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On Farm Production Systems Characterization of Indigenous Cattle in Bako Tibe and Gobu Sayo Districts of Oromia Region, Ethiopia

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Abstract
The study was conducted in Bako Tibe and Gobu Sayo districts of Oromia Regional State, Ethiopia, from October 2014 to January 2015 with the objective to undertake on-farm production system characterization of indigenous cattle breed (Horro) in the study area. Field studies and collection of data were carried out through semi-structured questionnaire, focus group discussions, key informants and secondary data collection from different sources. A total of 120 households (60 from each district) were randomly selected for semi structured questionnaire interview. SAS and SPSS software were used to analyze the data. The study result revealed that overall cattle herd size was 9.67±3.34 heads per household and was not significantly different ($p<0.05$) between districts. The main purposes of keeping Horro cattle in both locations were draught power, milk production, income, manure and threshing of crop. The age at first service (AFS) of male Horro cattle was 3.47±0.39 years. The age at first mating (AFM) and age at first calving (AFC) of female cattle were 3.73±0.51 and 4.98±0.68 years respectively. The calving interval (CI) of Horro cow was estimated to be 1.88±0.49 years and showed no significant difference between locations. The mean productive life time and number of calves born per female productive lifespan were found to be 11.95±2.10 years and 5.92±1.42 calves, respectively. The daily milk yield of Horro cow was estimated to be 1.42±0.55 liters and the cows were milked for a mean lactation length of 9.25±2.93 months. The lactation milk yield was estimated to be 394.05 liters. Natural and uncontrolled mating is the main breeding system in the two districts. The main sources of breeding bull were community land, owned bulls and neighboring herd. The effective population size and inbreeding coefficient were estimated to be 3.26 and 15.30% and 147.04 and 0.034% for household herd and combined population respectively for Bako Tibe while in Gobu Sayo district it were 3.06 and 16.30% and 159.8 and 0.030% for household herd and combined population, respectively. The main trait of Horro cattle breed preferred by the community were its milk yield, coat color and survival on low quality feed. The main cattle feed resource in all seasons is natural pasture obtained from community and owned grazing land in both Bako Tibe (63.3%) and Gobu Sayo (71.6%) districts. The major cattle production constraints were feed shortage, diseases, lack of improved breeds, improved forage, market access, shortage of water and labor in that order. The reported main cattle diseases in the area were trypanosomiasis, pasteurellosis, lumpy skin disease, contagious bovine pleuro pneumonia, parasites, blackleg and anthrax. The current study result indicated that Horro cattle production and reproductive performance in the current environmental condition are comparable with other indigenous breeds and have potential for improvement. Feed shortage got the highest rank by cattle owners to be the most limiting factor for productivity of their cattle followed by disease. This implies that the importance of improving feed (production of improved forage and grasses) and disease management (disease prevention control vaccination and treatment) are the critical steps toward improvement of the breed.

1. Introduction

Animal genetic resources (AnGR) for food and agriculture are an essential component and the biological basis for world food security. Hundreds of millions of poor rural people keep livestock and often rely on their animals to provide multiple products and services. In harsh environments where crop production is not reliable, livestock keeping is often the main or only livelihood option available. Livestock currently contribute to about 30 percent of agricultural gross domestic product in developing countries, with a projected increase of about 40 percent by 2030. The World Bank has estimated that it will be necessary to increase meat production by about 80 percent between 2000 and 2030. This will require more efficient animal production systems, careful husbandry of natural resources and measures to reduce waste and environmental pollution (FAO, 2011).

Livestock production in Ethiopia contributes up to 80% of the farmers income 18% of the overall GDP (FAO, 2004), 45% of the agricultural GDP (including draught power), above 20% all the national exports (official and cross border trade) and 5% of the total manufacturing GDP (IGAD LPI, 2010).

The total number of cattle in all regions of the rural sedentary areas of the country was estimated to be 55.03 million (CSA, 2013/14). Majority of these cattle (98.71 percent) are indigenous breeds which are kept under extensive management. Cross breeds and exotic breeds accounted for about 1.15 percent and 0.14 percent, respectively (CSA, 2013/14). If we include the value of traction services, livestock provided 45% of agricultural

GDP in 2008-09 (Behnke, 2010).

Indigenous livestock breeds in Ethiopia are a valuable source of genetic material because of their adaptation to harsh climatic conditions, their ability to better utilize the limited and poor quality feed resources and their tolerance to a range of diseases found in these regions. Despite the significant contribution of livestock to the country, little attention is given to identify, characterize and conserve the diversity of the various classes of livestock (DAGRIS, 2009). Understanding the diversity, distribution, basic characteristics, comparative performance and the current status of a country's animal genetics resources is essential for their efficient and sustainable use, development and conservation (FAO, 2007). However, only a small number of recognized cattle breed types have a fair description of their physical appearance, indications of their level of production, reproduction and genetic attributes (Workneh *et al.*, 2004).

The objective of the study is to characterize the production system of indigenous cattle breed (Horro) in the study areas

2. Materials and Methods

2.1 Description of the Study Areas

2.1.1 Bako Tibe

Bako Tibe district is located in West Shoa Zone of Oromia Regional state at about 250 km west of Addis Ababa at an average altitude of 1650 m.a.s.l. The area has a hot and sub-humid climate and receives a mean annual rainfall of about 1220 mm, of which more than 80% falls in the months of May to September. Mean monthly minimum and maximum temperatures are about 14°C and 28°C, respectively, with an average of 21°C. The daily mean minimum and maximum temperatures are 9.4°C and 31.3°C, respectively. The total area of Bako Tibe district is about 64,469 hectares of land with animal population of 137,343 cattle, 12,502 sheep, 24,212 goats, 3685 horses, 8415 donkeys, 1023 mule and 96742 Poultry.

2.1.2 Gobu Sayo

Gobu Sayo district is located in the eastern Wollega zone of Oromia Region; western part of Ethiopia, about 263 km from Addis Ababa. It is the mid land area with hot and humid climate. The mean annual temperature of the district ranges between 15^{o}C to 20^{o}C whereas the mean annual rain fall may reach to 2000 mm (District Agricultural and Rural Development Office). The district has an altitude range from 1500 to 1750 m.a.s.l. with average altitude of 1625 m.a.s.l. Total area of the Gobu Seyo district is about 33,153 hectares of land with animal population of 226,791 cattle, 9, 5334 sheep, 9283 goats, 72 horses, 3300 donkeys, 601 mule and 24954 poultry.

2.2 Sampling, Data Collection and Analysis

2.2.1 Sampling Technique

A multistage sampling technique was employed in gathering information on the production system, indigenous knowledge and husbandry practices, major constraints and physical descriptions of cattle in the study area. The first stage involved selecting two districts using purposive sampling technique based on availability of cattle population (comparatively), accessibility and randomly selecting three rural *kebeles* from each district. The district agricultural development offices and Livestock development and health agencies were contacted for brief discussion on traditionally recognized indigenous cattle types and their distribution in the zones and selection of sample rural *Kebeles*, was done together with district experts and development workers to select households or herds and three rural *Kebeles* from each district randomly. In the second stage, sample cattle owners were selected randomly using systematic sampling procedure so as to interview them with semi-structured questionnaire on the above important issues. A total of 120 households were interviewed for the study (60 from each district).

2.2.2 Data Collection

Information on the reproduction performance viz., age at first service, age at first mating, age at first calving, number of calf produced per cow's lifetime and calving interval of cattle were assessed using designed questionnaire. Similarly, information on breeding management, like Mating system, cow estrus sign and estrus detection methods, sources of bulls, main uses and special attributes of the cattle breed were also collected.

2.3 Questionnaire Content and Type of Data Collected

Information on the reproduction performance including age at first services, age at first mating, age at first calving, calving interval, number of calves produced per cow's lifetime, reproductive life time of cow, age at which bull castrated, reproductive life time of bull, age at which bull reach for draught, work life time for ox and milk production performance of cows were assessed using designed questionnaire. Similarly, information on breeding management of cattle including mating system, source of bull, cow estrus sign and main uses of indigenous cattle breed were collected.

Moreover, formal group discussions with cattle owners were conducted on general issues like status of

the indigenous cattle breed, breeding management and goal, population trends and major threats to the breed. Cattle owners themselves were also allowed to prioritize purposes of keeping cattle and cattle production constraints in the study area without any interference. Secondary data were utilized to support and/or cross check the accuracy of field surveys and measurements. Milk yield data of lactating cows were obtained by interviewing cattle owners in collaboration with DAs to estimate productivity of the breed though the cows may be at different stages of lactation, levels of management, ages and other factors related to milk yield.

2.4 Analysis of Data

The SPSS statistical software (SPSS for windows, release 20.0, 2011) was used to analyze the data. Index was calculated to provide ranking for purpose of keeping cattle and constraints to cattle production. Index was calculated as Index = sum of (4x number of households ranked first + 3x number of households ranked second + 2x number of households ranked third +1x number of households ranked fourth) given for each variable source divided by sum of (4x number of households ranked first + 3x number of households ranked second + 2x number of households ranked third +1x number of households ranked fourth) for all sources.

2.5 Effective Population Size and Inbreeding

The effective population size and inbreeding were calculated on the bases of individual household herd size and combining all the herds of the community. There are chances of mixing up of the communities' herds on the communal grazing land and there might be a probability of mating among the herds. But it was done for each district separately. Estimates of average change in percentage inbreeding were made with expression: $\Delta F = 1 / (2\ Ne)$

Where ΔF = Rate of change in inbreeding

$Ne = 4\ Nm \times Nf / Nm + Nf$ (Ne = the effective population number)

Nm = number of breedable male, Nf = number of breedable female

3. Results and Discussion

3.1 Cattle Production System

Current study indicated that the major household activity in the study sites mainly depend on crop cultivation. The communities' livelihood is also dependent on crop primarily and secondly, livestock and livestock products, both for home consumption and marketing. The main cattle production system of the area is characterized by mixed system which is defined by crop and livestock production side by side.

3.2 Livestock Possession and Herd Structure

The most important species of livestock in the study area was cattle followed by sheep and Goats, but population ways chickens were more than sheep and goat (Table 1). That is of different livestock raised in the area cattle is produced in large number followed by chicken (Table 1). Cattle possession in the study areas was 9.73±1.34 in Bako Tibe and 9.60±5.11 in Gobu Sayo among the sample population. The overall cattle possession in the study area was 9.67± 3.34 (Table 1). The report was lower than both that of Ayentu *et al*. (2012) in Horro district and Shiferaw (2007) in Fantale districts of Oromia region which were 14.7±0.55 and 12.2, respectively. This may be due to the fact that the study area is known as maize belt area, so that more land is allotted for maize crop and only little land is left for grazing, due to which farmers are forced to reduce their number of cattle compared to the high land area of Horro district.

Table 1. District-wise types and livestock possession in the sampled household (HHs)

District	HHs	%	Livestock species	Total	Mean	SD
Bako Tibe	60	100.0	Cattle	584	9.73[a]	2.34
	6	10.0	Goats	21	3.50[a]	1.98
	8	13.3	Sheep	44	5.50[a]	3.16
	26	43.0	Donkey	45	1.73[a]	1.15
	52	86.3	Chicken	424	8.15[a]	6.73
	5	8.3	Horse	5	1.00[a]	0.00
	5	8.3	Mule	5	1.00[a]	0.00
Gobu Sayo	60	100.0	Cattle	576	9.60[a]	5.11
	12	20.0	Goats	86	7.17[b]	4.32
	9	15.0	Sheep	36	4.00[b]	1.66
	14	23.3	Donkey	20	1.43[a]	0.65
	49	81.7	Chicken	392	8.00[a]	6.20
	-		Horse	-	-	-
	1	1.67	Mule	1	1.00[a]	0.00
Overall	120	100	Cattle	1160	9.67	3.34
	18	100	Goats	107	5.94	4.05
	17	100	Sheep	80	4.71	2.52
	40	100	Donkey	65	1.63	1.01
	101	100	Chicken	816	8.08	6.45
	5	100	Horse	5	1.00	0.00
	6	100	Mule	6	1.00	0.00

HHs= Households, SD= Standard deviation, [a,b] Means on the same column with different superscripts within specified class variable, are significantly different($p<0.05$)

3.3 Purpose of Keeping Indigenous Cattle

Rewe *et al*. (2006) mentioned that the knowledge of reasons for keeping animals is prerequisite for deriving operational breeding goals. As it was witnessed from group discussion, indigenous cattle play a key role in day-to-day life of farmers who are rearing them. This study revealed that, the purpose of keeping indigenous cattle, Horro cattle in this case was for traction, milk production, income generation, manure (to increase soil fertility), treshing of crop, social status and meat. Traction takes the lead in both districts with index of 0.392 in Bako Tibe and 0.383 in Gobu Sayo district (Table 2). These results were similar with the result of Jirenga (2007) which was conducted at Danno district of west shoa zone and that of Agere (2008) and Ayantu et *al*. (2012) both of which were conducted in Horro district of Horro guduru Wellega zone. However, the report of Solomon (2010) indicated that higher rank for milk production and cash income than for draught power was given for the purpose of keeping Ethiopian Borana cattle in pastoral and agro pastoral area of Borana zone. The finding of Endashaw (2010) also indicated that the main purpose of keeping Mursi cattle in Salamago district in south west Ethiopia was for milk production than draught power. VanDorland *et al*. (2004) reported that indigenous zebu cattle are multipurpose in Ethiopia. In Gambia, Steglich (2006) studied that the production objective of agro pastoralist and reported that cattle have primarily saving function. However, functions like milk production, manure and draught power are also important. In this study draught power got relatively high rank among the reasons for keeping cattle in mixed production system. This appears be due to the fact that oxen are used in different agricultural operations.

Table 2. Ranking of purpose of keeping Horro Cattle by respondents

Purpose of keeping	Bako Tibe					Gobu sayo				
	Rank1	Rank2	Rank3	Rank4	Index	Rank1	Rank2	Rank3	Rank4	Index
Traction	55	3	2	2	0.392	54	3	2	1	0.383
Milk	2	45	6	4	0.265	3	45	6	4	0.272
Income	1	4	37	18	0.180	2	4	37	17	0.185
Manure	1	2	13	9	0.075	1	2	12	9	0.073
Trashing of crop	1	4	1	10	0.046	0	4	2	10	0.043
Social status	0	2	1	8	0.027	0	2	1	8	0.027
Meat(cattle)	0	0	0	9	0.015	0	0	0	10	0.017

3.4 Cattle Population Trend

According to focal group discussion and key informants of the study area, the population of indigenous Horro Cattle had been seem to follow a decreasing trend for individual famer who rear them, mainly due to expansion of crop land which in turn results in scarcity of grazing land which then lead to feed shortage. As a result farmers

have the tendency to sell their cattle to reduce the burden of number of cattle they owned.

However, the overall cattle number seems to follow an increasing trend due to the fact that the demand for livestock and livestock product is increasing on the market and the number of individuals who rear the cattle was increasing. In this study the mean cattle herd size was 9.67 per individual farmers (Table 1) which is lower than the report of both Jiregna (2007) at Danno district and Ayentu *et al*. (2012) at Horro district which were 12.8 and 13.23 respectively.

This indicates that even though the demand for livestock and livestock product is increasing it seems a must for farmers to reduce the number of their cattle unless they have to shift the current production system.

3.5 Labor Division within Household in Cattle Management

Summary of the responsibility of family members in cattle husbandry practices categorized by age and gender are indicated in Table 3. Different husbandry practices are accomplished by different members of the family. In mixed production system of the area herding of cattle is mainly accomplished by sons 61.65% followed by husband (17.5%), household head in most cases. But, all family members take part in herding of cattle by different proportion in different time. However, milking of cows is mainly the job of wife (86.65%) but adult daughter (6.7%) and hired labor (6.65%) also take part in milking of cattle. Selling milk and milk product is mainly done by wife (93.35%) while selling of live cattle was mainly the responsibility of husband (80%). The report of Demmissu *et al*. (2014) also indicated as cow milking the duty of female family members, which reported 53.3% of cow milking is done by women and 45.3% done by women and girls at villages surrounding Guduru Cattle improvement and Research Center of Wollega University.

3.6 Feed and Feeding Management for Cattle

The reports of the farmers in the study area indicated that, the main feed resources available for cattle are community grazing pasture; own grazing land, crop residues, and crop by- products, table salt and household kitchen waste. The major feed resource utilized in the study areas are summarized in Table 5. The main cattle feed resource in all seasons is natural pasture obtained from community and owned grazing land in both Bako Tibe (63.3%) and Gobu Sayo (71.6%) districts. The report of Ayantu *et al*. (2012) indicated that the main feed resource that support

Table 3. Responsibilities of family members for some routine husbandry practices of Horro cattle

Husbandry practices	Bako Tibe					Gobu Sayo					Overall				
	Responsible individuals (%)					Responsible individuals (%)					Responsible individuals (%)				
	H	W	S	D	HL	H	W	S	D	HL	H	W	S	D	HL
Herding	16.7	5.0	60.0	8.3	10.0	18.3	3.3	63.3	3.4	11.7	17.5	4.15	61.65	5.85	10.85
Shade/house cleaning	12.5	54.2	8.3	11.7	13.3	10.0	58.3	13.3	11.7	6.7	10.85	54.15	10.8	11.7	10
Supplementary feed provision	50.0	16.7	13.3	11.7	8.3	60.3	8.0	6.7	16.7	8.3	55.15	12.35	10	14.2	8.3
Milking	0.0	83.3	0.0	6.7	10.0	0.0	90.0	0.0	6.7	3.3	0.0	86.65	0.0	6.7	6.65
Selling of milk and milk products	0.0	90.0	0.0	10.0	0.0	0.0	96.7	0.0	3.3	0.0	0.0	93.35	0.0	6.65	0.0
Taking care of seek cattle	66.7	13.3	11.7	3.3	5.0	66.7	13.3	10.0	6.7	3.3	66.7	13.3	10.85	5.0	4.15
Selling of live cattle	76.7	23.3	0.0	0.0	0.0	83.3	16.7	0.0	0.0	0.0	80.0	20.0	0.0	0.0	0.0

Livestock in the Horro district during the cropping season was natural pasture, whereas crop residues are the major feed in the dry season in the district as crop production is high in the farming community.

The common feeding management practice in the study area was reported to be extensive grazing system with average grazing time of 9:16±1.48 hours per day (Table 4). The study of Ayantu *et al*. (2012) in Horro district indicated comparable result with this finding who reported 9:30 hours per day.

Table 4. Length of grazing time (in hours)

Districts	Mean	N	SD	Minimum	Maximum
Bako Tibe	9.28	58	1.47	6:00	12:00
Gobu Sayo	9.04	59	1.50	5:00	12:00
Overall	9.16	117	1.48	5:00	12:00

N= Number of respondents, SD= standard deviation

As per table 5 the use of cultivated pastures (5%) which is mostly inaccessible in the study areas is good option in overcoming feed shortage by scaling up the production and use of cultivated pasture . Use of cultivated pasture and crop residue and by product is better in Bako Tibe district than in Gobu Sayo district (8.3 and 18.4%) in Bako Tibe and only (1.7 and 10%) in Gobu Sayo district. This could be due to the fact that more awareness was created in Bako Tibe district than in Gobu Sayo in utilization of cultivated pasture and conservation and utilization of crop residue and by products (Table 5 and 6).

Table 5. Types of feed utilized in the locality and total time cattle spend on grazing

Types of feed	Districts				Overall	
	Bako Tibe		Gobu Sayo			
	N	%	N	%	N	%
Natural pasture(communal and owned)	38	63.3	43	71.6	81	67.5
Crop residue and by product	11	18.4	6	10.0	17	14.2
Conserved hay	2	3.3	7	11.7	9	7.5
Cultivated pasture	5	8.3	1	1.7	6	5.0
Concentrates	1	1.7	3	5.0	4	3.3
Household kitchen waste	3	5.0	0	0.0	3	2.5

N= Number of respondents

Table 6. Seasons of feed scarcity and methods of overcoming feed shortage

Seasons	Districts				Overall	
	Bako Tibe		Gobu Sayo			
	N	%	N	%	N	%
Dry season(January to May)	46	76.7	43	71.7	89	74.2
Rainy season(June to August)	10	16.6	13	21.6	23	19.1
Year round	4	6.7	4	6.7	8	6.7
Methods						
Storing Crop residue(Both dry and wet seasons)	48	80.0	47	78.3	95	79.2
Cutting and carry of legumes, grass and weed of maize (Wet season)	8	13.3	12	20.0	20	16.7
Offering Sugarcane top (Dry season)	4	6.7	1	1.7	5	4.2

N= number of Household

Scarcity of feed was more pronounced in the dry season (74.2%). About (19.1%) of the respondents reported that there is also scarcity of feed during main rainy season (June to August) in the study area (Table 12).

3.7 Water Source and Watering Management

Major sources of water for animal consumption in the study areas were permanent River, pond and spring water (Table 7). Permanent River is the main water source in both Gobu Sayo (93.3%) and Bako Tibe (91.7%) districts. Only about (3.3%) and (5%) of the respondents in Bako Tibe and Gobu Sayo respectively, revealed that pond can be used as water source for their cattle (Table 7). There is no difference between cattle categories in providing water except very young calves, which were allowed drinking water two times at home, but adult animals drink water from rivers mainly available around community grazing areas.

Table 7. Source of water for livestock in the study area

Sources	District				Overall	
	BakoTibe		Gobu Sayo			
	N	%	N	%	N	%
Permanent river	55	91.7	56	93.3	111	92.5
Pond	2	3.3	3	5.0	5	4.2
Spring	3	5.0	1	1.7	4	3.3

N= Number of House

3.8 Housing and Herding Management of Cattle

As per Table 8 the grazing method in the study area was mainly just by herding (97.5%) and only about 2.5% of the respondents reported zero grazing. This herding method was of two type, herding cattle in community grazing land turn by turn through system called "ulee" which means a group of cattle kept together and in one ulee 60 to 100 cattle can be kept and herded by one or two herd men at a time. The report of (Jiregna, 2007) also indicated farmers in the Danno district herd their animals in groups and this is locally called "Ulee". One herding group may consist of 5-20 farmers and 50-150 cattle. The other one is herding of cattle on owned grazing land and in this case only household cattle can be kept. Even though the production system was same the housing system has significantly different between in the two districts. The housing system at Gobu sayo was mainly open camp (91.7%) and at Bako Tibe district about (73.3%) was open camp. In overall majority (82.5%) of the respondents at the study area reported that the system of housing they followed was open camp (Table 8). As per respondent very young calves are housed separately in closed house to protect them from suckling their dam, trampling, predators, wind, rain and theft. Farmers provide water for cattle two times per day. In Guduru area (Western Oromia) majority (60%) of farmers enclosed their cattle in stall/fence at their back yard during nighttime (Demissu *et al*., 2014).

Table 8. Grazing methods exercised and housing system in the study area

Methods of grazing	Districts				Overall	
	Bako Tibe		Gobu Sayo			
	N	%	N	%	N	%
Herding	58	97.7	59	98.3	117	97.5
Zero grazing	2	3.3	1	1.7	3	2.5
Housing System						
Open camp	44	73.3	55	91.7	99	82.5
Housed at night only	16	26.7	4	6.7	20	16.7
Housed at night and part of the day	0	0.0	1	1.6	1	0.8

N= Number of Household

3.9 Major Constraints to Horro Cattle Production

In any production system before starting any genetic improvement program it is basic to identify the constraints that hinder the production and productivity of cattle. Ranked constraints by respondents in the study area are presented in Table 9. The respondents put the most critical problem to cattle production as feed shortage in both districts with index (0.331) in Gobu Sayo and (0.330) in Bako Tibe districts. Disease problem ranked second with index of 0.280 and 0.295 in Gobu Sayo and Bako Tibe, respectively. Generally feed shortage, disease, lack of improved breeds, lack of improved forage, lack of market access, shortage of water during dry season and lack of labor were ranked from higher to lower in the above order by respondents as factors that hindered cattle production in the study area. Ayantu *et al*. (2012) found similar result at Horro district, except for lack of labor which got higher ranking in her finding. According to the report from elders and key informants in the study areas feed shortage was mainly due to shortage of grazing land as a result of expansion of crop land. Therefore, attention should be given to this issue to obtain better productivity from the indigenous breeds we have, Horro cattle in this case. The report of PRA (Participatory rural appraisal) survey undertaken by Ulfina *et al*. (2005) in Danno district indicated that the main production constraints of cattle production of the area were limitations in quality and quantity of feed, diseases, lack of breeding bulls and market access. Endashaw (2010) also reported seasonal feed shortage, disease, parasites and drought as main cattle production challenges in Salamango district of south west Ethiopia. Solomon (2010) indicated that in pastoral and agro pastoral area of Borana zone the main constraints to cattle production are recurrent drought, feed and water shortage, disease, market problem and genetic erosion. The reports of Nibret *et al*. (2012) indicated that shortage of animal feeds, grazing land and livestock health problems and low genetic potentials are the fore front constraints for livestock developments in Ethiopia. Similarly Belay (2013) also indicated feed shortage due to scarcity of grazing land and high human populations were the most important limiting factors to livestock production followed by poor productive and reproductive performance of animals, disease and the challenge of parasitic infestation in Haramaya district, eastern Ethiopia. To have promising products and reproductive performance from our indigenous cattle, Horro in this case it is a must to give attention on how to remove or reduce the problems, as mentioned above.

Table 9. Summary of constraints in cattle production as ranked by respondents

Constraints	Bako Tibe					Gobu sayo				
	Rank1	Rank2	Rank3	Rank4	Index	Rank1	Rank2	Rank3	Rank4	Index
Feed shortage	45	3	4	1	0.330	40	3	2	1	0.331
Disease	9	40	8	5	0.295	11	39	9	5	0.280
Lack of improved breeds	4	10	22	17	0.178	5	14	21	8	0.177
Lack of improved forage	2	7	26	21	0.170	3	3	25	15	0.131
Market	0	0	0	7	0.012	1	1	2	21	0.053
Water shortage	0	0	0	6	0.010	0	0	1	5	0.020
Labor shortage	0	0	0	3	0.005	0	0	0	5	0.008

4. Summary and Conclusion

The study was conducted in Bako Tibe and Gobu Sayo districts of western Oromia Regional State, Ethiopia, from October 2014 to January 2015, with the objective to undertake on-farm production system characterization of indigenous cattle breed (Horro) in the study area. Field studies and collection of data were carried out through semi-structured questionnaire, focus group discussions, key informants and secondary data collection from different sources. The study result revealed that overall cattle herd size was 9.67±3.34 heads per household and which was not significantly different ($p<0.05$) between districts, which was 9.73±2.34 and 9.60± 5.11 for Bako Tibe and Gobu Sayo districts respectively.

The average reported age at first service (male), age at first mating, age at first calving and calving interval for Horro cattle were 3.47±0.39,3.73±0.51, 4.98±0.68 and 1.88±0.49 years respectively, with associated lifetime calf crop production (number) of 5.92±4.2 and reproductive life span of 11.95±2.10 years.

The overall average reported daily and lactation milk yield for Horro cattle were 1.42±0.55and 394.05litres, respectively, with average lactation length of 9.25±2.93 months.

Sources of feed for cattle in the study area were mainly natural pasture (67.5%), crop residue and by products (14.2%) and conserved hay. Other feed resources utilized in the area were cultivated pasture, concentrates and household kitchen waste.

The effective population size and inbreeding coefficient were estimated to be 3.26 and 15.30% and 147.04 and 0.034% for household herd and combined population respectively for Bako Tibe while in Gobu Sayo district the respective values were 3.06 and 16.30% and 159.8 and 0.030% for household herd and combined population respectively.

Monitoring population to estimate the population size of Horro cattle should be undertaken as the breed needs conservation measures. The reported main cattle disease problems of the area were trypanosomiasis, pasteurellosis, lumpy skin disease, contagious bovine pleuro pneumonia, parasites, blackleg and anthrax. Thus regular vaccination should be given for those common diseases that have vaccine.

The breed produces and reproduces in the environment where there are no or few inputs, high disease and parasite challenge with preferable traits to the farmers in the area. Since Horro cattle owners prefer different traits (like draught power, milk production, reproductive performance and coat color) in selecting their cattle for production, it is better to include these preferences of farmers in the improvement strategies of the breed, because production function and services expected from cattle are related to the trait desired by farmers. Horro cattle are used for multiple purposes and kept in mixed crop-livestock production system.

Based on the result of this study, it is possible to suggest the following conclusions and recommendations.

- Feed shortage got the highest rank by cattle owners to be the most limiting factor for productivity of their cattle followed by disease. This implies that the importance of improving feed; feeding regime and disease management are the critical steps toward improvement of the breed.
- Horro cattle have variable milk yield when compared to other breeds, which can provide a room for their improvement through selection.
- It can be also concluded that Horro cattle are the only breed for milk production and draught power in the study area, and the breed has potential for better contribution through improved feeding, health management and genetic improvement.
- The current study result indicated that Horro cattle production and reproductive performance in the current environmental condition are comparable with other indigenous breeds and have potential for improvement.
- To improve the breed, functional community based breeding strategies at farmers' level can be suggested.

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