problems in the country.

Conclusion: This review assessed the recent cattle fattening practices, current constraints, potentials and prospects of cattle fattening in Ethiopia. The majority of the sources of fattening cattle were from the farm gate with a minimum number from the local producers and markets. The age of the animals was > 6 years and majority of them were old oxen and very less number of culled/unproductive/ females. The length of fattening period was between the range of 4 – 9 months with a cycle of fattening

duration was between 1 – 3 times within a year. Feed, initial capital, disease and market, land shortage were the major constraints for cattle fattening. Peaceful relationship with neighboring countries, the expansion of agro-processing industries, sugar factories, agricultural research institutions and mobile drone technology are the promising opportunities that can overcome the existing problems.

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