

Research article

Cattle Production in West Hararghe: An Opportunity and Constraints Assessments in Darolabu, Odabultum, Gemechis and Chiro Districts, Oromia Regional State, Ethiopia.

Abdi Etafa¹, kemal kasim², Yassin Esmael^{2*} and Muleta Debela³

^{1,2*} Adami Tulu Agricultural Research Center P.O. Box 35 Ziway, Ethiopia.

^{2,3} Mechara Agricultural Research Center P.O. Box 19 Mechara, Ethiopia.

E-mail: Abdrom.etafa@gmail.com

Abstract

The study was conducted in four district of west Hararghe namely, darolabu, odabultum, gemechis and chiro districts. The objective of the survey was: to identify the opportunities and constraints of cattle production in the study area and to use the information as a base line data for future intervention. Data was collected by semi structured interview, focus group discussion and secondary data was collected from different sources. Statistical package for social science were used to analyze data. Cattle in west Hararghe are kept in a mixed crop-livestock production system. Cattle have a multi function in west Hararghe helping as source of draft power income generation, milk and meat production. During the production and fattening farmers focus on traits like height to the wither, body width, and coat color in selection of breeds. Feed shortage, animal health, market problem, and land and water problem is the major identified problems and constraints of cattle production in the study area. On the other way the study reported that disease is also constraining for increasing production and productivity. In the meantime, good indigenous knowledge, favorable biological environment, popularity of Harar bull and income generated from fattening, recent introduction of improved forage, and farmer's interest in widening of their knowledge and skill on fattening, and available agricultural extension services were the opportunities in the area. There is no or little access to agricultural credit service. Therefore, addressing these constraints is very essential to develop a successful intervention program in this area for cattle. It is concluded that, future studies should focus on multidimensional improvement for solving problems and constraints in cattle production and productivity of the study area. **Copyright © www.acascipub.com, all rights reserved.**

Key words: cattle fattening, indigenous knowledge, traits, breed, cattle production

Introduction

Livestock in Ethiopia perform important functions in the livelihoods of farmers, Pastoralists and agro-pastoralists. Livestock are sources of food (meat and milk), services (transport and traction), cash income, manure (for soil fertility management and fuel), and serve as store of wealth and hedge against inflation. The subsector also provides year round employment for a significant part of the rural population, which would perhaps remain unemployed otherwise (MEDaC 1999). Livestock are especially important sources of cash income to the poorer sections of the Ethiopian rural population and women, as is also true in many other developing countries (Delgado et al 1999; Thornton et al 2002). Beneficial income diversification investments can arise from cash income generated from livestock (Little et al 2001).

The livestock is an important sub-sector within Ethiopia's economy in terms of its contributions to both agricultural value-added and national GDP. Between 1995/96 and 2005/06, the livestock sub-sector's share averaged 24 percent of agricultural GDP and 11 percent of national GDP, with the highest shares recorded at 27 percent and 13 percent, respectively, at its peak (NBE 2005/06). The contribution of livestock and livestock product exports to foreign exchange earnings is also large. The annual average revenue from livestock and livestock product exports was estimated to be 13 percent of the annual national foreign exchange earnings during the period 2000/01 to 2007/08 (NBE 2007/08). Given the large porous border, a large amount of cross-border exports also go un-recorded

At the household level, livestock plays a critical economic and social role in the lives of pastoralists, agro-pastoralists, and smallholder farm households. In the case of smallholder mixed farming systems, livestock provides nutritious food, additional emergency and cash income, transportation, farm outputs and inputs, and fuels for cooking food. The government recognizes the importance of livestock in poverty alleviation and has increased its emphasis on modernizing and commercializing the livestock sub-sector in recent years (SPS-LMM 2008).

West Hararghe is well known for its best practices and indigenous knowledge in cattle fattening. Enhancing the production and productivity in the area with available indigenous technical knowledge will help the improvement of the sector in increasing the sector contribution to national and agricultural GDP. Aim of the study is to identify and characterize challenges and opportunities of cattle production in west Hararghe.

Materials and Methods

Description of the study area

Oda bultum is one of the districts found in west Hararghe zone. The capital town of the district is named as Baddessa is located at 08°54', 318°N, 040°0', 021°E. Its Altitudinal range is from 1040 - 2500 m.a.s.l), the average altitude of the district is 1770 m.a.s.l. From the total land area/topography of the district; 60% is plain and 40% is steep slope. The annual rain fall is 900 mm-1100 mm). It has a mean maximum and mean

minimum temperature of 28 °c and 25 °c; respectively. The maximum rainfall and minimum rainfall is 1200 mm and 900 mm (DOA, 2012).

Chiro is located at 8°55'N 40°15'E. it is bordered on the south by Gemechis, on the west by Guba Koricha, on the northwest by Mi'eso, on the north by Doba, on the northeast by Tulo, and on the east by the Galetti River which separates it from Mesela and the east Hararghe Zone. Khat is an important cash crop of this woreda, but because it is a very perishable commodity and must be cultivated not too far from major markets or good roads, it is grown along the main road. Coffee is another important cash crop, with over 5,000 hectares is planted with this crop

Darolebu is located at 8°10'N 40°30'E. it is bordered on the south by the Shebelle River which separates it from the Bale Zone, on the west by the Arsi Zone, on the northwest by Guba Koricha, on the north by the Habro, and on the east by Boke. Towns in Darolebu include Machara and Micheta. Coffee is an important cash crop of this woreda. Over 50 square kilometers are planted with this crop. Gemechis is the one of districts of West Hararghe. It is one of the fourteen districts in West Hararghe zone located at 343 km east of Addis Ababa and about 17 km south of Chiro, capital town of the zone. It shares borders with Chiro district in the west and north, Oda Bultum district in the south and Mesala district in the east (DOA 2012). The district is found within 1300 to 2400 meters above sea level (m.a.s.l). It receives an average annual rainfall of 850 mm. The district has bi-modal distribution in nature with small rains starting from March/April to May and the main rainy season extending from June to September/October. The average temperature is 20 °C (DOA 2012).

Sample and sampling design

The study was used 165 households from four districts of west Hararghe namely darolabu, odabultum, gemechis and chiro. It involves a multistage purposive sampling method. Accordingly, districts were selected with zonal office of agriculture based on their cattle production potential.

Being with district agricultural development office eleven potential peasant associations from all districts; three from Darolabu, Gemechis, odabultum and two PAs from chiro were selected purposively. At each PAs potential cattle keepers were listed and among them the final fifteen respondents were selected randomly from the selected cattle keepers.

Data collection

A semi structured questioner was developed for the data collection; Enumerators was employed and trained on data collection. Accordingly, the primary data was collected from respondents. Focus Group Discussion was conducted in one peasant association of each district. All secondary data was collected both from published and unpublished source as per the demanded.

Data analysis

All the collected data was coded and entered in to the computer with statistical package for social science. Descriptive statistics (frequency, percentage, mean, and counts were employed to analyze the data. An index was calculated to provide overall ranking of breed selection criteria, according to the formula:

Index = sum of (5 X percent of household ranked first+4 X percent of household ranked second +3 X percent of household ranked third+ 2X percent of household ranked fourth+1X percent of household ranked fifth) given for each purpose divided by sum of ((5 X percent of household ranked first+4 X percent of household ranked second +3 X percent of household ranked third+ 2X percent of household ranked fourth+1X percent of household ranked fifth) for all selection criteria. Similar indices were done for constraints of livestock production.

Result and discussion

Table 1: Average land holding

No	Type	Mean \pm SE
1	Total cultivated land in Ha	0.8606 \pm 0.039
2	Total grazing land in Ha	0.0778 \pm 0.0134

Source: field survey

Socio Economic Characteristics of the House Hold

As the mean descriptive statistics of the above table shows the average cultivable land holding per household is equal to 0.86 \pm 0.039 ha, this result is the same with the result of CSA agricultural sample survey of 2008/09 report on land utilization. While, the total grazing land per household of the respondent shows 0.077 \pm 0.013 revealing that little land is given to grazing of livestock. The land holding reported in this study is below than that of Dhuguma et al who observed 2.5 hectare (ha) average landholding per household in dandi district of oromia regional state, central Ethiopia, the average area / male holder is 0.99+0.73.

Table 2: Occupation and educational level

Characteristics	Frequency	Percentage
Occupation		
crop production and livestock rearing	153	93.9
Crop production and trader	8	4.9
Crop production and carpeting	1	.6
livestock rearing	1	.6

Education		
illiterate	58	35.2
elementary	71	43.0
grade 9 and above	20	12.1
read and write	16	9.7
Average no of House hold	165	5.42

Source: Own Survey

The occupation and educational level was discussed in the table above. The result of the study shows that the major occupation in the study area were both crop production and livestock rearing followed by crop production and trading figuring 93.9 % and 4.9% respectively. Besides this, the average number of household is 5.42 members/household which is little greater than the result of CSA agricultural sample survey on land utilization in 2008/09, which reports the average house hold size as 5.33.

Majority of the respondents were learned the elementary school which means that they can able to write and read, followed by illiterate which cannot read and write and between grade 9 &10 formal education with 43%, 35.2% and 12.1% respectively. This result shows that even though formal education is crucial in promoting agricultural innovation still the level of basic knowledge on education is low which indicates enhancing education for improving farming community and livelihoods as well is needed.

Cattle production

Table 3: Breeds and breed types

No	Breed Type	Frequency	Percentage
1	Unknown Local	80	49.4
2	Ogaden	60	37.0
3	Jamusi/HF	4	2.5
4	Aruso	13	8.0
5	Carcar	1	.6
6	Boran	2	1.2
7	Baltu	2	1.2
	Total	162	100.0

Source: Own Survey

Generally, farmers in the area categorize their breed types as Local, Ogaden, Holistien Fresian /Jamusi, Aruso, Carcar, Borena, and Baltu, Different breed diversities were available in the study area Generally, there are around seven breeds which were named by the respondents among which the breed called Unknown Local, Ogaden, and Aruso/Arsi breed leads as first second and third with leading percentage of 49.4%, 37%,

and 8% respectively. This is the same as the result discussed by H.A. van Dorland et al 2003 on his study on the livestock breed survey of Oromia regional state in which he reported that Arsi/Aruso is the leading by number among the surveyed household followed by, unknown local and Ogaden.

Breed, and breed selection perception

Table 4: Index ranking of breed selection parameters or traits of cattle in west Hararghe

No.	criteria	1 st	2 nd	3 rd	4 th	5 th	index
1	Hump Size	13.33	4.96	5.63	19.04	-	0.09
2	Height to the wither	11.50	5.59	14.78	5.95	23.8	0.11
3	Dew Lap	7.87	11.18	8.45	-	4.76	0.076
4	Body width	10.30	29.19	11.97	32.14	14.28	0.188
5	Horn	1.21	1.24	1.40	3.57	23.8	0.030
6	Coat Color	15.15	13.66	26.05	11.9	9.52	0.161
7	Physical Appearance	4.24	3.1	9.15	10.71	-	0.055
8	Young Age	8.48	5.59	2.11	3.57	4.76	0.055
9	Tail	10.30	8.69	11.26	5.95	9.52	0.094
10	lion length	1.21	-	2.11	-	-	0.008
11	Leg Size	0.60	0.62	0.70	1.19	-	0.006
12	Thick Skin	1.21	0.62	-	2.38	-	0.008
13	Thin Skin	1.21	1.24	0.70	-	-	0.008
14	Teeth Number	1.81	0.62	0.70	-	-	0.009
15	Breed type	2.42	3.1	2.11	-	-	0.020
16	Long height	9.00	7.45	0.70	1.19	4.76	0.057
17	Face	-	3.1	0.70	2.38	-	0.013
18	Cattle with pendulous outer umbilical sheath	-	-	1.40	-	4.76	0.006

Source: own survey

The table above indicated that different phenotypic characteristics/traits are used for the identification and selection of breed for cattle production in the study area. There are more than eighteen traits of selection used for selection of cattle production (fattening and dairy). Furthermore, hump, height to the wither, dewlap, body width, short horn, color Physical appearance, age, tail, lion, leg thickness, skin thickness, tooth number, breed type, Face, and cattle with pendulous outer umbilical sheath are used.

Among the trait, Respondents ranked, body width as first criteria, followed by coat color (usually white, red and grey 'dalacha') and height to wither with respective index ranking result of 0.188, 0.161, and 0.11. This

result was different from the result reported by mekonnen et al 2012 in which farmers give better selection for Traits like body size, physical appearance, coat color and hump size were all considered as important. However, all the traits are considered also in this study area during breed selection for different purposes.

Feed Availability and type

Table 5: Abundant crop residues used as feed and feed sources

No	Feed type	Frequency	Valid Percent
1	Cereal straw (sorghum and maize)	74	45.1
	Cereal straw and sweet potato vines and tubers	30	18.3
2	Legumes haulms	28	17.1
	Cereal straw legume sweet potato	11	6.7
3	Sweet potato vines and tubers	4	1.8
4	Cereal straw and HB at early maturity	1	.6
5	Cereal straw and legume haulms	15	9.1
6	Maize, sorghum and barley	1	.6
7	Legume haulms and sweet potato vines and tubers	1	.6
	Total	165	100.0

Source: field survey

Inadequate supply of feed in both quantity and quality was reported to be the most single problems responsible for low productivity of the livestock (Galmesa et al) Different feed types were used in the study area. However, as indicated in the table above the major feed resource available among crop residues are cereal straw such as maize and sorghum which accounts 45.1% followed by cereal straw and sweet potato vines and tubers accounting for 18.3%. This result resembles the study of Azage et al 2011, which reports that Sorghum, maize, haricot bean and sweet potato production in Mieso woreda cover 73%, 22%, 3% and 1%, respectively of the arable land area they are used as food/feed crops, for cash income, up keep of soil fertility and for fulfilling various social functions.

Table 6: purpose of keeping cattle

No	Purpose	Frequency	Percent
1	Oxen		
	meat and cash	1	.6
	draft power and cash	159	99.4
	Total	160	100.0
2	Cows		
	milk	18	12.5

meat and cash	1	.7
milk and cash	125	86.8
Total	144	100.0

Cattle are kept for different purpose in Ethiopia. The result of this study revealed that cattle in western Hararghe kept for different purpose.

Knowledge of reasons for keeping animals is prerequisite for deriving operational breeding goals (Rewe et al 2006). Based on the result of these study cattle both (oxen and cow) the primary purpose of keeping oxen in Hararghe is for draft power and cash or income generation purpose accounting for 99.4 % of responses. Cows are kept for the purpose of milk and cash generation from sell of cattle 86.6, while they are also kept for milk purpose only secondly accounting 12.5% of responses.

Constraints in livestock production

Table 7: Rank of constraints of cattle production in the study area as indicated by respondent's (%) below with their index value

No	Constraint	Rank1	Rank2	Rank3	Rank4	Index
1	feed shortage	75.7	15.7	11.8	*	0.455
2	animal health,	4.8	10.4	23.5	12.5	0.098
3	feed cost	3	4.5	*	*	0.030
4	land shortage	2.7	14.6	2.9	12.5	0.068
5	water shortage	2.7	11.2	8.8	12.5	0.066
6	housing problem	2.7				0.014
7	agro industrial by product shortage	2	2.2	8.8	*	0.032
8	capital shortage	1.4	5.6	*	*	0.026
9	quality water shortage	0.7	1.1	2.9	*	0.012
10	market problem	0.7	12.4	20.6	12.5	0.080
11	lack of credit	0.7	*	*	*	0.004
12	poor management	0.7	*	*	*	0.004
13	lack of improved breed	*	6.7	8.8	25	0.037
14	extended drought	0.7	10.1	8.8	0	0.052
15	technical skill on feeding and fattening	*	1.1	*	25	0.004

16	market information	0.7	*	*	*	0.004
17	lack of improved forage	*	4.5	*	*	0.015

Source: own survey

*** unavailable**

The performance and effectiveness of cattle production depends on the various factors that affected the supply chain actors through different channels. These factors may impose constraints or establish opportunities that have bearings on the performance of the livestock production S N Mlote et al 2012. The survey result on one hand as reported by cattle keepers revealed that feed shortage is the major constraint of livestock production ranking first with the index of 0.455 followed by animal health, fair selling price as market problem, land shortage and water shortage problem with an index value of 0.098, 0.080, 0.068, and 0.066 respectively,

However, capital shortage, market information, extended drought, little access to credit service, and feed costs are among listed constraints of livestock production in the study area.

The first and second constraints of this study were similar with the study of (Belay et al 2012); it also seems the result of Galmesa et al. In which he reported Feed shortage, diseases and parasites, labor scarcity and lack of capital and credit were the major constraints limiting livestock production. In the meantime, the third and fourth constraints were different for this study. However, all listed problems in the finding of Belay et al 2012 and Galmesa et al are also similar problems for this study.

Health and health management system

Table 8: Health problems major diseases identified

No.	Disease type	Symptom	Treatment
1	Blackleg	Skin and its hair removed, Change meat color to black	*
2	Anthrax	Change meat color to black, sudden death, difficulty in breathing, fever	Cutting of under toung Skin burning , grlic
3	FMD/foot and mouth disease	Irresolute, Tongue enjury Lack of apatite, high fever, refuse to eat, become lame and refuse to stand	*
4	Skin disease	Irritation and External Parasitic effect	spraying diesel
5	Pasteurolosis	Uncontrolled salivation , lack of apatite	*

6	Bloating	Bloating	*
7	Trypanosomosis	*	*
8	Mastitis	*	
9	CBPP/contagious bovine pluro pneumonia	*	*
10	Internal parasites	*	*
11	diarrhea	Frequent diarring Egee kutaa Eye sickness	Feeding of Balanced diet and use of clean water
12	Emergent disease	refuse to eat, Irresolute Sudden death	*

Source: oda bultum farming system characterization

*means no /unidentified symptom and no treatment measures followed.

Different disease types found in the study area these shows establishing and extended veterinary service is crucial in the future to increase production and productivity of cattle in the area through reducing disease incidence and severity. Therefore, it is essential to give attention through establishing different sites of veterinary service and veterinary technician in different sites at large.

Farmers are using their indigenous knowledge to treat their sick animals using different mechanisms like giving different trees and shrubs leaves and roots, garlic, spraying of diesel on skin disease, but the dosage of the treatments and the impact of the medicaments are not known and burning of cattle body to treat their sick animal may have mechanical damage on their body. On the other way, the medicinal herbaceous plants should be studied on their correct and helpful medicinal parts and value so that may be used as an input for industrial purposes.

Opportunity for cattle production in west Hararghe

Cattle production can significantly benefits the farmers of west Hararghe at all. Availability of diversified breeds, good fattening weather, and good income generated, good indigenous knowledge of fattening, recent introduction of some improved forage varieties, popularity of fattened Harar bull in the country were an opportunity for cattle production in the study area. Farmers in the area were willing and interested in using improved management and fattening practices in bridging the indigenous knowledge with improved fattening practice because they were believed that with available potential indigenous knowledge it will improve their efficiency and increased their income generation opportunity.

Credit, extension and agricultural intervention service

Table 9: Access to Agricultural credit service across the districts as survey count result count

No.	Service type	Frequency No.	District of respondents				Percentage
			Darolab u	Odabultum	Gemechi s	Chiro	
1	Agricultural credit service						
	Have access	18	5	7	5	1	10.9
	No access	147	41	37	40	29	89.1
	Total	165					100
2	Agricultural extension service (access)						
	Have access	129	37	38	36	18	78.2
	Have no access	36	9	6	9	12	21.8
	Total	165					100.0

Source: own survey

In promoting cattle production agricultural credit service plays a major role in providing services both in kind and cash According to the survey result, only 10.9 percent of the respondents have an access to agricultural credit service where as 89.1 percent or majority have no access to credit service. Furthermore, the numbers of credit receivers are almost all the same in all district of the study area.

Agricultural extension services in the study area was good showing that 78.2 percent of respondents have got an access of agricultural extension service in their community, area in which service received were advisory service, provision of improved forage varieties, training on area of improved feed and feeding system, on how to get credit service, veterinary service.

Table 10: access to credit gained as described by gender and district.

No.	Access to credit	Darolabu		odabultum		gemechis		chiro		Total
		husband	Wife	husband	Wife	husband	Wife	husband	Wife	
1	Receiver	5	0	7	0	4	1	1	0	18
2	Type of credit service rendered									
	Credit type	darolabu		Odabultum		Gemechis		chiro		total
	in cash	2		2		3		1		8
	In kind	5		7		2		0		10

Source own survey

Table 11: Purpose credit service obtained, count result

No	Purpose	District of respondents				Total
		Daro labu	Oda bultum	Gemechis	chiro	
1	for fattening	5	7	3	1	16
2	livestock rearing	0	0	1	0	1
3	crop production and fattening	0	0	1	0	1
	Total	5	7	5	1	18

Source: own survey

Conclusion and recommendation

Conclusion

Findings of the study concluded that the average land holding of the respondent is below one hectare and the grazing land allocated privately was not enough for producing feed for cattle at large. Crop production and livestock rearing in the study area is the major livelihood system. There are seven breed types of cattle that farmers categorized but they believed that most of the breeds have the capacity to easily fatten so in the future characterization will play a crucial role in identifying and improving available breed for increasing livestock productivity. Farmers keep animals for different purpose as to the study area more than 99% of the response indicated that cattle kept for draft power, cash to generation income in terms of fattening, dairy and animal products.

The study revealed that cereal straw is the leading crop residue for feed followed by the combination of cereal straw and sweet potato vines and tubers during the dry season. this is related with the preservation of cereal straw for future use and implicit view of producing drought tolerant crops for feed.

Farmers use different traits to select animals for future use either for breeding or fattening, during this time more than eighteen traits has been considered but the most stressed and focused during selection of breed are height to the wither body width and animal coat color.

Although different constraints were facing the farmers in the area; Feed shortage, animal health, market problem (fair selling price) land shortage and water problems were the major ones constraining form intensified cattle production.

Availability of diversified breeds, good fattening weather, and good income generated, best indigenous knowledge of fattening, recent introduction of some improved forage varieties, popularity of fattened Harar bull in the country are an opportunity for cattle production.

Agricultural credit service plays a vital role in commercializing agriculture. But the result of this study concluded that there is little or no credit service in the study area to promote the productivity and improvement of the sector.

Although extension service was available in the area on time and quality extension service promotion plays a major role in effective livestock production sector.

Livestock diseases were among the major factors that limit cattle owners' benefits as a result of mortality mekonen et al 2012. The study area experiences different disease like blackleg, anthrax, FMD (foot and mouth disease), Pasteurellosis Skin disease Trypanosomosis Mastitis, pneumonia, emergent disease, CBPP/contagious bovine pluro pneumonia, internal parasite and diarea. Better addressing of the veterinary service may improve the available problem.

Recommendation

Depending on the result of the findings and conclusion made the recommendations below has been given for future cattle improvement and the sector development in the study area.

Most of the breeds in the study area didn't well known and are called local or 'habesha' so characterizing of existing breeds for different traits of performance will help to develop the future intervention areas. Research has to be done to identify the potential of existing breed as to dairy, beef, and etc. so that specializations based improvement will be done for each breed based on their potential accordingly.

As the study area specializes on fattening and feed shortage was the major constraint for the area; Introduction of new improved forage varieties which will help for fattening plays indispensable role. Quality water development and delivery should make relative reduction in the severity of disease in the area.

Cattle marketing and market related things are a crucial problem. Lack of fair selling price, broker interference, and market monopoly by single merchant was significantly reduced farmers benefit 'once the trader come in the community and asked me to sell my fattened animal with the price he gave me no body purchase me the animal more than the price he fixed so, I'm enforced to sell at what price merchants fixed earlier' farmers said. So promotion of livestock marketing study will solve the problem and bringing all actors along value chain will improve the market access for optimum benefit of each actors.

Establishing cattle market information center will also play a vital role in helping farmers to seek and hear for current market price. On the other way, improving access to micro finance institution will capacitate farmers bargaining power by providing credit system.

Putting the indigenous fattening practices with the current scientific knowledge will help in enhancing the sector for its contribution to household income generation activities. Therefore, fattening based ration formulation research should have to be done and/or adopted from different areas of the same agro ecology.

Increasing livestock production and productivity will include effective control of cattle disease. It has to be studied with its characteristics. Future studies have to address severity and incidence analysis in the area.

Enhancing the capacity of veterinary technician both technically and materially will help in controlling the outbreak of the disease so attention should be given.

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