Adunea Dinku*

Oda Bultum University; College of Agriculture; Department of Agricultural Economics; Chiro (Aseba Teferi), Ethiopia

***Corresponding authors:** Adunea Dinku, Oda Bultum University; College of Agriculture; Department of Agricultural Economics; Chiro (Aseba Teferi), Ethiopia, Tel: +251910775100; E-mail: adunedinku@gmail.com

Research Article

Assessment of constraints and opportunities in small-scale beef cattle fattening business: Evidence from the West Hararghe Zone of Ethiopia

Abstract

The study was conducted in Gemachis and Doba districts of West Hararghe Zone of Ethiopia to investigate the major constraints and opportunities of small-scale cattle fattening practices, and identify cattle selection criteria used for fattening purpose. Multi stage sampling procedure was employed to obtain a total of 171 cattle fatteners. The questionnaire based formal survey was conducted using pre tested semi-structured questioners to generate quantitative data. Besides, qualitative data were gathered through group discussions and key informant interviews to corroborate the survey data. Secondary date was obtained from published and unpublished documents. Data was analyzed using descriptive statistics, inferential statistics, and rank index. The study revealed that body condition (1st), breed type (2nd), frame size (3rd), cot color (4th) was the primary cattle selection criteria for fattening purpose. Illegal brokers(1st), recurrent drought and feed shortage(2nd), water scarcity(3rd), feed price increment(4th), weak extension service (5th),lack of initial capital(6th),informal traders(7th),inadequate veterinary service(8th), management knowhow(9th), unpredictable beef cattle market (10th), shortage of improved fodder species (11th), inadequate infrastructures (12th), limited access to credit (13th), and absence of functional flour factories (14th) were the major constraints in small-scale cattle fattening business. Current increase in demand for meat in the country and export markets, presence of different cattle breed, and high preference of Harar beef cattle in market, indigenous knowledge of cattle fattening, absence of endemic livestock health problem, high government emphasis to the sub-sector, proximity to large city and export abettors are the major identified opportunities. Hence, the study suggest that, concerned stakeholders should give due attention and policy support to strengthen the existed indigenous of cattle fattening practice and solve branded constraints through establishing marketing cooperatives to improve productivity and revenue derived cattle fattening industry.

Introduction

In developing countries including Ethiopia poor people's live disproportionally in rural areas and directly or indirectly depends on subsistence and small-scale agriculture, which are partly integrated into markets for their livelihoods [1,2]. Thus, development in this subsistence small-scale agriculture is seen as imperative for sustainable pro-poor economic development, improvement in food security and poverty mitigation in affected region [3,4]. Yet, in developing countries especially in Ethiopia, the feat of the agricultural sector is unsatisfactory and unable to go with the increasing of population at alarming rate. There also exist a significant productivity gap between Africa especially Sub-Saharan Africa (SSA) and the rest of the world [5].

The majority of the SSA countries where most of their people highly depend on agriculture as a source of livelihood have not been able to guarantee food security at all levels [6]. This is also the case for Ethiopia, were people still suffering from persistent and widespread poverty and food insecurity [7]. So, to embark upon poverty, agricultural sector which is a backbone for rural development and poverty reduction has to get due consideration. This calls for diversification of agricultural activities to improve the income and livelihood of the poor people in the country.

Through for sustainable pro-poor economic development, livestock sub-sector should be taken into account as it plays an indispensable role in the national economy. At present, livestock contributes about 20% of the GDP, supporting the livelihoods of 70 % of the population and generating about 11% of annual export earnings [8]. As the country has a large livestock population, which ranks first in Africa and tenth in

the world, it has much to gain from the growing global markets for livestock products [8].

Currently, it was believed that, cattle fattening activities among livestock production has greater potential for improving the living standards of people through enhancing nutrition arising from meat consumption and incomes from sale of beef cattle and its products. At the household level, livestock plays vital economic and social roles in the lives of pastoralists and agro-pastoralists. In addition, beef cattle fulfill an important function in coping with shocks, accumulating wealth, and serving as a store of value in the absence of formal financial institutions and other missing markets [9-11]. The rising population, income levels and urbanization across the developing world are driving demands for livestock and livestock products. Improvement of access to market and the establishment of an efficient value chain are therefore essential in order to enhance livestock farmers to excel [12,13].

However, currently, the level of beef cattle productivity is low in Ethiopia. The study affirmed that, lack of proper livestock management, feed shortage and low standards of feeding, inadequate marketing information, especially on prices, poorly developed marketing infrastructure, weak institution, legal and regulatory framework and inadequate access to financial services for livestock rearing activities are among the major factors constraining cattle fattening industry [13-15].

Besides, feed price increment, recurrent drought and feed shortage, financial problem, lack functional flour industries, inaccessibility and unpredictable cattle market, illegal brokers in cattle market, livestock disease, water and land shortage are among other major constraints come across by cattle fatteners [16,17]. Another studies also argued that inadequate market information, lack basic infrastructure, facilities like cattle pen, weighing scale, water troughs, feed for their cattle, especially the smallholder resource-poor livestock producers are among factors which prevent farmers to benefit from the potential marketing of their beef cattle [18,19].

The study affirmed that the production of quality and safe meat has the potential for import substitution and increased exports earning. Yet, beef productivity (110 kg carcass /head) is about 25-30% lower than the average for East Africa (143 kg/head) [13]. The total herd off take is estimated at 7% annually for cattle and 33% and 37% for sheep and goats, respectively which is much lower than other countries [15]. It is thus critical to examine the constraints and opportunities exist in this sub-sector for cattle fattening industry to develop in the country.

Many scholars have undertaken their studies for instance on beef cattle production system, beef cattle value chain, beef and animal feed value chain, constraints and opportunities in the beef cattle value chain and others in Ethiopia [16-18,20-23]. However, in light of their findings there are no doubt that, little attention had given to the constraints and opportunities in small-scale cattle fattening industry in Ethiopia thereby the study areas. Therefore, this study aimed at assessing the constraints and opportunities in small-scale beef cattle fattening practice that needs improvements in order to increase income of the smallholder farmers in particular and livestock keepers in general.

Materials and Methods

Description of the study area

This study was undertaken in the eastern part of Ethiopia specifically in West Hararge zone of Oromia National Regional State. From the selected zone, two districts namely Gemachis and Doba districts were selected based on their extent of cattle fattening business. Gemechis district is located at 343 km east of Addis Ababa and about 17 km south of Chiro, capital town of the Zone. The district is situated at the coordinate between 8040'0" and 9004'0" N and 40050'0" and 41012'0" E. It's found within 1300 to 2400 m.a.s.l. It shares borders with Chiro district in the West and North, Oda Bultum district in the South and Mesala district in the East. The district covers an area of 77,785 ha and it has 35 rural and one urban kebeles [24]. Agro-ecologically, the district has highland (15%), midland (45%) and lowland (40%) climatic zones and it receives bi-modal average annual rainfall of 850 mm [24]. The average temperature of the district is 20 0c. The total projected population of the Gemechis district is 235,638 of which 119,485 are males and 116,153 are females [25]. The number of agricultural households in the district is estimated to be 38,500 [24].

Doba district is located at 382 km from east of the capital city, Addis Ababa and 45 km from Chiro, Zonal capital town and shared boundary with Chiro on the south, Mieso on the west, Somalia Region on the north, Misraq Hararghe zone on the east, and Tulo district on the southeast. The district has 33 rural kebeles and three rural towns ((Doba district Agricultural and Rural development office). The district has an altitude ranging from 1400 -2500 m.a.s.l. Agro ecologically, the district has highland (dega) 40%, medium high land (weyna dega) 57% and low land (kola) 3%. The district receives bi-modal average annual rainfall ranging from 550 mm to 800 mm and has daily mean temperature ranging from 18oC to 26oC [26]. The total projected population of the district is 171,458 of which 87,428 are males and 84,030 are females [25]. Among this, 166,181 populations are leaving in rural areas through driving their livelihoods from agriculture and related activities (Figure 1).

Sampling producers and sample Size determination

Multi stage sampling procedures was employed in order to generate primary data. Firstly, Doba and Gemachis district was selected purposively after the discussion with the zonal livestock and fishery resource office experts due to their potential (predominant producers) production of beef cattle, market participation and volume of market supply, and their proximity to the main road and local market as compared to other neighbor districts in the Zone. Next, before selecting kabeles, potential kabeles were identified and listed from both districts with help of experts of respective districts. Following this, six kebeles (three from each district) were selected randomly with probability proportional to size of identified kebeles from two districts. Before selecting the respondents,
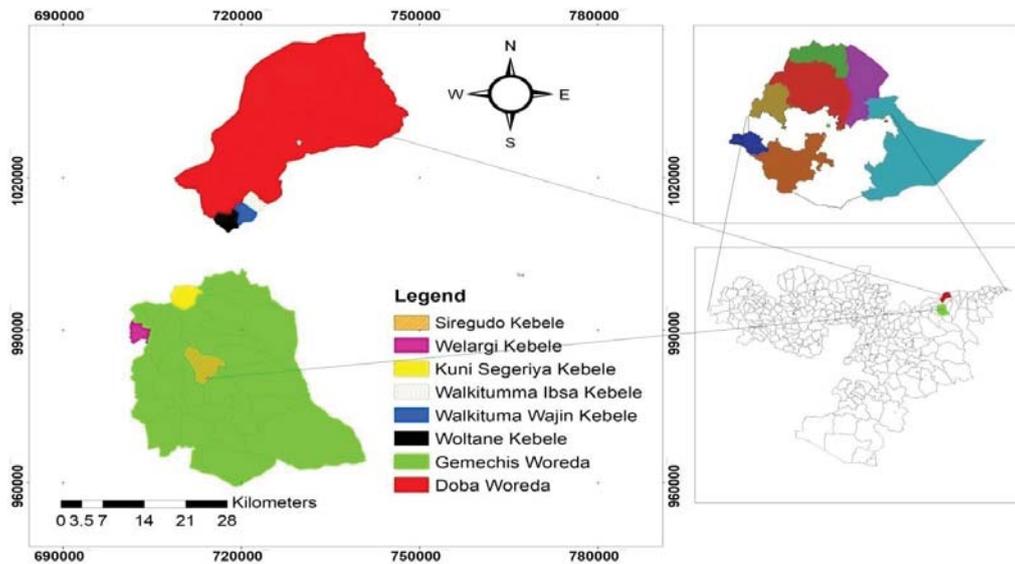
Figure 1: Location map of the study areas
Source: Adopted and manipulated from Ethiopian map.

sampling frame of beef cattle producers was taken from selected kebeles office and updated to the current with help of experts of respective kebeles. Finally, the study respondents were selected randomly with probability proportional to size of households in sample kebeles. Sample size for producers for this study were determined using appropriate sample size determination formula provided by [27], at 95% confidence level, 0.5 degree of variability and 7% level of precision. Hence, the sample size was calculated as:

$$n = \frac{N}{1 + N(e2)} \qquad (1)$$

$n = \frac{2098}{1 + 2098(0.07)2} = 185.99 \sim 186$. Where n is the sample size, N= population size (sampling frame) and e = level of precision considered 9%.

Therefore, considering the resource available and representativeness of this producer's sample, the total sample size of the producer for the study was reduced to 171, and the calculated sample size was distributed proportionally to purposively selected lower administrative kebeles from two districts (Table 1).

Type and source of data

To achieve the intended objectives, primary and secondary data sources were used. Primary data were collected from small-scale beef cattle producers, and respective district officers using semi-structured questionnaire and checklists prepared for this purpose, respectively. The secondary data including both published and unpolished documents that are available and relevant for this study was collected to substantiate the primary data. Besides, personal observation was undertaken on different beef cattle management and feeding aspects during survey period to get general information on cattle fattening activities in the study areas.

Table 1: Sampling frame and sample size determination.

Districts *Kebeles*		Producer (number)	Proportion of sampled HH (%)	Numbers of sampled HH
Gemechis district	Qunii-segeriya	261	12.44	21
	wol-argii	322	15.35	26
	Sire gudo	412	19.64	34
Doba district	Woltanee	423	20.16	35
	Wolqixumaa ibsa	312	14.87	25
	Wolqixumaa woji	368	17.54	30
Total		2,098	100	171

Method of data collection

The major instrument used for primary data collection was semi-structured interview schedule. The questioner was administered by trained enumerators through face-to-face interview with respondents. Questionnaires was pre-tested on similar different area from the study location on randomly selected ten non-sampled respondents to ensure its validity and reliability of generating all the necessary information in line with the objectives of the study, and necessary amendments was made prior to conducting the formal survey. After pre-testing, two days training were given to the enumerators on briefings of the objectives, contents of the interview questioners and to acquainted them with the basic techniques of data gathering and interviewing techniques and on how to approach respondents. The enumerators for the data collection were selected on the basis of their educational background and data collection experience, local knowledge and ability of their speaking the local language of the study area. The interview questions were focused on socio-economic characteristics of sample households, institutional services, available livestock feed resources and utilization, cattle selection and

purchasing criteria for fattening purpose, health service for cattle fattening, major constraints and opportunities for cattle fattening industry to achieve the stated objective.

Subsequently, the survey was conducted under the close supervision and assistance of the researcher. Focused group discussion was conducted in each selected kebeles to get in-depth information from the respondents and fill the gaps observed during personal interviews. The groups consists of a group of men, women, youth and elders representing all the others in the area using checklist prepared for this purpose. Besides, key informant interview were undertaken with knowledgeable people to get overall information regarding constraints and opportunities of cattle fattening activities using checklist prepared for this purpose. Key informant participants were includes extension agents, model farmers regarding beef cattle business, Zonal and district officers.

Method of Data Analysis

Descriptive analysis

Percentages, frequencies, means, standard deviation and inferential statistics (Independent sample t-test and F-test) were used for the analysis of quantitative data. Besides, an index was calculated to provide overall ranking of selection criteria of cattle for fattening purpose and small-scale beef cattle fattening business constraints in the study area by developing rank index formula based on the method used by [28].

$$\text{Rank index} = \frac{Rn\ {}^*C1 + Rn-1\ {}^*C2\ldots + R1\ {}^*Cn)a - g}{\sum_{a-g}(\ Rn\ {}^*C1 + Rn-1\ {}^*C2\ldots + R1\ {}^*Cn)}$$

Where, Rn = value of the least rank of constraint a (if the least rank is 14th, then $R_n = 14$, $R_{n-1} = 13$, $R_1 = 1$), C_n = counted value of the least ranked level (in the above example, the counts of the 14th rank=Cn, and C_1= the count of the 1st rank), and (R_n $^*C_1 + R_{n-1}\ ^*C_2 \ldots + R_1\ ^*C_n$)a–g = *W= weighted summation of each constraints (a, b, c...,g). For the analysis of quantitative data, the study was used STATA version 13 software packages. The result of quantitative data analysis was presented in the form of table and figure.

The qualitative data was analyzed by a means of conceptually organizing, categorizing thematically and narration with respect to the current research objectives. This was done immediately after first hand data obtained from respondents.

Result and Discussion

Socio-economic characteristics of small-scale beef cattle producers

The data revealed that high percentage of respondents, involved in cattle fattening activities in the study areas were male headed (87.4%) when compare to female's (12.6%) (Table 2). This is may be due to the nature of the cattle fattening activities, it needs intensive energy for proper management and handling of cattle such as watering, feeding, feed collection/ purchasing, cattle purchasing for fattening purpose and selling activities. Generally, female participation on cattle fattening business as owner was less as compared to male counterpart

Table 2: Socio-economic characteristics of sampled respondents: dummy variables.

Variables		Frequency	Percent	t-test value
Sex of respondents	M	148	86.55	20.9492***
	F	23	13.45	
Participation in off/non-farm activity	Yes	46	26.90	23.9189***
	No	125	73.10	
Access to credit service	Yes	43	25.15	24.0263***
	No	128	74.85	
Access to animal health service	Yes	82	47.95	22.7278***
	No	89	52.05	
Access to market information	Yes	96	56.14	22.3094***
	No	75	43.86	
Access to extension service	Yes	139	81.29	19.2095***
	No	32	18.71	

Note: *** is statistically significant at 1% probability level.
Source: Own computation from survey result, 2018.

which may be due to high burden of females on household chores and non-farm economic activities.

The amount of income generated from off/non-farm activities varied among sample farmers ranging from no additional income to a maximum of birr 20,000 birr (ETB) per annum. The average amount of non/off-farm income earned by sample farmers was 2075.45. Results revealed that 73.10% and 26.90% beef cattle producer farmers are non-participant and participant on non/off-farm income generating activities, respectively. High non- participation (73.10%) of respondents may be due to labor intensive nature of cattle fattening business. The t-test result also revealed a significant mean difference at 1% probability level between participant and non-percipient of non/off-farm activities in terms of the actual quantity of beef cattle produced during past three years including the survey year (Table 2).

The survey result shows that, about 25.15% of small-scale cattle fatteners had access to credit services from formal financial institutions, money lenders and relatives or friends in the survey year. Information from formal interview shows that, among the reasons that many had no access to credit was lack of collaterals for enabling them to secure loans, lack of information on how to secure loans and complicated procedures to get loans in the study areas. These at times have left the gap between cattle fatteners and financial institution, which are supposed to work together so as to uplift the cattle fattening industry. Besides, the result indicated that, cattle fatteners who have access to animal health service accounts (47.95%), which is smaller than those who have no access (52.05%). The independent t-test result indicated that there is a significant mean difference at less than 1% probability level between those who have access to extension service, animal health service, market information, and credit service and not, respectively in terms of quantity of beef cattle they produced last three years including the survey year (Table 2).

The study result revealed that, 56.14% of beef cattle producers had access to market information. Large percentage of respondents reported to depend on actual market day information/through personal observation, market information

obtained from fellow/other farmers in the neighbors' betrothed on the same activities, and friends for prices and selling decisions. This is a result of information asymmetry where the traders have more information than producers, which is a market imperfection thereby maddening negotiations between the small-scale cattle fatteners and traders (Table 2). The availability of market information would boosts confidence of producers who are willing to market their beef cattle. For all intents and purposes, information is a prerequisite and a required tool on price setting, or available cattle, forecast of future supplies and demand, and general market conditions (LEISA, 2007).

The survey on age provided a clue on working ages of households. The survey result indicated that, the average age of cattle fatteners were 41.27 years with the minimum and maximum age of 23 and 69 years (Table 3). The result indicates that productive age bracket of the community involved in the cattle fattening business in the study areas.

Related to household assets, respondents' had 0.50 hectare on average which includes both cultivated and grazing land. About 41.5 % households' holds less than 0.5 hectare. The minimum and maximum land holding size was 0.125 and 1hectare, respectively which indicates scarcity of this resource in the study areas (Table 3). This has implication of livestock feed shortage due to limited land size per household. And also, the result show that the average available labor force (labor supply) estimated by adult equivalent scale [29], was about 4.95 persons per household which is larger than the national average of 4.6 (CSA, 2014). This implies that most households had enough family labor and might not hire labor for their cattle fattening operation, which might assist them for a better participation in the cattle fattening business (Table 3).

The study shows that, about 28.65% were illiterate household heads whereas, the rest accounted for about 32.75%, 20.47%, 11.70% and 6.43% are literate and had education background of 1st cycle primary school (1-4), 2nd cycle primary school (5-8), secondary school (9-10), and preparatory school (11-12), respectively (Table 4). The result also shows that the average education level of respondents were 6 years with standard deviation of 3.125 years. This shows that on average, farmers attended the minimum required education level that is adequate for understanding and adoption of introduced modern cattle fattening technologies.

Education is important to manage the business as well as in decision making [30]. The F-test result indicates that education level of household heads were found to be significant at 10% probability level; indicating that there were significant differences between sampled respondent education categories in terms of quantity of beef cattle produced past three years including the survey year (Table 4).

According to the survey result, about 81.29 % of cattle fatteners had access to extension services (Table 2). They are on average four times visited by extension agents. They received the services related to input usage such as feeding system, management, up to date information regarding beef

cattle market among others. The analysis of variance (ANOVA) test result also indicated the significant mean difference at less than 5% probability level between cattle fatteners regarding frequency of extension contact (Table 5).

The study result indicated that, cattle fatteners had on average 9.44 years of experience with the minimum and maximum experience of 1 and 20 years, respectively (Table 3). This indicates that the sub-sector is very old as compared to other parts of the country where cattle fattening are practiced. The F-test result also indicates that experience of cattle fatteners were found to be significant at 1% probability level; indicating the significant differences between categories of producers' year of experience in terms of quantity of beef cattle produced during past three years (Table 6).

Rationale of small-scale cattle fattening business

The study found that, smallholder farmers in rural areas hold livestock and participate on cattle fattening for many reasons. Among them, the present study identified five main dominate reasons for small-scale cattle fattening in the study areas. Those are to diversify income sources (42.1%), to cover

Table 3: Socio-economic characteristics of cattle fatteners: Continuous variables.

Continuous variables	Observation	Mean	Std. Dev	Min	Max
Age of HH	171	41.27	11.485	23	69
Distance from market	171	3.89	1.849	0.5	8
Education level	171	6	3.125	0	12
Family size	171	4.95	2.052	1	11
Land size	171	0.50	0.253	0.125	1
Experience	171	9.44	4.787	1	20
Extension contact	171	4.46	2.810	0	12

Source: Own computation from survey result, 2018.

Table 4: Household heads education categories.

Description	Mean	Std. Dev.	Frequency	Percent	F-value
Illiterate	1.80	0.447	49	28.65	
1-4(1st cycle primary)	1.63	0.520	56	32.75	
5-8(2nd cycle primary)	1.75	0.426	35	20.47	2.11*
9-10(secondary school)	1.93	0.373	20	11.70	
11-12(preparatory school)	1.63	0.354	11	6.43	

Note: * is statistically significant at 10% probability level.
Source: Own computation from survey result, 2018.

Table 5: Household heads extension agent contact frequency.

Description	Mean	Std. Dev.	Frequency	F-value
No contact	1.82	0.559	15	
Weekly	1.55	0.427	33	
Once in two weeks	1.41	0.483	15	
Monthly	1.78	0.408	70	3.68 **
Twice in a year	1.82	0.575	14	
Once in year	2.09	0.471	8	
Any time I ask	1.82	0.274	16	

Note: ** is statistically significant at 5% probability level.
Source: Own computation from survey result, 2018.

different household expenses (22.2%), as store of wealth (18.1%), to copy with recurrent drought (15.8%), and for better farming power (1.8%) (Figure 2).

The current result coincides with the finding of [31]. They found that livestock are important source of cash income and play an important role in ensuring food security and alleviating poverty. Furthermore, the result from researcher observation and group discussions indicated that, smallholder farmers participate on cattle fattening business due to limited land size for crop production, high population density on small land size, and recurrent drought in the study areas in particular and zone in general.

Major cattle selection criteria for fattening purpose

Small-scale cattle fattening practice is the type of business where the smallholder farmers engaged on fattening activities alone or along other farming activities. Their main function is fattening the cattle of different age categories through utilizing available feed resources mostly in semi-intensive type of feeding system and then finally supplying for sell to the market when the animals conditioned. The sources of cattle for fattening might be from own herd or could be purchased from local market based on different selection criteria's. The survey result shows that, body confirmation/condition, breed type, frame/width size, cot color (mainly white color) was the primary cattle selection criteria for fattening purpose and ranked as 1st, 2nd, 3rd, and 4th, respectively (Table 7). They think that any cattle breeds meet all these criteria perform well on fattening than others.

According to the response of almost all producers, young bull of local and Borena breed within the age of 3-6 year were mostly used for fattening operation. Most of the draught oxen are used for fattening after 1-3 years of services in both districts.

Table 6: Beef cattle fattening experience in years.

Description	Mean	Std. Dev.	Frequency	F-value
1-5 years	1.42	0.453	41	
6-10 years	1.84	0.402	57	
11-15 years	1.81	0.438	55	10.22 ***
16-20 or>20years	1.91	0.426	18	

Note: *** is statistically significant at 1% probability level
Source: Own computation from survey result, 2018.
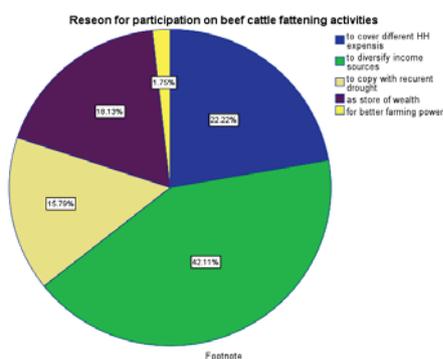
Figure 2: Reason of cattle fattening by smallholder farmers.

Table 7: Major selection criteria of cattle for fattening ranked in their order of importance.

Variables	Weighted frequency Index Rank											
	1	2	3	4	5	6	7	8	9	10		
Breed	43	13	7	11	5	-	6	-	14	4	0.11	2
Frame/width size	33	17	13	-	-	15	10	14	-	16	0.109	3
Age/teeth eruption	18	23	14	6	11	13	-	-	10	7	0.100	7
Body conformation	37	28	16	13	11	-	9	7	6	2	0.140	1
Horn size	17	6	13	-	7	15	12	-	-	7	0.072	10
Initial price	22	16	17	9	-	12	6	15	8	-	0.102	6
Length	19	12	6	-	7	18	11	7	9	4	0.081	8
Health	22	25	15	6	17	5	7	-	-	-	0.105	5
Adaptation	26	6	-	16	8	-	-	13	-	5	0.074	9
Coat color	27	13	9	20	7	16	-	-	15	8	0.106	4

Source: Output from survey data, 2018.

Majority of the purchased young bull and few home born are used for fattening purpose in both districts. Information from focus group discussion also shows that, cattle fatteners bought mainly Borena and Ogaden cattle breeds in addition to home breed in the zone due to their high performance on fattening than other. This implies that they have little information about other cattle breeds that could suit for their fattening activities. For instance, it was noted that Ogaden and Kerayu [23] cattle breeds have a good feedlot fattening performance.

Better preference of young bulls at the age of 3-6 years suggested that animals after grown to these ages are more suitable to fatten and produce high yield and quality beef to the local market and the standard required by the export market niche of Ethiopian. The result is agreed with the finding of [32], who reported that the majority of the farmers were preferred matured bull for fattening.

It was reported that body size (frame size) as an individual trait is said to be very important since it is related to potential growth at every stage of the development process (Sintayehu et al., 2010) and affect the whole production system, due to its influence on aspects such as the food conversion efficiency, the time taken to meet a specific market finishing degree, or the final quality of the product obtained [33]. Besides [32], found that the body frame had significant effect on the live-weight change and gross profit of fattening cattle. The study also revealed that producers in the area used largely white color young bull for fattening purpose. The current result is consistent with reports in different area of Ethiopia that traders would not prefer to purchase black coated animal at market place due to consumer preference [34,35] (Figure 3).

Health, initial price, age/teeth eruption, length/height, adaptation, and horn size, and ranked as 5th, 6th, 7th, 8th, 9th, and 10th, respectively was also another selection criterion of cattle for fattening purpose in the study areas(Table 7). The choice of cattle based on those criteria could be to meet the market demand and finishing ability of the animal. The current result is consistent with fatteners in northern part of Ethiopia were

selected cattle for fattening by using phonotypical selection criteria like select tall height, big and stand hump, good body condition, and glossy coat cattle [36]. The others study in other part of Ethiopia also found that, body frame; wide/deep body condition, skeletal frame confrontation, thick neck, castration, age, and glossy coat color are the top priority criteria that are considered while selecting cattle for fattening purpose [22,32].

Constraints in small-scale cattle fattening business

The result revealed that, illegal brokers, recurrent drought and feed shortage, water scarcity, feed price increment, weak extension service, lack of initial capital, and informal cattle trade were among the major constraints betrothed small-scale cattle fattening business and ranked as 1st, 2nd, 3rd, 4th, 5th, 6th and 7th, respectively (Table 8). As they reported, these constraints reduce the performances of beef cattle, prolong the fattening period and number of cattle fatten per cycle thereby decrease their frequency of market participation. The present finding corroborates the findings of [21,23].

The result from Key Informant Interview (KII) and Focus Group Discussion (FGD) also indicates that the first and second limiting factors that constrain small-scale cattle fatteners were found to be water scarcity and feed shortage. Comparatively, this could be due to recurrent drought and shortage of grazing land in which most of cattle fatteners depend mostly on crop residues. They also argued that feed availability was season dependent and lead to variation in cost between seasons. For that reason, ample amount of hey is produced starting from end of October to beginning of March and within which the price of hay is reasonable. Whereas, starting from April to September the availability of hay decreased and cost of hay is very high. Similarly, the availability of concentrate decreased starting from March to the end of June. Because at that time there is shortage of pasture and crop resides and leads to high competition in purchasing of concentrate.

Likewise, according to [37], crop residue, natural pasture and weed were mentioned as the major feed resource for cattle in the west and east high lands of Hararghe Zone. They argued that, the major problem with feed of these kind were seasonal availability and/or quality of the feed resource which in turn affects cattle fatteners by restricting production to the time of feed availability; so introduction of potential forage production, improvement of the feed resource through different techniques

Figure 3: Major selection criteria of cattle for fattening.

Table 8: Major constraints of cattle fattening business ranked in their order of importance.

Description	Weighted frequency															Index	Rank
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15		
Drought & feed shortage	67	33	14	15	9	9	7	7	3	7	4	5	1	4	0	0.113	2
Illegal brokers	44	53	25	11	14	7	12	8	4	-	3	5	2	-	4	0.117	1
Weak extension services	21	21	23	17	6	5	3	2	-	3	1	3	-	-	2	0.67	5
Shortage of improved fodder species	27	15	-	12	7	6	2	-	7	9	3	1	-	-	-	0.052	11
lack of initial capital	34	19	12	8	7	-	2	7	-	-	5	1	3	-	-	0.061	6
Feed price increment	28	32	9	14	11	9	-	5	3	5	4	-	2	1	-	0.074	4
Water scarcity	39	24	11	7	14	3	5	-	8	7	3	2	4	-	-	0.077	3
Absence of functional flour factories	24	16	8	-	7	5	-	5	-	3	-	3	1	-	-	0.045	14
Inadequate veterinary services	37	13	7	6	9	3	-	7	6	6	-	5	3	-	2	0.06	8
Management knowhow	25	21	12	8	-	5	9	9	-	-	3	5	-	2	-	0.058	9
Inadequate infrastructures	21	18	9	-	13	-	7	2	3	5	5	3	2	-	-	0.05	12
Limited access to credit	34	13	11	-	7	-	3	-	-	3	1	1	-	2	-	0.049	13
Unpredictable cattle market	26	17	15	3	9	7	2	3	4	1	2	-	2	-	-	0.056	10
Informal traders	33	21	13	9	4	2	-	6	-	4	1	2	-	3	-	0.061	7

Source: Own computation from survey data, 2018.

and/or supplementing the animal should be practiced to optimize production. The same source shows that, shrinkage of grazing land, shortage of land and water, low productivity of the local breed, low of improved breed, disease and parasite as the major constraints of beef cattle production among others in West and East high lands of Hararghe zone.

In the same way [38,39], found that inadequate feed supply is one of the major physical constraints hampering market oriented livestock development and to further expansion of the livestock population in Ethiopia in general. According to [40], result from stakeholder discussions revealed that the average price of animal feed increased by 3.2 times over the last 5 years – faster than the rate of increase for prices of food for human consumption, and more quickly than overall inflation.

The unorganized beef cattle market systems in both local and export markets constrain cattle fattening industry. Beef cattle market lack consistency and continuity in the country thereby affect small-scale cattle fattening farmers. During formal interview, producers also noted that conflicts in the region and informal trade throughout the border of the country had significant effect on marketing of the fattened cattle. Similarly [41], reported several constraints violating the smooth flow of beef cattle market from the producer to the end consumption points in Ethiopia. Furthermore [40], argued that, seasonal variability of water availability introduces
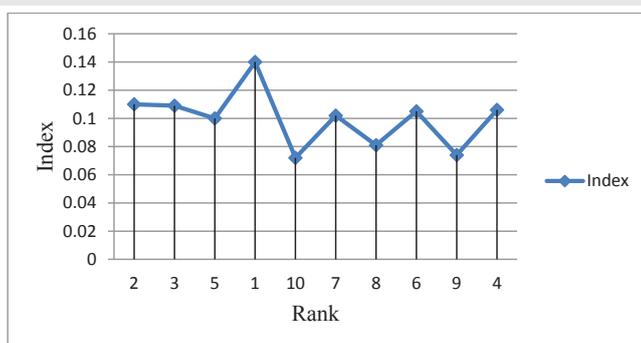
pressures in both highland and lowland production systems which are particularly pronounced where water sources are not collocated with feed: a common situation during the dry season and in droughts.

According to the result from sample respondents, inadequate veterinary services, management knowhow, inaccessibility (unpredictable) of beef cattle market, shortage of improved fodder species, inadequate infrastructures, limited access to credit and absence of functional flour factories were identified as the other constraining factors of small-scale cattle fattening business and ranked as 8th, 9th, 10th, 11th, 12th, 13th, and 14th (Table 8).

The present finding is agreed with the result of [39]. They reported that about 58% and 5% of the live animals come from the grassland and mixed systems, respectively, and are exported through informal channels in which informal exports are more than double the formal exports in Ethiopia, which has a very significant impact on the country's economy, in terms of both lost government revenues and high domestic prices (Figure 4).
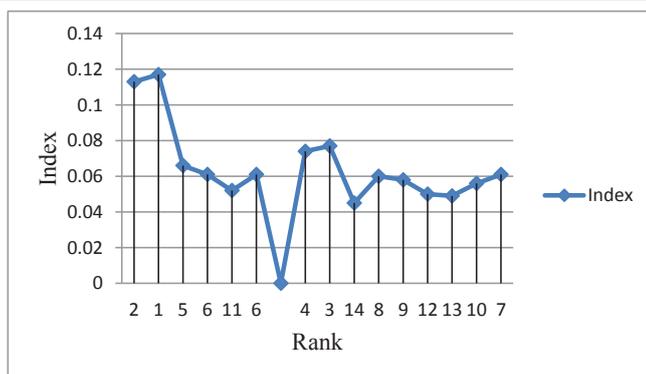
Figure 4: Major constraints small-scale cattle fattening.

Generally, the present finding were corroborate with the findings of [17,21,22,32,]. They reported recurrent drought, feed shortage, shortage of water, shortage of grazing land, feed price increment, absence of market information, lack of governmental feed processing factories and suppliers, diseases and parasites, limited brewery grain access, lack of cattle transportation systems and improved cattle fattening technologies, poor distribution of the available feed resources, illegal cattle feed traders, difficulty to access molasses, inaccessibility of cattle market, lack of initial capital, limited access to credit, lack of processed and mixed ration feed suppliers, and unpredictable cattle market, inadequate veterinary services, weak extension services, lack of good management practices and proper policy support for livestock development as a major constraints of cattle fattening in Ethiopia.

Opportunities in small-scale cattle fattening business

Livestock play a great role in developing countries economy like Ethiopia, particularly to rural development through supplementing the livelihood of poor people. Currently the federal as well as regional government of Ethiopia was given great emphasis to mixed-agriculture (both crop and livestock production) which includes cattle fattening as one of the source of livelihoods and development structure. This is also the case particularly for the study areas and generally for the west Hararghe zone when the land holding size is much more less than national average due to high population density and geographic futures of the zone. The growth and transformation plan two (GTP II) of the federal government and Oromia Regional state considered also cattle fattening as primary and most focused important activity.

As information provided from key informant interview shows, Harerghe beef locally called 'Harar Sanga' is very famous in domestic markets of larger cities like Addis Ababa, Dire Dawa, Adama, Harar, Jijga and other towns in and outside the zones, and export markets which is a good opportunities for small scale cattle fattening business. Similarly, Workneh and Rowland (2004) reported that beef production and marketing made the West Hararghe zone known in domestic and export market.

The accessibility of the study areas and cattle marketing towns near the main rode to local capital city, indigenous beef cattle fattening knowledge and managements, cultural medication of fattening cattle, copying and better adoption tradition from model cattle fatteners are the available opportunities currently in cattle fattening business. Likewise [42], reported the existence of different abattoirs and live animal exporters in and around peri-urban, urban towns and large cities such as Addis Ababa, Adama, Mojo, Dukam and Bishoftu created a favorable environment for cattle fattening in Ethiopia.

The result from FGD indicated that, comparatively, there is abundant of feed resources (crop residues) mainly from September to December for beef cattle fattening which creates an opportunity to use their own feeds by reducing the cost of purchasing available other feeds. As they said, the indicated months are the major period to harvest different crop in and around the study areas which is a source of crop residues for beef cattle fattening. This also one indication of beef cattle producers in the study areas where most of them use their own feed resource comes from the farm land.

The current increase in demand for meat due to the increase in number of hotels, and restaurants in and around the study area towns, and emerging middle-class urban dwellers with increasing income and more buying power are among good opportunities the study identified. The study also found that, currently, the study areas town and other towns found in the zone and outside are becomes more urbanized than before and urban dwellers increased the use of animal product, particularly, meat comes from fattened cattle uncompromisingly which is an opportunities for cattle fatteners. Correspondingly, in the country, the demand for livestock products like meat is increasing due to the growing urban population, while farm areas are shrinking much as a result of an increase in the rural population which creates an opportunities for cattle fattening on small land [43,44].

The study also found exploding demand of beef cattle as a result of rapidly increasing population growth to 127 million people and rising per capita income, based on the projections over the next 15 years, which will result in a deficit of about 1.3 million, 53% MT of meat in 2028. Per capita meat consumption will then be about 24.5 kg/year, with countries currently at a similar stage of development. Thus, meeting this gap will require substantial investments in the sector which is immense opportunity for small-scale farmers for extensively participate in cattle fattening [39]. Major markets in the Middle East are also growing in terms of population and income, providing a range of niches for targeting by Ethiopian meat exporters. There is substantial regional demand for cattle and beef, which Ethiopia could further, exploit the opportunities [40]. Generally, there are potentials of cattle fattening, and geographic location offers substantial opportunities for exportation, thus earning foreign exchange from export of beef cattle and its products, especially of red meat to the Middle East and across African countries.

Conclusions and Recommendations

Cattle fattening business has a significant contribution in national income in general and smallholder farmers income in particular. Generally, West Hararghe Zone is well known cattle fattening areas in the country due to its favorable agro-ecology and high experience/indigenous knowledge on traditional cattle fattening and limited land holding size. Following this, the current study is aimed at analyzing major constraints and opportunities, and cattle selection criteria's for fattening purpose. The study found that cattle fattening industry is constrained with both production and marketing systems. From the constraint side, water scarcity, recurrent drought and feed shortage, illegal brokers, feed price increment, inadequate veterinary service, lack of initial capital for the business, shortage of improved fodder species, weak extension service, management knowhow, inaccessibility (unpredictable) of beef cattle market, informal beef cattle traders, inadequate infrastructures, limited access to credit and absence functional flour factories are among the major constraints. .

From opportunity side, availability of local breeds for fattening, popularity of locally called 'Harar Sanga' in the different local markets of the country, presence of good hay preparation experience and indigenous knowledge of beef cattle production, cultural medications and management, accessibility of the study areas to the main rods connected to large cites and abattoirs, presence of animal science experts and development agent at kebeles and district levels, current increase in demand for beef cattle and it is products, and emerging middle-class urban dwellers with increasing income and more buying power are among good opportunities the study identified. Based on the result of the study, the following recommendations are set for sustainable cattle fattening industry.

The study found that, the acute constraint in cattle fattening business was illegal brokers. Cattle fattening business sustainability will highly depend on the reduction or elimination of this bottleneck. Hence, the local livestock

and fishery office by cooperating with others stakeholder should augment cattle fatteners bargaining power and balance brokers' interference in the market through launching cattle marketing cooperatives.

Feed shortage and price increment animal feed is also found to be the critical problem which reduced incentives for feeding regimes, and also prolonged the cattle fattening period. Therefore, the local extension system should plan and take action on improving farmers' knowledge through frequent training on how to use the marginal land not suitable for crop production for animal feed production by them is imperative. Besides, due emphasis should be given to the market place infrastructures where beef cattle are marketed and on how to make illegal traders to be legal and pay the tax for the government. To conclude, the government should design appropriate livestock strategy to optimize the population of livestock used for fattening purpose and replacement livestock at its original area.

Acknowledgement

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