Beef cattle fattening practices and marketing system in Gondar, Ethiopia

E. Gobezie*, G. Asiressie

College of Agricultural and Environmental Science, Debark University, P.O. Box 90, Debark, Ethiopia,
*Corresponding author Email: gobezieeyayu@gmail.com. ORCID. 000-0002-0971-2114

Journal of Livestock Science (ISSN online 2277-6214) 15: 192-202
Received on 17/3/24; Accepted on 5/5/24; Published on 17/5/24
doi. 10.33259/JLivestSci.2024.192-202

Abstract

A cross-sectional survey was conducted in Gondar town, Amhara National Regional State, Ethiopia with the objective of assessing beef cattle fattening practices, marketing systems, constraints and opportunities of beef cattle fattening cooperatives and individual farmers. Data were gathered using a semi-structured questionnaire that had been pre-tested. In the study, 102 households from the town of Gondar were chosen using a stratified sampling technique. Both econometric and descriptive statistics were used to analyze the data. STATA software was used to code, enter, and clean data on household characteristics and cattle fattening practices that were gathered from the field. 27.2% of respondent's overall castrate their animals, compared to 72.8% of respondents who do not. The criteria used to select cattle for fattening included age (17.2%), breed (3%), body size (30%), health (36.4%), and price (13.4). Cattle that had been fattened had the highest price from January to April and the lowest price from May to June. The primary marketing obstacles impeding the efficacy of cattle fattening operations within the studied region were capital, price volatility, insufficient market size, and insufficient market intelligence. The results of the Heckman two-stage sample selection model showed that household income, veterinary service accessibility, and beef cattle body condition all had a substantial impact on sample producers' participation in beef cattle markets. The physical state of the beef cattle, the overall number of cattle possessed, and the distance from the closest market all have an impact on the quantity of cattle provided to markets.

Key words: Cattle fattening; Constraints; Opportunities; Marketing system

Introduction

Ethiopia has an agrarian economy; according to Matousa et al. (2013), agriculture directly supports 85% of the population's livelihood, accounts for 41.4% of the GDP, and generates 83.9% of the nation's export earnings. The money from livestock provides the rural population with the means to meet their basic requirements and buy inputs for agriculture. Ethiopia earns more foreign exchange from coffee than from livestock. With the greatest livestock population, an estimated 56.71 million cattle, 29.33 million sheep, and 29.11 million goats. Ethiopia has significant potential for the development of beef (CSA, 2015).

Despite Ethiopia's abundance of livestock resources and high production potential, the country's productivity is disproportionately low due to a lack of feed resources, a lack of focus on improving local breeds, the prevalence of disease and parasites, a low rate of extension services to farmers, a lack of training and awareness among farmers regarding the adoption of new technologies, and inadequate infrastructure (Shitahun, 2009). Most importantly, cattle fattening contributes significantly to food security, employment, income, and investment opportunities for households, as well as draught power and manure for sustainable agriculture and the fulfillment of cultural roles. It also helps to meet the nation's growing demand for high-protein foods (Mlote et al., 2012). The profitability from beef cattle can be increased by adding feed supplements (Inocencio et al 2024)

Due to the high density of animals in the town, Gondar has a potential for beef cattle. Many years ago, government and nongovernmental organizations made efforts to support cooperatives and individual farmers in the beef cattle fattening industry, as well as to provide extension services to these establishments in a cooperative or private form. However, the results of these efforts have not been to the satisfaction of all the beef cattle fatteners in the town. There is a lack of organization and documentation in the activities. Source of feed for fattening cattle were not further investigated, and the operations of the beef cattle cooperatives were not adequately documented (GARDO, 2015). Therefore, the objective of this study was to assess the current situation of beef cattle fattening practice, marketing system and to assess the beef cattle fattening constraints in the town.

Materials and Methods

Descriptions of the Study Area

The study was carried out at the town of Gondar in the northwest region of Ethiopia between November and August of 2017. One of the eleven administrative zones in the western regions of Amhara National Regional State is North Gondar administrative zone, with its capital city being Gondar Town. The location is 750 kilometers to the northwest of Addis Ababa, with coordinates of 12.3–13.8°N, 35.3–35.7°E, and 2,200 meters above sea level, respectively. The region experiences yearly variations in lowest and maximum temperatures of 12.3–16.7°C and 22–30°C, respectively (CSA, 2008). According to GARDO (2015), there are an estimated 2,771,701 cattle (local and exotic cross), 815,716 sheep, 1, 251,867 goats, 27,248 horses, 9,695 mules, 376,841 donkeys, and 3,165,068 poultry in North Gondar.

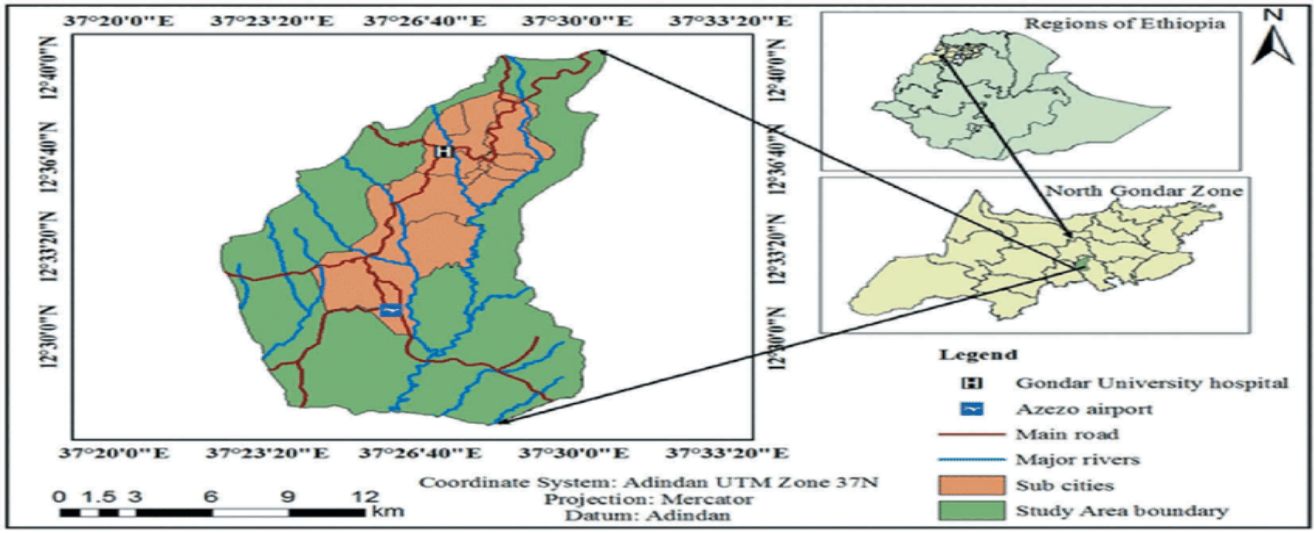

Fig 1: Location map of Gondar town

Sampling Technique

There are 122 individual fatteners from Maraki, Medanialem, Azezo Ayermarefiya, Adebabay Eyesus, Arada, Abajale, and Qirqos Kebeles who are involved in livestock production for both sustenance and commercial purposes in Gondar town. There are 16 registered beef cattle fattener cooperatives from Maraki, Lideta, Adebabay Eyesus, Aribegnoch, and Medanialem Kebeles. In total, there are 118 members of these cooperatives, comprising 83 males and 35 females. Out of the 12 kebeles in the town, nine sample kebeles were specifically chosen for this study based on their likelihood of participating in the local market and their closeness to it. Then, to choose the providers of beef cattle to the markets, a stratified sample technique was used. Producers were divided into cooperative and individual fatteners in the first stage. In the second stage, two samples of respondents (one male and one female) from each cooperative and sample families were chosen at random based on proportionality from selected kebeles for individual fatteners.

Sample size determination

Sample size for this study was determined using appropriate sample size determination technique using the total population of fatteners (cooperatives and individuals). The determination of sample size was resolve using Yamane (1967), simplified formula to calculate the sample size with the desired confidence level of 95%.

$$n = \frac{N}{1 + N(e)2}$$ ---------- (1)

Where:

n= actual sample size;
N= total number of HHs in the Selected kebeles
e = margin of errors at 5% (the desired level of precision, e= 0.05).
Therefore, the sample size that would be necessary for the above given combinations of precision, confidence levels and 138 households in the selected kebeles of Gondar town is computed as follows.
n= 138÷ (1+138(0.05)2) =102 households---------- (2)

Methods of Data Collection

Both primary and secondary data was collected. Primary data were collected using semi structured questionnaire with the owner of cattle fattener, Focus group discussions, and direct observation. The questionnaires were pre-tested and readjusted before the actual data collection started. Field observations on feed management, house management and cattle selection for fattening were an important component of the study process.

Descriptive analysis

Data collected from the field on household characteristics and cattle fattening practice were coded, entered and cleaned using STATA software. The comparisons of different characteristics of households were done by applying t-test and chi-square test.

Econometric analysis

Heckman two-stage procedure was used in the analysis of factors influencing market participation and market supply of beef cattle fattening in the study area. The Hickman's sample selection model where a probit model for the participation or selection equation was estimated and an OLS (ordinary least square) regression model which is corrected for selectivity bias was specified to account for the level of the amount marketed was estimated.

Results and Discussion

Sources of feeds and feeding system

Source of feed for fattening cattle in Gondar town are indicated in Table 2. From the total of household respondents, the feed sources which was used for fattening purpose were wheat bran (26.47), bean bran (13.73%), cotton cake (24.5%), nug cake (11.8%), barely straw (7.84%), wheat straw (13.7%), rice bran (1.96%). The study was in line with the result of (Alemu, 2008) who stated that the availability of crop residue is closely related to farming system, the type of crop produced and intensity of cultivation of maize, teff, wheat straw and barely straws are the main residuals available in the area.

Table 1: Description of dependent and independent variables

Variable	Description	Types	Values	Expected sign
LANDSIZE	Total land owned	continuous	Meter care	+
SEXHH	Sex of the household	Dummy	1=male,0=female	-/+
VETSERV	Access to veterinary service	Dummy	1=yes, 0=no	+
DIFESOU	Distance to farmland	continuous	Kilometers	-
EXP	Experience in beef cattle fattening	continuous	Number of years	+
HHINC	House hold income	continuous	Amount in birr	+
CATTSZ	Number of cattle owned	continuous	Tropical livestock unit	+
CATBC	Body condition of the beef cattle	Dummy	Good =1, unless=0	-/+
HHSZ	Number of household size	continuous	Head count	+
DISMKT	Distance to market	continuous	Kilometers	-
ACRED	Access to credit	Dummy	Access =1, unless=0	+
AGE	Age of household head	continuous	Number of years	-/+
EDUCHH	Education of household	Dummy	Literate =1, unless=0	+

Table 2: Source of feed for fattening cattle

Sources of feed	Respondents	Percentage
Wheat bran	27	26.47
Bean bran	14	13.73
Cotton cake	25	24.5
Nug cake	12	11.8
Barely straw	8	7.84
Wheat straw	14	13.7
Rice bran	2	1.96
Total	102	100

Table 3: Water source and watering frequency

	Individual fattener N = 70		Cooperative fattener N = 32		Total		Chi-square
Source of water	Frequency	%	Frequency	%	No=102	%	
River	49	70	8	25	57	47.5	
Piped water	21	30	24	75	45	52.5	18.04^{***}
Total	70	100	32	100	102	100	
Water frequency							
Once a day	10	14.29	-	-	10	7.145	
Twice a day	48	68.57	20	62.5	68	65.535	
Three times a day	12	17.14	11	34.38	23	25.76	
Adlibitum	-	-	1	3.12	1	1.56	9.77^{**}
Total	70	100	32	100	102	100	

Source: Survey data, 2017 ***Significant at 1%, **significant at 5%, *significant at 10%

Table 4: Housing system of beef cattle fattening

Parameters	Individual fattener N =70		Cooperative fattener N =32		0verall		Chi-square
	Frequency	%	Frequency	%	N=102	%	
Separate house	29	41.43	27	84.38	56	62.9	
Stall	41	58.57	5	15.62	46	37.1	16.36^{***}
Total	70	100	32	100	102	100	

***Significant at 1%, **significant at 5%, *significant at 10%

The present finding was similar with the report of Takele and Habtamu (2009) in Southern region and Belete et al. (2010) in Amhara region of Ethiopia, major feed resources used as a basal diet for fattening cattle were crop residues. However, according to the report of Teshager et al, (2013) one of the challenges of cattle fattening were feed shortage such as poor-quality grazing land, a need for greater knowledge on the use of crop residues and poor availability of concentrates and feed supplements when needed.

Water source and watering for fattening cattle

According to the respondent's response, the two type of water sources identified in Gondar town were piped water (52.5%), river (47.5%) in order of their importance. Water sources for cattle varied due to season, during summer (wet season) there was ample water. From the result presented in Table 3, it is evident that cooperatives are making an improvement to water availability and quality by ensuring that farmers have access to piped water. According to the overall response of the households in the study area, most of the respondents watered for their beef cattle twice a day (65.5%), once a day (7.14%), three times (25.76%) and adlibitum (1.56%).

Basically, the study showed that water requirement mostly depends on feed type, temperature of the environment, age of the animal and usage of the animal for different purposes. In similar to the result of present study, Teshager *et al*. (2013), Tsedeke (2007) and Asrat *et al*. (2013) households provide water to their animals once a day, twice day and ad libitum. In line with the present study Amistu *et al* (2016) reported from Hadiya zone, southern Ethiopia, farmers in the highland area watered their beef animal's ones a day, this was due to the fact that, there was wet air condition and where as in the low land area they watered their beef cattle twice a day at morning and afternoon. This was due to the rise of temperature both in environment and within the body of animal temperature or the environment is hotter.

Housing of fattening cattle

Housing is important for successful cattle fattening operation. Proper housing adequately protects animals against the adverse effect of weather when they are raised in relatively small area. The current study showed that two types of houses which had been used to keep the fattening cattle were separate house constructed for the cattle (62.9%), and stall (37.1%) (Table 4). Similar to current study Yisehak et al. (2013) who reported that animal houses are too primitive and animals are not kept in a good welfare. Contrast to current study Dessalegn (2015) reported that all farmers house their cattle separate house not far from family house at night to protect them from cold, rain, predators and theft. Similar to current study Asrat et al. (2013), indicated cattle are house together with family and some also in separate house.

Selection criteria of fattening cattle

Parameters of cattle selecting for fattening purpose are indicated on Table 5. Different criteria have been used for purchasing of cattle to be fattened. The finding revealed that majority of farmers were selected cattle for fattening based on age (18.75%), body size (15.63%), breed (3.13%), health (50%) and price (12.5%). From the overall respondents, 72.8% of the respondents do not castrate their animals and 27.2% of the respondents castrate their animals. As the respondent's response, uncastrated animals have better body conformation, fast growth rate, high customer demand, and also increase income.

The present finding contrary to Shewangzaw (2015), farmers in north western Ethiopia, 80% of the respondents castrate their animals before fattening while the remaining 20% of the respondents were not recommending for castration. The current study contrary to Yidnekachew et al. (2016), Omo Zone Southern Ethiopia reported that uncastrated animals increase time of fattening, store low fat and have low market price. The result of the study contrary to Takele and Habtamu (2009) and BoARD (2004), fatteners in welaita and northern part of Ethiopia select fattening cattle of tall height, good body condition and big and stand-high hump in addition to coat color.

Season of cattle fattening

63.5% of the cattle fattening activity were done starting from January to April targeting to deliver fattened cattle for Easter. About (35.8%) of the cattle fattening was done starting from mid-August to December when the plowing activity was finished seasonal supply of feed became optimum and mainly targeting to deliver fattened cattle for Christmas (Table 6). The remaining 0.7% of the cattle fattening activity was done starting from May to August, cattle fattening was totally absent in this season. The possible reason the absence of cattle fattening during the specific period were high demand of oxen for plowing purpose, dampness of feeding area and low demand for fattened cattle at the market. In line with Shewangzaw (2015) reported that starting from July up to August, cattle

fattening was totally absent in northern part of Ethiopia. The market price of fattened animals was highest from January to April. This is high demand of fattened cattle at the market, low purchasing price of beef cattle.

Age and duration of cattle fattening

The fatteners in the study area select and fatten mature animals (5-6years old). According to the overall selected respondents beef cattle were fattened two months (8%), three months (79%) and four months (13%). contrary, MOA (1996) reported that the age and duration of fattening cattle in western part of the country were one years old and for six months, respectively.

Table 5: Selection criteria of fattening cattle

Parameters	Individual fattener N =70		Cooperative fatteners N =32		Chi-square
	Frequency	%	Frequency	%	
Age	11	15.7	6	18.75	22.76***
Body size	31	44.29	5	15.63	102***
Breed	2	2.86	1	3.13	7.67*
Health	16	22.86	16	50	0.703
Price	10	14.29	4	12.5	2.84*
Total	70	100	32	100	

Table 6: Season of cattle fattening

Season	Individual fatteners N =70		Cooperative fatteners N =32		Total		Chi-square
	Frequency	%	Frequency	%	N=102	%	
Mid-August to December	13	18.6	17	53	30	35.8	12.6***
January to April	56	80	15	47	71	63.5	11.4**
May to August	1	1.4	-	-	1	0.7	0.47
Total	70	100	32	100		100	

***Significant at 1%, **significant at 5%, *significant at 10%

Table 7: Probit result of market participation

Variable	Coef.	Std. Err	Z	P>z	Marginal effect
1.SEXHH	.0296655	.5351435	0.06	0.956	2.191224
AGEHH	.0434564	.0440311	0.99	0.324	1.007818
1.VETSERV	1.466386	.8097545	1.81	0.070*	13.20186
DISMAK	-.0000327	.0006669	-0.05	0.961	0.0250804
HHSZ	-.1226133	.1798194	-0.68	0.495	1.172571
HHINC	.0014669	.0004356	3.37	0.001**	0.00145
CATBC	-5.780153	1.850641	-3.12	0.002**	32.94794
CATTSZ	-.0446458	.0213296	-2.09	0.036*	1.345183
ACRED	-.5452703	.5882369	-0.93	0.354	3.258089
DIFESOU	.0006432	.0161772	0.04	0.968	0.0924005
EDLHH	1.127513	1.726131	0.65	0.514	10.37572

***Significant at 1%, **significant at 5%, *significant at 10%; Number of observations= 102 Censored =18 Uncensored = 84
Wald chi2 (17) = 72.64; Prob > chi2 = 0.0000; SEXHH= sex of the household, AGEHH= age, VETSERV= veterinary service, DISMAK= distance to the market, HHSZ= household size, HHINC= household income, CATBC= cattle body condition, CATTSZ= number of cattle owned, ACRED= access to credit, DIFESOU=distance to farmland, EDLHH=education level of the household.

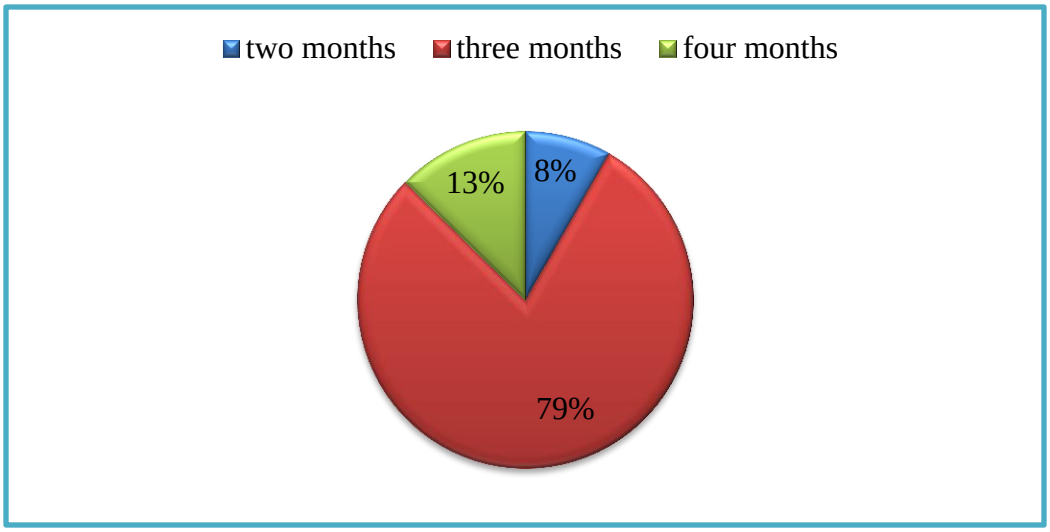

Fig 2: Duration of beef cattle fattening

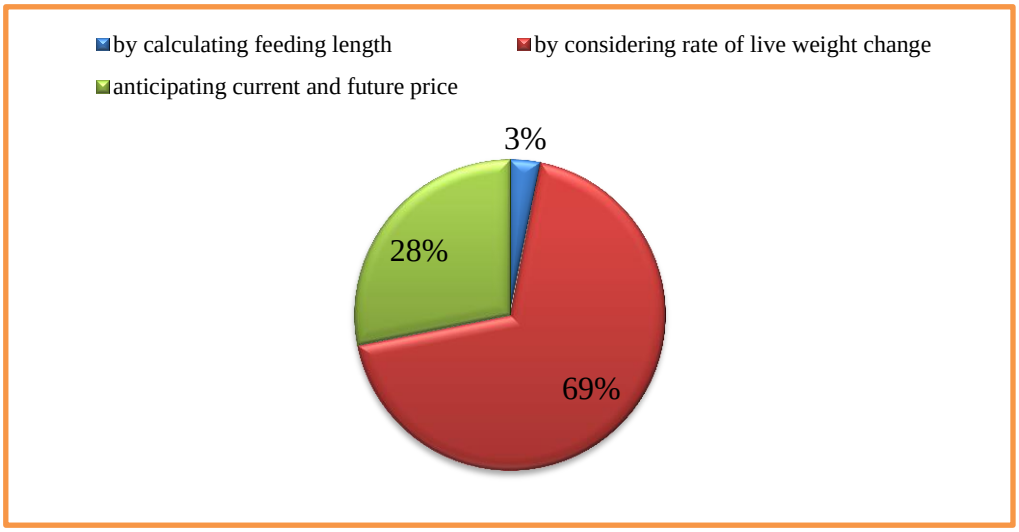

Fig 3: Method to decide the end of finishing period for fattening cattle

Method to decide the end of finishing period for fattening cattle

As indicated in Fig 3, from the total of respondents deciding finishing period of fattening cattle in the study area were based on considering rate of live weight change (69%), while 28% of them were anticipated current and future prices, and others by calculating feeding length (3%). The present study was in line with Shitahun (2009) reported that end of cattle finishing period was decided by considering live weight change of fattening cattle with visual observation based on their feed intake (84.97%) and by anticipating the current and future price (15.03%).

Type of cattle breed used for fattening

Cattle breeds in the study area were indigenous. Through focus group discussion farmers in the study area were asked about the kind of breeds they keep in their herds. 92% of the respondents stated that they kept pure local cattle breed. About 5.6% of them stated that they use cross breed. CSA (2009) reported that about 99% of cattle population in Ethiopia are indigenous that are adapted to feed and water shortages, disease challenges and harsh climates.

Beef cattle marketing constraints

Of the overall sample respondent, the major marketing constraints that faced during fattening business were 12.1% lack of access to adequate market, 8.84% lack of market information, 3.71% inadequate infrastructural development, 32% price fluctuation, 43.35% capital. The present finding similar to Belete *et al*. (2010) reported that shortage of capital was the first constraint to cattle fattening in Amhara region of Ethiopia. Credit provision was crucial problem to animal fatteners in the region which might be due to source of financing, generally involving subsidize, low interest credit; tend not to allow small holders to borrow money unless they are organized in groups or through cooperative arrangements, Azage *et al*. (2006). According to the respondents in the study area, cooperative fatteners have got 100% (32 households) credit provision where as individual fatteners have 22.8% (16 households) credit access. However, the credit allowed to cooperative and individual fatteners is not enough for further expanding.

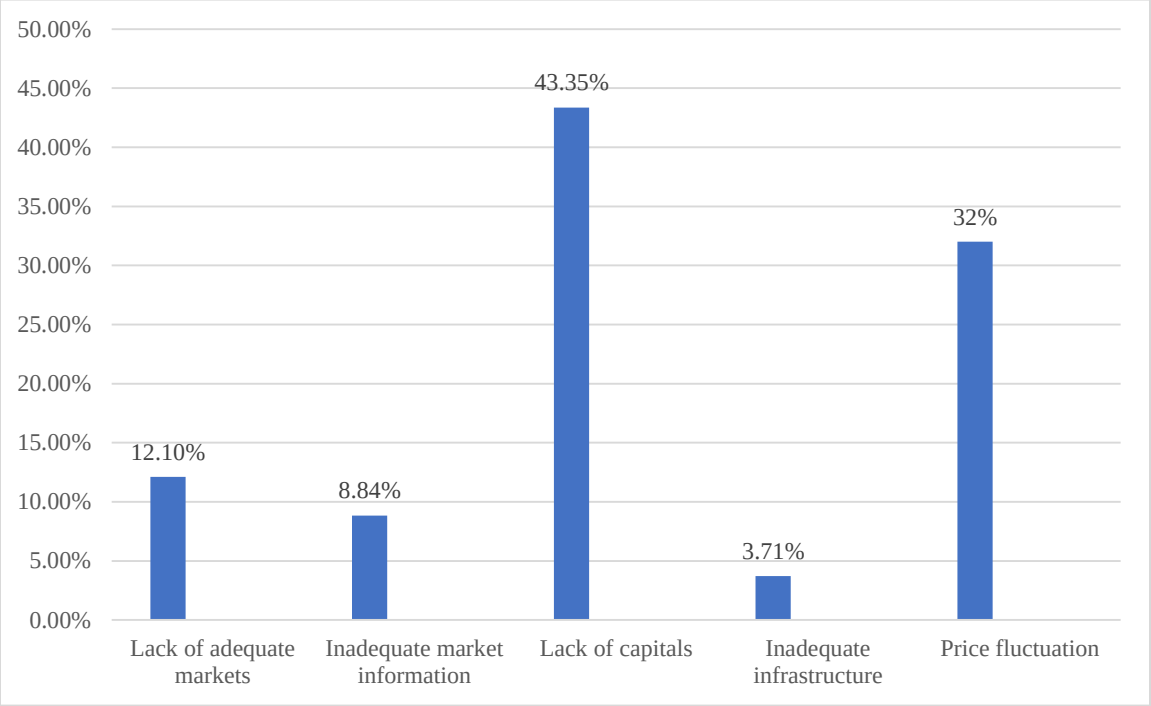

Fig 4: Beef cattle marketing constraints

Fig 5: Fattened beef cattle in Gondor town

Econometric analysis results

Under this econometric part result of two step selection model is discussed. Here, the likelihood function is significant (Wald $\chi 2= 72.67$ with $P<0.0000$) showing strong explanatory powers. Similarly, the coefficient of the mill's ratio is found to be significant ($P<0.097$) which indicate presence of self-selection and hence justifying the appropriateness of using Hickman's two-stage model. In addition, multicollinearity and econometric test are made for the independent variables using VIF and coefficient of contingency. The result has shown that there is no multicollinearity problem among or between the variables.

Determinants of beef cattle market participation decision

As shown Table 7, out of the 13 variables expected to affect the probability of market participation of the sample households, three variables are found to be significantly explain the probability of participation in the beef cattle market. Household income (HHINC) and veterinary service access (VETSERV) have positively and significantly affected market participation of the sampled households. Body conditions of beef cattle (BCBCHO) have negatively and significantly affected market participation of the sampled households. However, the coefficients of the independent variables sex of the household head (SEXHH), age of the household head (AGEHH), household size (HHSZ), farm land size (LAND SIZE), number of beef cattle owned (NBCOW), access to credit service (ACRED), distance to the nearest market (DISMAK), education level (EDUHH), experience (EXP) and distance from farm land to provide feed (FARLDIST) were found to be insignificant.

Body condition of beef cattle that household owned (BCBCHO):

Body condition of beef cattle is one of the variables that affect market participation negatively at 1% level of significance. As the sample producers having good body condition of beef cattle, their probability of participation in markets decreases by 3.2%. This may be due to the fact that customers who have less economic status prefer to buy medium body condition than good body condition of beef cattle that are sold at good market price. Kefyalew (2011) who reported that domestic meat demand is believed to increase with increasing literacy and family income. Meat
consumption is often an indicator of the economic status of a country or an individual. People with a higher social or economic status demand a greater amount of high-quality meat products.

Veterinary service access (VETSERV)

Veterinary service access is one of the variables that affect market participation of beef cattle in the marketing chain positively at 10% level of significance. As the respondents getting veterinary services for their beef cattle, their probability of participation in markets increases by an amount of 13 percent. Households get access to veterinary service; their market participation will be high. This is due to the fact that veterinary service households are getting to secure their beef cattle from different animal diseases. The present finding in line with Gezehagn (2015) who reported that as the sample producers start receiving veterinary service for beef cattle their probability of participation in markets increases.

Household income (HHINC)

Household income is one of the variables that affect market participation of beef cattle in the marketing chain positively at 1% level of significance. As the respondents getting household income for their beef cattle, their probability of participation in markets increases by an amount of 0.1% percent. The present finding in line with Gezehagn (2015) who reported that producers who have adequate income to purchase inputs can easily participate in markets and supply more beef cattle than those not having the money.

Determinants of amount of beef cattle supplied to the markets

The supplied quantity of beef cattle in to markets is also affected by body condition of beef cattle that household owned, total number of cattle owned, distance from the nearest market.

Conclusion and Recommendation

The study showed that the major feed resources given for the fattening cattle were wheat bran, bean bran, cotton cake, nug cake, barely straw, wheat straw, and rice bran. The major fattening practice is starting from January to April. Different cattle marketing chain which provides the movement of livestock from producers to final end users. Producers have the option of selling their animals directly to small traders, large traders, butchers, hotels and consumers. The major marketing constraints that faced during fattening business were lack of access to adequate

market, inadequate market information, inadequate infrastructural development, price fluctuation, capital. Based on this information, it is recommended that, shortage of land, water supply, feed resources and feed cost are the main

Table 8: OLS result of the Heckman two stage model

OLS result of the Heckman two stage model				
Variable	Coef.	Std. Err	Z	P>z
1.SEXHH	1.720987	10.11758	0.17	0.865
AGEHH	-1.037058	.7236449	-1.43	0.152
1.VETSERV	12.93486	14.83146	0.87	0.383
DISMAK	-.0250094	.0123992	2.02	0.044**
HHSZ	1.270308	2.670568	0.48	0.634
EXP	1.785908	1.163302	1.54	0.125
CATBC	-39.30181	20.58331	-1.91	0.056*
CATTSZ	1.312451	.3558294	3.69	0.000***
1.ACRED	-5.271328	10.05454	-0.52	0.600
DIFESOU	-.0339533	.2278715	-0.15	0.882
LANDSIZE	.0000855	.0160454	0.01	0.996
_cons	86.04945	38.71042	2.22	0.026
Lambda	-25.10135	15.11802	-1.66	0.097
Rho	-0.84878			
sigma	29.573383			

***Significant at 1%, **significant at 5%, *significant at 10% SEXHH= sex of the household, AGEHH= age, VETSERV= veterinary service, DISMAK= distance to the market, HHSZ= household size, EXP= experience, CATBC= cattle body condition, CATTSZ= number of cattle owned, ACRED= access to credit, DIFESOU=distance to farmland, LANDSIZE=total land owned.

challenges to livestock production in the study area, the government and other stakeholder should give a solution by supporting private feed processing organization, adequate water supply and adequate land for future expansions. Access to credit for both cattle production and marketing positively affected market participation decision in the study area. Hence, it is important to strengthen credit institutions in terms of spatial coverage, amount of credit and timely provision for farmers and traders. Improvement of management capability and skills of cooperative members are essential for the development and sustainability of cooperatives.

Funding

This work has no funding.

Availability of data and materials

All data generated during the research are relevant and included in this publishing article.

Ethical consideration

The authors declare and confirm that the manuscript is original, has no misconduct, has never been published in another journal and is confirmed to be published in this journal.

Conflict of interest

The authors declare no conflicts of interest.

Author`s contribution

The authors wrote the first draft of the text, reviewed relevant literature, and revised it with others. The final draft of the manuscript was verified by the authors after proofreading it.

Acknowledgment

The authors would like to acknowledge Gondar City Administration, Technical and Vocational Enterprise Development Department for financing this research and the beef cattle fatteners for their collaboration during data collection in field work.

References

1) Alemu, T., 2008. The Borana and 1991-92 Drought Range Land and Livestock Institute for Sustainable Development Addis Ababa, Ethiopia PP503-517. https://search.worldcat.org/title/borana-and-the-1991-92-drought-a-rangeland-and-livestock resource-study/oclc/45354798

2) Amistu, K., Temesgen M, Alemu A and Tarekegn W, 2016. Assessment of beef cattle fattening and marketing system and contribution to household food security in Lemmo Woreda, Hadiya Zone, Southern Ethiopia. Journal of Marketing and Consumer Research, 29, 1-10. https://www.google.com/ search?q=Amistu%2C+K.%2C+Temesgen+M%2C+Alemu+A+and+ arekegn+W%2C+2016.pdf

3) Asrat, A., Yilma Z and Nurfeta A, 2013. Characterization of milk production systems in and around Boditti, Southern, Ethiopia. Livestock Research for Rural Development, 25(10), 2013. https://www.lrrd.cipav.org.co/lrrd25/10/ayza25183.htm
4) Azage, T., Berhanu, G. and Dirk, H., 2006. Input Supply System and Services for Market Oriented Livestock Production in Ethiopia. https://cgspace.cgiar.org/server/api/core/bitstreams/98094c18-fd7d-4e9a-a17a-8f9f015ddb6c/content
5) Belete, A., Azage, T., Fekadu, B. and Berhanu G, 2010. Cattle milk and meat production and marketing system and opportunities for market-orientation in Fogera Woreda, Amhara Region, Ethiopia. International Livestock Research Institute (ILRI) https://hdl.handle.net/10568/1686
6) BOARD (Bureau of Agriculture and Rural development), 2004. Livestock Feeding Strategy Manual. Bahir Dar.
7) Central Statistical Agency (CSA), 2008. Report on livestock and livestock characteristics; vol. II.
8) Central Statistical Agency (CSA), 2009. Report on livestock and livestock characteristics; vol. II.
9) Central Statistical Agency (CSA), 2015. Agricultural Sample Survey 2014/15 [2007e.c.] Volume II Report on Livestock and Livestock Characteristics (private peasant holdings).
10) Dessalegn, G., 2015. Assessment of production and reproductive performance of cattle and husbandry practices in Bench-Maji Zone Southwest Ethiopia. Global Journal of Animal Scientific Research. 3(2): 441-452, 2015. http://archives.gjasr.com/index.php/GJASR/article/view/217/415
11) Gezehagn Gesese, 2015. Beef Cattle Value Chain Analysis in Konso Districts. file:///C:/Users/dell/Downloads/BEEF_CATTLE_VALUE_CHAIN_ANALYSISIN_IN_KO.pdf
12) Gondar Agriculture and Rural Development Office (GARDO), 2015. Annual Report, Gondar
13) Inocencio, M.A.E., Purnamasari, L., Hwang, S.G., dela Cruz, J.F. 2023. Effect of Vitamin A, C, and D on improving intramuscular fat in Hanwoo beef cattle – Review. Journal of Livestock Science 14: 91-103 doi.10.33259/JLivestSci.2023.91-103
14) Kefyalew Alemayehu, 2011. Value Chain Assessment of Beef Cattle Production and Marketing in Ethiopia: Challenges and Opportunities of Linking Smallholder Farmers to the Markets. Livestock Research for Rural Development. 23, Article #255. Retrieved March 16, 2024, http://www.lrrd.org/lrrd23/12/alem23255.htm
15) Matousa, P., Todob, Y. and Mojoc, D., 2013. Roles of extension and ethno-religious networks in acceptance of resource-conserving agriculture among Ethiopian farmers. International Journal of Agricultural Sustainability 11(4), 301-316. DOI:10.1080/14735903.2012.751701
16) Mlote SN, Mdoe NSY, Isinika AC, Mtenga LA, 2012. Value addition of beef cattle fattening in the Lake Zone in Tanzania: Challenges and opportunities. Livestock Research for Rural Development. Volume 24, Article #95. Retrieved March 16, 2024, http://www.lrrd.org/lrrd24/6/mlot24095.htm
17) MOA (Ministry of Agriculture), 1996. Animal and Fishery Resources Development Main Department, Fattening Extension Manual, FLDP, Addis Ababa, Ethiopia, 83 pp.
18) Shewangzaw, A., 2015. Cattle fattening, constraints and marketing system in North Western Ethiopia. World's Veterinary Journal, 6(2): 59-65, June 25, 2016. https://wvj.scienceline.com/attachments/article/38/World%20Vet.%20J.%206(2)%2059-65,%20June%2025,%202016.pdf
19) Shitahun Mulu, 2009. Feed Resources Availability, Cattle Fattening Practices and Marketing System in Bure Woreda, Amhara Region. Mekelle University, Ethiopia. International Livestock Research Institute (ILRI). https://hdl.handle.net/10568/672
20) Takele, T. and Habtamu, L., 2009. Traditional backyard cattle fattening in Welaita: systems of operation and the routine husbandry practices. Ethiopian Journal of Animal Production. 9(1): 39-56 https://api.semanticscholar.org/CorpusID:127226980
21) Teshager A, Belay D and Taye T, 2013. Small holder cattle production systems in three District of Ilu Aba Bora Zone of Oromia Regional state, South Western Ethiopia. American –Eurasian Journal of Scientific Research. 8 (1): 38-46, 2013. DOI: 10.5829/idosi.aejsr.2013.8.1.6670
22) Tsedeke K, 2007. Production and marketing systems of sheep and goats in Alaba, Southern Ethiopia. MSc. Thesis in Awassa University. https://core.ac.uk/download/pdf/132631374.pdf
23) Yamane, T., 1967. Statistics: An Introductory Analysis. 2nd Ed., New York: https://www.sciepub.com/ reference/180098
24) Yidnekachew, A., Asmera, A., Mesfin, M. and Binyam, E., 2016. Assessment of Market Oriented Beef Cattle Fattening System Under Farmer Management Condition in South Omo Zone of SNNPR. Current Research in Agricultural Sciences, Vol. 3, No. 3, pp. 31-45. 2016. DOI:10.18488/journal.68/2016.3.3/68.3.31.45
25) Yisehak, K., Taye, TM., and Aynalem H, 2013. Characteristics and constraints of livestock in Jima Zone, Southern, Ethiopia. OAU: Nairobi. African Journal of Basic & Applied Sciences 5 (2): 69-81, 2013. DOI: 10.5829/idosi.ajbas.2013.5.2.314