

Economic Profitability and Constraints of Commercial Beef Cattle Fattening in East Shewa Oromia Region, Ethiopia

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Abstract: This study was conducted in the Adama, Lome, and Adami-Tulu districts of the East Shoa Zone of Oromia Regional State to assess the economic profitability and constraints of commercial beef cattle fattening. A questionnaire-based formal survey was conducted using a cross-sectional survey by interviewing 45 feedlot operators purposively selected from the three districts. Quantitative and qualitative data on beef cattle fattening systems were obtained. The average total weight gain and average daily weight gain of animals recorded in 90 days of fattening was significantly higher ($P < 0.05$) for large (97.7 ± 1.16 ; 1.09 ± 0.01) and medium (97.58 ± 1.16 ; 1.09 ± 0.01) than for small-scale (91.04 ± 1.169 kg; 1.01 ± 0.01 kg) commercial fattening. Whereas, the average weight gain and daily weight gain recorded across the phase of fattening was significantly higher ($P < 0.001$) for initial (33.18 ± 0.44 ; 1.11 ± 0.01) and middle (31.79 ± 0.44 ; 1.06 ± 0.01) phase as compared to small scale (30.46 ± 0.44 kg; 1.02 ± 0.01 kg) commercial fattening. The average weight gain recorded was significantly ($P < 0.001$) higher in the initial phase (1.11 kg /day) than in the middle (1.06 kg /day) and final phase (1.02 kg/day) phases of fattening. The highest profit was made for large-scale commercial fattening compared to medium- and small-scale commercial fattening. However, the highest unit profit was made for medium-scale commercial fattening compared to small- and large-scale commercial fattening. It was concluded that large-scale feedlot operators are better at cattle management and earning profits than medium- and small-scale feedlot operators. Therefore, policies aimed at increasing access to modern inputs and markets, developing and improving infrastructure, product upgrading by farmers, and investment in abattoirs are crucial, and cooperative development is recommended to accelerate beef cattle development.

Keywords: Beef Cattle, Commercial, Economic Profitability, Ethiopia

1. Introduction

Ethiopia is endowed with abundant livestock resources of varied and diversified nature reared across several agro-ecologies [1]. Farm animals are an integral part of the country's agricultural system and are reared across different agro-ecologies of the country [2]. It contributed approximately 17 percent of the gross domestic product (GDP) of Ethiopia and 39 percent of the agricultural GDP in 2013 [3]. However, livestock management is often inefficient in Ethiopia, with low and unreliable returns that leave many livestock-producing households in poverty [4]. In Ethiopia, livestock provides multiple functions, including as a source of quality food and industrial raw [5]. The livestock sector in Ethiopia plays a significant role in the economy, accounting for 45 % of the agricultural gross domestic product, 18.7% of

the national gross domestic product, and 16 – 19% of the country's total foreign exchange earnings [6].

Cost-benefit analyses assess the financial and economic desirability of investments, and may be ex ante or ex post. Ex ante analyses are prepared in the design or pre-financing stages of investments and are important for the efficient allocation of government, development assistance organizations, and private sector resources. They can improve the design and implementation of support activities and help convince livestock producers understand the value of adopting improved practices. Ex-post analyses are useful in monitoring and evaluation and can indicate whether the original assumptions are valid and identify the effects of changing conditions and risks. This information can guide mid-course corrections during implementation and inform decisions on expansion and replication efforts [7].

Sankhayan, P. L. [8] asserted that agricultural production function is the principles for allocation of scarce resources (Inputs) such as land, labour, capital and management which have alternative uses so as to achieve predefined objectives such as profit maximization, satisfaction or combination of both at micro and macro levels.

Cattle fattening was able to earn additional income and create employment for farm household members, especially unemployed family members such as housewives. [9, 10] Cattle fattening entrepreneur should be enlighten on how to access credit in order to increase their capital base to expand their scale of production. Facilitate access to financing for cattle farmers by strengthening savings and loans for further investments. Effective beef cattle agribusiness strategy plans improved char livelihoods and alternative year-round income sources. Government support services and establishment policies can enhance small-scale cattle farming transferred to the beef cattle sub-sector agribusiness and deliver market-driven agro-food products [11].

Different scholars used cost benefit Analysis to measure smallholder farm profitability. [12] used cost-benefit analysis of smallholder dairy cattle enterprises in different agro-ecological zones in Kenya highlands. Therefore, the evaluation of economic returns plays a crucial role in influencing farmers' choice to adopt improved agricultural technology and consequently influences farmers' resource allocation decisions. Understanding the costs and benefits is also an important prerequisite for policy formulations aimed at improving productivity levels. Various methods of fattening practices, feeding systems, and feed treatments are used by farmers to feed cattle, reduce the length of the fattening period, and boost profits [13].

Thus, estimating the economic profit levels of beef cattle fattening enterprises and their constraints will contribute to the livestock sector. Therefore, this study sought to identify the economic profitability and constraints of commercial beef cattle fattening in the East Shewa Oromia Region, Ethiopia. Specifically, this study aimed to determine the profitability of beef cattle fattening enterprises and identify the constraints of beef cattle fattening in the study area.

Ingredients of the nutritional ration

In this study, the five main ingredients of the nutritional ration provided to cattle during the fattening period are described as follows:

Hay: Households frequently rent land for forage production. Cropping intensity is another factor that determines the area available for grazing and browsing. In the Ethiopian highlands, better soils are used for cropping, while steep slopes and seasonally waterlogged foothills are used for grazing. Natural pastures are continuously decreasing because of the increasing human population and expansion of croplands. The protein content and digestibility of most grass species decline rapidly with advancing physiological maturity. The productivity of natural pastures in Ethiopia is very low and usually does not exceed 0.5 to 2 tons per hectare of dry matter per year. Knowledge of silage production is also limited.

Crop residues: Crop residues are an important source of roughage feed for livestock in the highlands of Ethiopia. These include cereal straw, such as tef, wheat, barley, maize, sorghum, field peas, chickpeas, and haricot beans. The principal crop residues used for animal feeding are cereal straw and pulses. Haricot bean residue is also a good source of protein for livestock. Cereal straws and stovers generally have a low nutrient content, high fiber content, low digestibility, and low voluntary intake by animals. The nutritional value of many cereal straws is similar to that of the medium-quality native grass hay.

Wheat bran (Wheat) is the most common milling by-product used for livestock feed in Ethiopia. It can be used as a source of energy and proteins. Wheat bran is easily digestible. It contains 15%–18 percent crude protein and has a digestibility level of 75 percent. It is also a good source of water-soluble vitamins, with the exception of niacin. Wheat bran can improve feed intake, digestibility, and growth performance of animals when added to protein-source feed.

Oilseed cakes: Oilseed cakes are residues or cakes produced as by-products during the extraction of oil from oilseeds. These include noug, cottonseed, groundnut, linseed, and sesame cakes. This analysis uses Noug cake as an ingredient in the daily fattening ration. The two methods of extracting oil from oilseeds are mechanical pressing and solvent extraction. Mechanical extraction leaves a substantial amount of oil in the residue. In Ethiopia, most oil extraction factories use this mechanical extraction method. The protein content of the Noug cakes was between 28 percent and 35 percent. Most oilseed cakes are low in the essential amino acids cysteine and methionine and usually have low lysine content.

Brewery and winery by-products: This is the last ingredient of the feed ration commonly used, but farmers often exchange manure for these brewery and winery by-products, so the cost of the by-products can be measured by the value of the manure. For simplicity, the value of manure was excluded from the analysis based on the costs of the by-products of the brewery industry. Brewery and winery by-products are important sources of supplementary feed for commercial livestock operations, particularly for households located close to commercial breweries, distilleries, and wineries. These by-products have moderately high levels of crude protein, energy, and digestibility [14].

2. Research Methodology

2.1. Description of the Study Area

The study was conducted in selected districts of East Shewa Zone of Oromia Regional state, Ethiopia. Three districts in East Shewa zone, namely Adama, Lume and Adami-Tulu Jido Kombolcha were selected for the study. Adama district is located at altitude of 1400 – 2700 m a. s. l and it receives uni-modal rainfall with annual amount of 600 – 1200 mm and the average temperature varies 17°C - 34°C. According to the East Shewa Zone Agricultural and Rural Development Office, the

number of livestock population in Adema was estimated to be 1, 216, 39 cattle, 51,432 goats, 42,425 sheep, 36,180 equines, 87, 341 poultry and 474 camels [15] Adami-Tulu Jido Kombolcha District is located at the altitude of 1650 m a. s. l. It receives an annual rainfall amount of 500-760 mm and its

average ambient temperature varies from 12.7°C– 27°C [14]. Lume distric tis located at the altitude of 1604-2364 m.a.s.l. It receives rain fall with annual amount 1065mm and the average temperature varies 18-28.7°C East Shewa Zone Agricultural and Rural Development Office [15].

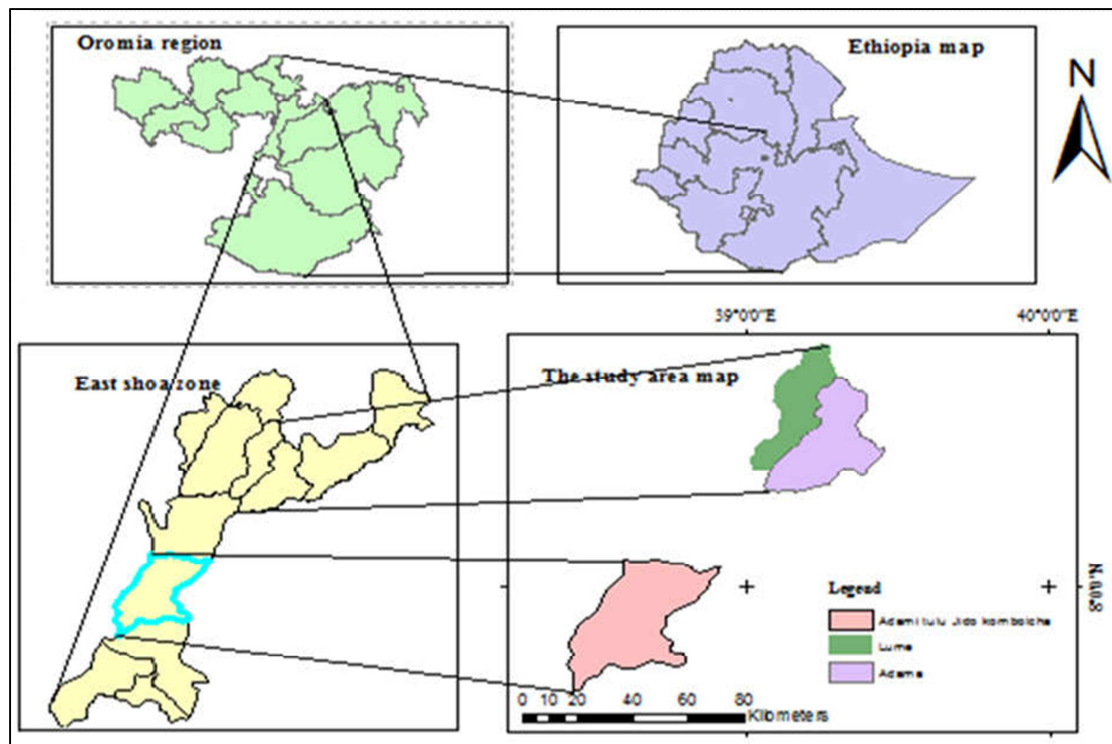


Figure 1. Map of the study area.

2.2. Sampling Techniques

A multistage sampling procedure was employed to select a representative sample for the survey study. First, three districts were selected based on their potential for commercial cattle fattening. Then, 45 feedlots were purposively selected based on their potential, size, accessibility, and willingness of the owners to cooperate in the study. The representative feedlots selected from each district included 25 from Adama, 17 from Lume, and 3 from Adami-Tulu. Finally, the interview information collected from selected commercial feedlots was used in this study.

2.3. Data Collection

Both qualitative and quantitative data were used in this study. Both primary and secondary data sources were employed to generate the data. Primary data were collected from producers (commercial feed lots) using semi-structured questionnaires and group discussions. A semi-structured questionnaire was used to collect data on variables such as fattening cattle breed types, sex of animals, type of animals (castrated or intact), age of animals preferred by fatteners, source of animals, number of animals engaged in fattening operation per cycle, feed types and sources of feeds used, feeding strategy (frequency of feeding, order of feeding if

different types of feed are offered separately), form of feed offered (wet, dry, chopped, etc.), group- or individual-based feeding or selected group feeding, feed mixing method used, etc., watering system, fattening duration and cycle, animal selection and purchasing criteria for fattening animals purpose, health care for the fattening animals, good opportunities and constraints/problems/major challenges for fattening practices, animal management, marketing system (buyers, market destination, any agreement/contract entered between producers and buyers), and transportation of purchasing items. Economic data on the total cost of production, such as cost of animal purchase, feed, medical care, return, selling, labor wage, and cost of transportation, were collected.

In addition, personal observations were made on different aspects of animal management during farm visits and monitoring to obtain an overview of general management activities practiced by different commercial fattening enterprises. Secondary data, including both published and unpublished documents available from various sources, were used to consolidate the generated information.

2.4. Data Analysis

The collected data were analyzed using the Statistical Package for Social Sciences (SPSS Version 20.0). A partial

budget analysis was performed for the economic evaluation of the fattening practices. The profitability of beef cattle fattening in one cycle (period) was determined by employing a farm budget analysis based on the scale of production (farm size) and age of animals. The analysis was performed considering the main input cost such as animal purchase cost, feed cost, veterinary and medicine cost, labor transportation cost, water fee, land rent cost, and others. The selling price of finished cattle was estimated by feedlot operators involved in cattle fattening operations based on their experience. Additionally, the price of finished cattle obtained from animal quarantine station. Net Farm Income (NFI) was calculated by subtracting the production costs from the gross production value based on the works of [16-19]. Computing the net income enables one to determine the profit level of a firm when the fixed cost can be calculated [20].

Mathematically, the NFI of an enterprise is given as follows:

$$NFI = \sum P_i Y_i - \sum P_{xi} X_j - \sum Z_k \quad (1)$$

Where:

NFI = Net farm income for the beef cattle fattening enterprise (Birr),

Y_i = the i^{th} fattened animal, for $i = 1, 2, \dots, n$

P_i = Unit price of the i^{th} fattened beef cattle in Ethiopian Birr (ETB)

X_j = the j^{th} variable inputs used in cattle fattening (for $j = 1, 2, 3, \dots, m$)

P_{xj} = Unit cost of the j^{th} variable inputs (Birr)

Z_k = the cost of the k^{th} fixed inputs (Birr) (for $k = 1, 2, 3, \dots, k$)

Σ = the summation sign.

The Benefit: Cost Ratio is given as:

$$TR / TC \quad (2)$$

3. Result and Discussion

3.1. Demographic Characteristics of Sample Respondents

The average age of the sample respondents were found to be about 40 years ranges from 25 years to 65 years. The average family size of the sample households was 4 persons per household ranges from 1 to 9 members. Both, experienced and young participated in cattle farming in the study area. The cattle fattening experience of households were on average 11.96 years which range from 4 years to 22 years. This results indicated that cattle fattening is profitable enterprise that why respondents in this business for many years (Table 1).

Table 1. Age, family size and experience of sample households.

Variables	Mean	St.Dev.	Minimum	Maximum
Age of respondents	40.01	11.39	25	65
Family Size	4.00	2.00	1	9
Experience in cattle fattening	11.96	5.27	4	22

Source: Survey result, 2016

3.2. Economic Profitability of Commercial Cattle Fattening

Economic profit is the difference between the revenue received from sales and the explicit costs of producing its goods and services, as well as any opportunity costs. Thus economic profitability of commercial Cattle fattening is the net income of the enterprise after cover all expenses for fattening activity. The commercial farms were characterized as small, medium and large farm sizes based on the number of fattening animals hold by the farms and by benchmarking earlier classification criteria employed by

researchers [21-23]. In the present study, small scale production represents those farms that hold less than 200 animals at a time. The medium scale production holds 201 – 500 and large-scale production greater than 500 head of animals. As indicated in table 2, the average cost incurred to purchase animal were highest for large, followed by medium and the lowest for small scale commercial cattle fattening. Regarding to feed cost, the highest cost incurred by large scale, followed by medium and the lowest by the small scale of production.

Table 2. Summary of inputs cost by different scale of production.

Type of cost	Scale of production			
	Large	Medium	Small	Total
	Mean±SD	Mean±SD	Mean±SD	Mean±SD
Animal purchase cost	8657233 ±9398393	3022385 ±760694.40	1671529 ±1112526	390344 ±6190994
Feed cost	5158200 ±4712449	1849915 ±3795597	1005131 ±583147.50	2633536 ±3256954
Veterinary and medicine cost	32867.33 ±29975.45	21873.85 ±21667.14	7455.59 ±6417	20091.44 ±23391.80
Labor	102133.3 ±235177.10	11007.69 ±6263.45	8652.94 ±8699.79	40493.33 ±139929.10
Transportation cost	234083.3 ±121602.20	121962.5 ±75174.98	50912.5 ±24818.96	139590 ±113270.30

Type of cost	Scale of production			
	Large	Medium	Small	Total
	Mean±SD	Mean±SD	Mean±SD	Mean±SD
Water fee	-	9000	7000	7666.67
Land rent cost	39500 ±4044.35	15000	12300	23450
Other cost	53800 ±5374.01	694215 ±609222	4500	300106
			-	±27244.21

Source: Survey result, 2016 Note: SD=Standard deviation

The total income and profit obtained from sales fattened cattle by different scale of commercial cattle fattening was presented in Table 3. On average large scale, medium and small commercial cattle fattening earn about, 16 million, 6138615 and 3222824 Ethiopian birr respectively. The highest gain was obtained by large commercial scale followed by medium and the lowest by small commercial

scale cattle fattening. The average profit of large, medium and small-scale commercial cattle fattening were made about 1959156 ETB, 1050839 and 493566.80, respectively. However, the average unit profit of medium scale of commercial fattening was the highest unit profit, followed by small and the lowest were made by large scale of commercial fattening.

Table 3. Revenue, Profit and unit profit of the farm across scale of production.

Scale of production	Revenue		Profit		Unit profit	
	Mean	SD	Mean	SD	Mean	SD
Large scale	16000000	±1570000	1959156	±1654548	1881.20	±567.29
Medium scale	6138615	±1202058	1050839	±372836.30	2426.22	±904.59
Small scale	3222824	±1841122	493566.80	±228280.90	2189.78	±832.55

Source: Survey result, 2016

The average costs incurred to purchase animals between ages of 3 up to 4 was about 2216571. The purchase cost for animals aged from 4 up to 5 was about, 3873556. Also, the purchase cost for animals aged between 5 up to 6 was about 7446885 on average. The highest cost was made for matured bulls, medium age bulls and the lowest cost incurred for

young bulls. In addition, the highest feed cost incurred for matured animals, which are about, 3960000 on average, followed by medium age animals and the lowest feed cost incurred for young age animals was about 1507918 on average as presented in (Table 4).

Table 4. Summary of cost incurred across age of animals.

Type of cost	Age of animal			
	3-4	4-5	5-6	Total
	Mean±SD	Mean±SD	Mean±SD	Mean±SD
Animal purchase cost	2216571 ±1501712	3873556 ±36033490	7446885 ±12020000	4390344 ±6190994
Feed cost	1507918 ±1078324	2551015 ±2657113	3960000 ±4923296	2633536
Veterinary and medicine cost	11591 ±8993.49	17491.94 ±16039.07	32845 ±35827.48	20091.44 ±3256954
Labor	15150 ±209731.58	18233.33 ±19671.12	98607.69 ±256160	40493.33 ±139929.10
Transportation cost	111980 ±87303.10	14706.3 ±131569.10	17491.94 ±16039.07	139590 -
Water fee	-	7000 ±2828.43	9000	139390
Land rent cost	16000 ±3464.10	16000 ±3464.10	56000 ±62225.40	7666.67 ±2309.40
Other cost	4500	1125000	123676.7 ±121089	23450 ±227244.21

Source: Survey result, 2016

As presented in Table 5, the average profit obtained from matured, medium and younger animals was about, 12257145, 1224363 and 932676.8 respectively. This shows that, the matured bull were made the highest profit, followed by

medium age and the lowest by small of commercial fattening. However, young bulls were made the highest unit profit, followed by medium age and the lowest for matured age animals as presented in Table 5 below.

Table 5. Profit of farm across age of animals during production year.

Age category of animals	Profit		Unit profit	
	Mean	SD	Mean	SD
3-4 years	932676.8	±560187.40	2487.84	±925.90
4-5 years	1224363	±1248144.00	2283.74	±784.78
5-6 years	12257145	±1489639.00	1619.07	±524.39

Source: Survey result, 2016

Feedlot profit margin is a function of animal purchasing and selling prices, feed costs and utilization efficiency, and the time spent in the feedlot [18, 24]. The survey result indicated that, the average costs for purchasing animals incurred across the scales of production were presented in Table 6. The highest cost were made by large commercial scale cattle fattening, with the amount of 14277817 ETB, followed by medium scale commercial cattle fattening with amount of 5745359 ETB and the lowest cost was incurred by small scale of fattening, which estimated 2767481 ETB. As presented in table 6 animal feed cost incurred was vary across scale of production, which was estimated about 2216571.00, 3873556.00 and 7446885.00 ETB for large, medium and small-scale commercial feed lot, respectively.

The result indicated that, total cost incurred between age of animal was vary, the highest cost were made 11735506 ETB for matured bulls; followed 7616003 ETB for medium age bull and the lowest 3883710 ETB for young animals. Concerning the feed cost the highest cost incurred 3960000 ETB for matured bulls; followed by 2551015 ETB for medium and 1507918 ETB feed cost incurred for younger age group. In general, the results reveal that animal purchases for fattening had the highest operating expenses with 60.65%, 60.4% and 52.61% of total cost at large, small and medium scale of commercial cattle fattening respectively. The finding also shows that 30.13 %, 32.2 % and 36.32%. feed cost for large, medium and small-scale productions. This agrees with the finding of [25].

The total income and profit obtained from sales of fattened cattle was about 16 million, 6138615 ETB and 3222824 ETB on average for large scale, medium and small commercial cattle fattener, respectively. The highest gain was obtained by large, followed by medium and the lowest for small commercial scale of cattle fattening. Similarly, the average costs incurred to purchase animals between ages of 3 up to 4, 4 up to 5 and 5 up to 6 were about 2216571 ETB, 3873556 ETB, and 7446885 ETB, respectively (Table 6). The highest costs were made for matured and medium age bulls, while lowest cost incurred for young bulls.

Although the highest average feed cost incurred for matured animals, which is about, 3960000, followed by medium age animals 2551015.00 and the lowest feed cost incurred for young age animals was about 1507918 ETB.

The average highest profit were made for large scale commercial fattening which is about 1959156, followed by medium and small scale commercial fattening which are about 1050839 and 493566.80, respectively this implies that, the profitability obtained from commercial scale fattening was varying across the scale of production. However, the

highest unit profit were made for medium scale commercial fattening, followed by small and large scale commercial production according to their decreasing orders.

The age of animals also is one of the factors affect the profitability of fattening sectors, the average profit obtained from matured, medium and younger animals was about, 12257145, 1224363 and 932676.8 respectively. This implies that, the matured bull was made the highest profit, followed by medium age and the lowest by small of commercial fattening. Nonetheless, medium scale commercial fattening were made the highest unit profit, followed medium age and young age animals according to their decreasing order. Based on unit profit the younger age has the highest profit followed by medium age and the lowest earned by matured animals.

In addition, the benefit cost ratio of each enterprise was about (1.19), thus indicating an additional return of (1.19%) birr for every one birr spent on production. The average return on every birr invested in the beef cattle fattening business (total 1.19.9%). The additional return per unit of cost incurred by different scale of production was about 1.16, 1.22 and 1.21 respectively. This implies that, for additional one unit of cost incurred, their return increase by 1.16, 1.22 and 1.21 respectively. This finding is in agreement with the results obtained by [25].

3.3. Major Constraints of Beef Cattle Fattening in the Study Area

The major challenges of Beef cattle fattening were identified as feed scarcity, marketing problem, water scarcity, animal health problems, and lack of appropriate stock for fattening were identified as the major problems that are hindering the performances of the fattening operations as a whole. According to the respondent's lack of feed, marketing problems, water scarcity and animal health problems were the primary constraints to run the fattening operations in all the scale of production. According to the respondents, productivity and fattening activity of livestock were affected by shortage of feed, market, animal health problems, water shortage, lack of animal supply, management skill, and housing system. This finding is in line with the [25] who noted poor nutritive value of available feeds, its limited availability and high price of supplementary feed associated with poor management practices and seasonality of market price for fattened cattle as a major constraint to cattle fattening business in Chiro area of Western Hararghe small holder cattle fattening operation and similar constraints were also listed by the study of [26] which identified market, shortage of feed, type of livestock, water shortage, disease and skilled personnel as a major constraint to commercial

feedlot fattening.

Table 6. Major constraints of Beef fattening in the study area.

Variable Scale of production	Weighted frequency							Index	Rank
	1	2	3	4	5	6	7		
Small scale N=18									
Feed	5	4	3	-	-	-	-	0.28	1
Market	6	3	1	-	-	-	-	0.17	2
Animal health	0	5	0	6	-	-	-	0.14	4
Lack of animal supply	0	0	0	4	3	-	-	0.16	3
Management knowhow	0	0	0	3	-	1	2	0.08	6
Water	1	1	0	3	-	-	-	0.11	5
Absence of promotional activities	-	-	-	-	-	4	-	0.06	7
Medium N=12									
Feed	5	4	3	-	-	-	-	0.22	1
Market	6	3	1	-	-	-	-	0.18	3
Animal health	-	5	-	6	-	-	-	0.20	2
Lack of animal supply	-	-	-	4	3	-	-	0.13	4
Management knowhow	-	-	-	3	-	1	2	0.11	5
Water	1	1	-	3	-	-	-	0.09	6
Absence of promotional activities	-	-	-	-	-	4	-	0.07	7
Large scale N=15									
Feed	10	3	2	-	-	-	-	0.42	1
Market	6	-	-	-	-	-	-	0.17	2
Animal health	-	3	2	-	-	-	-	0.14	3
Lack of animal supply	-	-	3	1	-	-	-	0.11	4
Management knowhow	-	-	-	-	2	-	-	0.06	6
Water	-	-	3	-	-	-	-	0.08	5
Absence of promotional activities	-	-	-	-	1	-	-	0.03	7

Source: Survey result, 2016 Note: N= Number of respondents

4. Conclusions and Recommendations

The result concluded that the average cost incurred to purchase animal were highest for large, followed by medium and the lowest for small scale commercial cattle fattening. Regarding to feed cost, the highest cost incurred by large scale, followed by medium and the lowest by the small scale of production, the highest cost was made for matured bulls, medium age bulls and the lowest cost incurred for young bulls. Similarly, highest feed cost incurred for matured animals, followed by medium age animals and the lowest feed cost incurred for young age animals.

The profitability was varying across the scale of production and the highest profit was made for large scale commercial fattening which is, followed by medium and small-scale commercial fattening. However, the highest unit profit was made for medium scale commercial fattening, followed by small- and large-scale commercial production according to their decreasing orders.

Regarding to profitability by the age of animals, the average profit obtained from matured bull were made the highest profit, followed by medium age and the lowest by young animals. However, young bulls were made the highest unit profit, followed by medium age and the lowest for matured age animals. Generally, the profitability revealed that majority of the commercial feed lot operators was realizing positive net income. On average, the feed lot operators were able to get a 19% return for every one birr they invested.

As we know the livestock are agricultural products earning maximum foreign currency for the country. However, there is marketing problems of live animals due to conflicts of Middle East countries. Therefore, the government should search other international market through creating storing diplomatic relationship with other developed and developing countries through reducing illegal marketing systems and Investment on meat processing and beef cattle production sectors should be encouraged.

Abbreviations

ESZARDO: East Shewa Zone Agricultural and Rural Development Office; ETB: Ethiopian Birr; GDP: Gross Domestic Product; USAID: United States Agency for International Development; Kg: Kilogram; NGOs: Non-Governmental Organizations; NFI: Net Farm Income; PPS: Probability Proportion to Size; SNNPR: South Nations Nationalities and Peoples Region.

Authors' Contributions

The author, *Genet Dadi* contributed to conceptualization, methodology, software, formal analysis, investigation, resources, data curation, writing – original draft preparation, writing – review and editing, visualization, supervision, project administration, funding acquisition, read and approved the final manuscript.

Availability of Data and Materials

The data used to support the findings of this study are available from corresponding author upon request.

Competing Interests

The authors declare that they have no conflicting interests.

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