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Original Article

Assessment of Production and Reproductive Performances of Cattle and Husbandry Practices in Bench-Maji Zone, Southwest Ethiopia

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ABSTRACT

The research was conducted to characterize the performances of cattle, to assess farmer preferences for cattle traits and to identify the husbandry practices and major constraints. Mean for age at puberty age at first services and age at first calving cows was 44.01±11.0 months, 41.47±5.6 months and 50.87±7.0 months, respectively. Average daily milk yield and lactation length was reported 2.06±0.5 liters and 278.03±77.9 days respectively. Source of cattle feeds is natural pasture, crop residues and aftermath. In all the season, wet and dry season cattle were allowed to graze entirely on natural pasture on communal and private grazing land. Rivers springs, borehole water and dam/pond and rain water were the main sources of water for their cattle. Shortage of water was not common and watering frequency cattle usually drink freely per day. Cattle's house separated and not far from family house at night to protect them from cold, rain, predators. Calves were always housed separated from their dams in a barn constructed as an expansion of the main houses. Uncontrolled breeding is dominantly practiced. The major diseases reported were, trypanosomosis, black leg, anthrax and bovine pasteurellosis in order of their importance. They included shortage of grazing land 73.3%, shortage of feed 51.4% in the months of January, February and March, scarcity of labor 50.8%, and water scarcity 35% low productivity 32.7% and disease 28.8% were the main constraints. The overall livestock production system in the area was identified as crop-livestock (mixed) production management system.

Keywords: Cattle, husbandry practices, production system.

INTRODUCTION

Livestock production systems all over the world can be divided into four major categories: transhumant, agro-pastoralist, intensive crops and livestock, and peri-urban intensive systems. In addition, there are a few not-so-obvious livestock systems. 'Pure' nomads or transhumant do not have fixed settlement, but move between established territories and pastures. They are more common in Africa's arid and semi-arid regions than anywhere else. In Asia, they are found in India, Afghanistan, Pakistan, Iran and in the

countries of the Arabian Gulf. In most countries, their population is relatively small in number, but they are well integrated into the local economy (Azage *et al*., 2009).

Ethiopia is endowed with diverse ecosystems inhabited by an abundant diversity of animal, plant and microbial genetic resources. The country's geographical proximity to the historical entry point of many livestock populations from Asia and Europe to Africa and the diverse topographic and climatic conditions as well as the wide ranging production systems have further contributed to the existence of a large diversity of farm animal genetic resources. Farm animals are an integral part of the Ethiopian agricultural fabric. They are the country's source of food, traction, manure, raw materials, investment, cash, security, and foreign exchange earnings as well as its social and cultural identity. They are one of the input suppliers to the manufacturing sector of the country. The contribution of livestock to the total agricultural GDP and national foreign currency earnings are about 30% and 16%, respectively (IBC, 2004). The livestock production systems are characterized as mixed crop-livestock, agro-pastoral, and pastoral and peri-urban and urban. The majority of livestock are kept in low input production system in rural areas, while some species are kept in medium input system mainly in peri-urban and urban areas (IBC, 2004).

Ethiopia has the largest livestock population in Africa estimated to be 47.57 million cattle, 26.1 million sheep, 21.7 million goats, 1.78 million horses, 5.57 million donkeys, 380 thousand mules, 1 million camels, 39.6 million chicken and 4.7 million beehives. The majority (99.25%) of the cattle population is local breeds, which are found in rural areas under subsistence type of farming system and the remaining are hybrid and exotic breeds that accounted for about 0.65 percent and 0.09 percent, respectively (CSA, 2008**).** However, performance in the production of the major food commodities of livestock origin has been poor compared with other African countries (Befekadu and Birhanu, 2000). This is constrained by several factors that can be classified as; technical and biological and socio-economic and institutional factors.

However the productive performances of cattle are very low these may be due to animal diseases, unavailability of feed in terms of quality and quantity and genetic characteristics of animals. Sustainable intensification of production systems is the manipulation of inputs to, and outputs from, livestock production systems aimed at increasing production and/or productivity and/or changing product quality, while maintaining the long-term integrity of the systems and their surrounding environment, so as to meet the needs of both present and future human generations (FAO, 2001).

There is limited knowledge of this production system, reproduction and production performance of cattle and practiced husbandry the extent. Characterization of the cattle production systems in the Zone helps to clearly understand the socio-economic implications and to design appropriate development interventions. Therefore, with this background this study was conducted with the following objectives was to characterize the production & reproductive performances of cattle, to assess farmer preferences for cattle traits and to identify the husbandry practices and major constraints of the production system of the area.

MATERIALS AND METHODS

Description of the Study Area

The research was conducted in Bench Maji Zone of the Southern Nations Nationalities and Peoples Regional State. The Zone is located at latitude of 7° 59'27" N and longitudes of 35°35'9"E west longitude. It is found at elevation of 1451 masl and about 561km from Addis Ababa and 842 km from the regional capital Hawassa. The Zone has 9 districts, which are further divided in to 214 peasant associations. The Zone has a human population of 418,000 of which 199,883 are males and 218117 are females (CSA, 2001). It also covers 19,326.55 km^2 area of land (Fasil, 2004). The altitude in the area ranges from 850 to 3000 meters above sea level. The soil is generally red brown with scattered tracts of red color. The annual average temperature ranges from 20 to 40^oC and the annual rainfall from 1200 to 2000 mm.

The area is wet most of the year with a relatively dry season in January, February, March and May. The main rains occur in April and from June to September. The Zone has high livestock population consisting of 447000 cattle, 73700 sheep, and 69200 goats, 9700 equine and 254300 chickens. Agro-ecologically, the Zone consists of 52% lowlands (500-1500 masl), 43% midland (1500-2300 masl) and 5% highland (>2300 masl). The main crops gowning in the study area are coffee, tubers (taro, cassava, sweet potato), cereals (maize, sorghum, tef, barley and wheat), pulses (peas and bean) Enset (*Ensete ventricosum*), fruits (banana, papaya, orange and mango) and spices (ginger, cardamom and turmeric).

Semien-Bench District

Semien-Bench district is found in Bench-Maji administrative zone of Southern Nations Nationalities and Peoples Regional State. The district has a total land area of 921.65 km^2 and human population of 116,892(57,960 males and 58,960 females). About 46.6% of the total area is cultivated and average household landholding is about 1.125 ha. The altitude of the *district* ranges from 1300 to 2200 meters above sea level (masl). The mean total annual rainfall is 1241mm (range from 1000–1482 mm) and the average temperature is 22.5ºC (range from 18–25°C). The agro- ecology of the district is classified in to three consisting 2% lowland (800-1300 masl), 95% mid land (1300-2000masl) and 3% highland (>2000masl). The district has 102179 cattle, 21738 goats, 46625 sheep, 81580 chicken, 7481 bee colony, 162 donkeys, 1995 horse and 2804 mules.

Sheko District

Sheko district is found in Bench-Bench administrative zone of South Nations and Nationalities and Peoples Regional State (SNNPRS). The total land area of the *district* is 48,089 ha and the human population is 57397 (28986 males and 28411 females). The average land holding is about 1.25 ha per household (BOANR, 2011). The altitude ranges from 1100 to 1700 masl and the agro-ecology is predominantly classified as 87% lowlands and 13% midlands. The mean annual rainfall is 1219.5 mm (range from 1103–1336 mm) and the annual temperature ranges from 20ºC–25ºC. According to BOANR (2011), report, 37275 cattle, 18324 sheep, 6427 goats, 36224 chicken, 7212 bee colony, 1064 donkeys, 1241 mule and 720 horses.

Guraferda

Guraferda district is one of the districtsfound in Bench-Maji administrative zone of Southern Nation Nationalities and Peoples Regional States (SNNPRS). The human population is estimated at 41931 (24879 males and 17052 females). The district lies between altitudes of about 850 to 1995 meter above sea level (masl). The soil is generally red brown with scattered tracts of red color. The annual average temperature ranges from 25 to 39°C. The tract receives maximum rain from June to September. The mean annual rainfall ranges from 1200 to 1332 mm. The area is classified in to two agro-ecological zones consisting 78% lowland (*kola*), 28% mid altitude (*woinadega*). According to BOANR (2011), the districthas 22347 cattle, 3831 goats, 2952 sheep, 50947 chicken, 19384 bee colony, 4 donkeys and 172 mules.

Study Population

Cattle and cattle owners under the extensive production systems in the selected study sites constituted the study population

Study Design

This research was basically a retrospective and cross-sectional survey focused on the selected area. Generally, data was gathered through questionnaire survey, observation focus

group discussion, and interview with key informants carried out in Bench-Maji Zone of Southern Nations nationalities.

Sampling Procedures and Sample Size Determination

The sampled households were randomly selected from three districts (Semien-Bench, Sheko and Gura-Ferda districts) to identify the study households and the sampling units was households keeping indigenous cattle. And sample size was determined based on the formula recommended by Arsham (2007): $\mathbf{N=0.25/SE^2}$

With the assumption of 3.7% standard error a total of 180 households was taken. To take, the households, three Kebeles was selected from each district using random sampling procedure and from each Kebelle 20 (180/9) households was taken randomly (n=180 households).

Data Collection Method

Survey

A formal survey was carried out with the help of standard questionnaire designed to obtain information from the selected sample households. The content of the questionnaires on the cattle production systems were as follows; households characteristics, production systems, husbandry practices herd dynamics, constraints, farmers' preference for cattle and major cattle feeds. The production and reproductive performance of the cattle was obtained by asking farmers and the questionnaires were consisting open-ended and closed-ended questions. The district experts, development agents and enumerators participated in data collection. Secondary data was collected from relevant regional bureaus, zonal agricultural offices, districts agricultural and rural development office and personal communications. Available literature and web pages was also searched to consolidate the document.

Data Management and Statistical Analysis

Data was entered into Microsoft Excel computer program. The statistical computer software (SPSS, 2006) was used to analyze the data. The analysis was implemented separately for cattle owners of each district. Results are represented mainly in the form of descriptive tabular summaries. Contingency table for independence was run for comparison between districts. Analysis of variance was also conducted for livestock composition, production and reproduction traits.

RESULTS AND DISCUSSION

Household Characteristics

Table 1 shows sex, age group, education status and marital status of respondents in the study areas. The overall age categories of the selected farmers was 3.89 % (18-30) years, 43.89% (31- 40) years, 16.11% (41-50) years and 6.11% (> 50) years. This survey result showed that people in the most productive age are actively engaged in cattle production activities. Overall, 92.78% of the households were male headed, and this was slightly differ between the three districts.

The overall educational status of the households indicated that about (27.78%) were iliterate, (29.44%) were those that had adult education or read and write, and followed by primary education amongst of which the majority (34.44%). Comparing the education of household heads in different areas, proportionately the percentage of illiterate were more in Guraferda (55%) than Semien-Bench (20%) and Sheko (8.33%). Household heads that received adult education was more in Semien-Bench (35%) than in the two districts. On the other hand, household heads that received primary education or above was relatively higher in Sheko (46.67%) than in Semien-Bench (38.33%) and Guraferda (18.33%) (Table1).

Table 1: Profile (%) of respondents by age, level of education, marital status and sex

Description	Sheko (N = 60)	Semien-Bench (N= 60)	Guraferda (N = 60)	Overall (N=180)
Sex of the respondents	Percent (%)	Percent (%)	Percent (%)	Percent (%)
Male	83.33	96.7	98.33	92.78
Female	16.66	3.3	1.67	7.22
Age category				
18-30	60	28.33	13.33	3.89
31-40	30	60.00	41.7	43.89
41-50	8.33	10.00	30	16.11
>50	1.67	1.67	15	6.11
Level of education				
Illiterate	8.33	20	55	27.78
Read and write	30	35	23.33	29.44
Primary education	46.67	38.33	18.33	34.44
Secondary school	15	6.67	1.67	7.78
Higher education	-	-	1.67	0.56
Marital status				
Married	93.33	91.67	98.33	94.44
Single	5	5.00	-	3.33
Divorced	1.67	3.33	1.67	2.22

Family Size and Landholding

The family size and land holding in study districts are given in Table 2. The mean of the family size was 5.65, 5.68 and 5.96 % in Sheko, Semien-Bench and Guraferda, respectively and did not differ significantly among the three districts. The overall mean family size was 5.96±3 heads/household. The average family size obtained in the study area was comparable with the result (5.10±0.27 heads/household) obtained around Dire Dawa(Tesfu, 2006) and the national average (5.20), reported by CACC (2002). However it was less than from the family size of Alaba (6.7±0.18), which was reported by Tsedeke (2007).

Table 2: Family size and landholdings in (ha) in the districts

Description	Sheko (N=60)	Semien-Bench (N=60)	Guraferda (N=60)	Overall (N=180)	P-Value
Family size	Mean±SD	Mean±SD	Mean±SD	Mean±SD	
Male	2.72±1.4	3.5±2.7	3.03±1.3	3.07±1.9	0.06
Female	2.93±1.5	3.1±2.1	2.65±1.4	2.89±1.7	0.93
Total	**5.65±2.3**	**6.6±4.2**	**5.68 ±2.2**	**5.96±3.0**	**0.14**
Landholding in (ha)	2.04±1.5	1.1±0.6	3.04±1.8	2.1±1.6	0.00

The average landholding (land size) of the respondents was significantly different. Sheko and Semien-Bench districts were 2.04 hectares and 1.10 hectares per household, respectively, which is much smaller than landholding per household in Gura-Ferda (3.04 hectares). The landholding per household in Gura-Ferda is larger ($P \leq 0.005$) than in Sheko and Semien-Bench districts. The overall land holding per household (2.1±1.6) is greater than to the findings (1.6 ha) of (Azage et al., 2009) in North Gondar, AmharaRegion of Ethiopia.

Livestock Holding Composition and Cattle Herd Structure

Table 3 shows the livestock species and number per household in the study area. Cattle were the main livestock species in the smallholder agricultural production because of their multiple uses and followed by chickens and sheep.The cattle holding per household in Sheko district is significantly larger ($P<0.005$) than Semien-Bench, and Gura-Ferda. Sheep holding per household in Sheko district is significantly larger ($P<0.001$) than Guraferda and Semien-Bench districts. This was probably due to the farmers preferences. Goat holding per

household in Semien-Bench and Sheko districts is significantly larger (P<0.001) than Guraferda district. The low number of goats in Guraferda was due to the land occupied for coffee plantation and other cereals crops and reduced space and browse vegetation which is source of feed for goats. The livestock holding per household in the study area was less than the finding of Dessalegn *et al*., (2012)in North-West Zone of Tigray.

Table 3: Livestock holdings per households in the study areas

Description	Sheko (N=60)	Semien-Bench (N=60)	Guraferda (N=60)	Overall (N=180)	P-value
	Mean±SD	Mean±SD	Mean±SD	Mean±S	
Cattle	6.83±4.2	5.37±2.0	4.73±3.1	5.64±3.3	0.00
Sheep	2.05±2.1	1.71±1.5	0.75±1.4	1.50±1.8	0.00
Goats	1.32±1.8	1.38±1.4	0.63±1.4	1.11±1.6	0.02
Mule	0.25±0.5	0.03±0.2	0.02±0.1	0.10±0.4	0.00
Horse	0.38±0.6	0.03±0.2	-	0.14±0.4	0.00
Donkey	0.02±0.1*	0.02±0.1*	0.03±0.2*	0.02±0.1	0.78
Hens	5.37±4.4*	4.98±2.8*	5.90±9.8*	5.42±6.4	0.74
Beehives	1.15±2.5*	0.62±1.9*	0.80±3.0*	0.86±2.5	0.49

*No significance difference ($p >_{0.05}$)

Cattle holdings and herd structure in the three districts are presented in Table 4. The overall mean cattle holding per household were 5.64±3.3 heads, and did not differ significantly among the three districts. This value of cattle holding is similar to the 5.69 ± 0.35 heads/household reported for the Mieso district (Kedija *et al*., 2008). However, the current finding was much lower than the cattle holdings in Metema district (15.53 ± 0.71 heads per household) reported by Tesfaye (2008). Regarding herd composition, the overall average number of cows in the three districts (1.91±1.2 heads/HH), oxen (1.54±1.3)/HH) and calves (0.69±0.8 males and 0.53±0.8 females) heads/HH) in the cattle herd cow was higher (P<0.05) than other classes of cattle structure. The average number of heifers was 0.58±0.8 heads/HH), and they are used for replacement purposes.

Table 4: Cattle holding and herd structure of the respondents in the study area

Species	Sheko (N=60)	Semien-Bench (N=60)	Gura-Ferda (N=60)	Overall (N=180)	P-Value
Cattle	Mean±SD	Mean±SD	Mean±SD	Mean±SD	
Ox	1.52±1.3	1.43±1.0	1.67±1.5	1.54±1.3	0.60
Cow	2.08±1.1	2.10±1.1	1.55±1.2	1.91±1.2	0.01
Bull	0.54±0.9	0.43±0.8	0.10±0.3	0.36±0.7	0.00
Heifer	0.83±0.9	0.43±0.6	0.47±0.8	0.58±0.8	0.01
Steers	0.24±0.5	0.00±0.0	0.10±0.3	0.11±0.3	0.00
Male calf	0.92±1.1	0.65±0.8	0.50±0.6	0.69±0.8	0.02
Female calf	0.90±1.0	0.32±0.7	0.37±0.6	0.53±0.8	0.00

Source of Income

In mixed crop- livestock production system in the districts, the main source of the respondents was from the sale of crop products (76.11%), livestock and livestock products (16.11%), other (7.22%), and off-farm activities (0.56%), (Figure 1). This result is in agreement with the reports by Abraham (2009) who indicated that of the respondents in western zone earn cash income for the family need from livestock, crop and off farm and was also in line with the findings from the different areas of Ethiopia (Daniel, 2008; Dessalegn, 2009).

Purpose of Keeping Cattle

The reasons for keeping cattle are rational and are related to the farmers' needs in the long or short term. They provide draught power for cultivation, milk, income generation for the family from sell of animals, replacement stock, social security, prestige and manure. The

results of this survey revealed that cattle play multi-functional roles in the study area. Most farmers in all sites keep cattle primarily as source of milk and draft power.Table 5 presents and ranked the purposes of keeping female cattle, for milk, income and breeding and draft power, income source and meat for male cattle. Similar results were reported earlier by (Takele, 2005; Dereje, 2005; Sisay, 2006) in most parts Ethiopia and Rege *et al*., (2001) in Kenya.

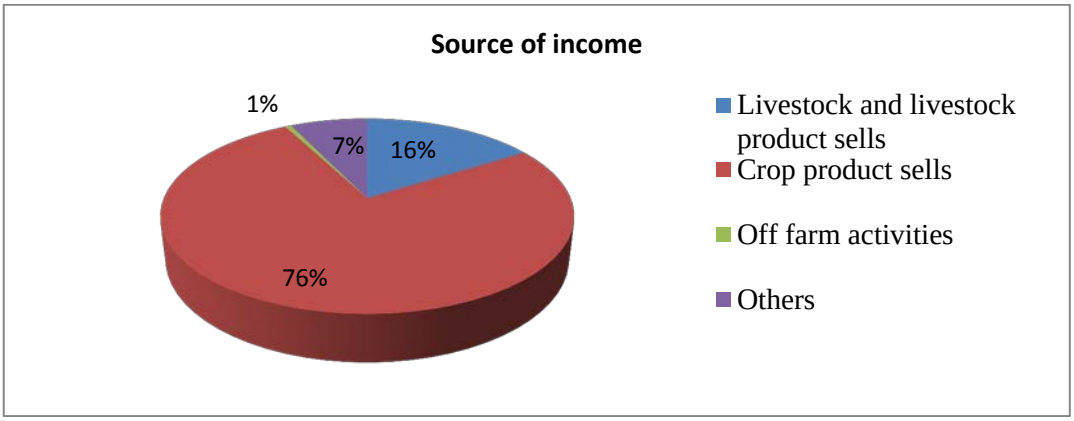

Figure 1: Source of income in the sample farmers (study area)

Table 5: Purpose of cattle rearing in the study area

Purpose	Male rank top 5					Female rank top 5				
	1st	2nd	3rd	4th	5th	1st	2nd	3rd	4th	5th
Milk						157	16	6	-	-
Draft power	159	19	-	-	-					
Meat	4	54	9	1	-		2	19	1	1
Manure	-	12	25	3	-	-	10	26	4	-
Income source	5	75	47	17	1	8	81	56	7	-
Prestige	2	-	-	-	1	-	-	-	-	2
Saving	6	12	41	8	2	8	5	24	17	1
Breeding	1	10	36	3	2	2	65	30	3	-
Ceremony	-	-	-	-	-	-	-	1	-	-

Reproductive and Production Performance of Indigenous Cattle

Reproductive Performances

Fertility is the ability of male and female animals to produce viable germ cells, mate, conceive and deliver normal living young. The lifetime productivity of a cow is influenced by reproductive performances like age at first oestrous, age at first Service age at first calving and calving interval (Ray et al., 2007).

Age at First Service (Age at Puberty) Age at First Calving

The overall mean for age at puberty AAP, age at first services AFS and age at first calving AFC cows was 44.01±11.0 months, 41.47±5.6 months and 50.87±7.0 months, respectively. In the present study, the result of AAP, AFS and AFC Analysis of variance indicated that there was no significant different in the three districts (Table 6). These overall mean values for AAP and AFS obtained in this study were similar within the mean reported by Takele (2007) for Sheko cattle, but longer in AFC. Similarly, Dessalegn *et al.*, (2012) reported mean AAP, AFS AFC of 39.83, 56.9 and 21.6 months respectively for Arado cattle breed in North-West Zone of Tigray. Different factors advance or delay age at first service (AFS) and age at firs calving (AFC). Environmental factors, especially nutrition, determine pre-pubertal growth rates, reproductive organ development, and onset of puberty and subsequent fertility.

Calving Interval

The estimates of CI of cattle for Sheko district, Semien-Bench and Guraferda are presented in Table 6. The overall mean value of the CI was 21.18 months (n=180). The respective values for each district were 20.92±4.9, 21.68±5.3 and 20.95±4.9 months, respectively. There was no significant difference (P≥0.05) in the CI between the districts. Results obtained in the present study are in comparable with earlier reports. Shiferaw (2006) reported the mean CI for kariyu cattle in the East Shwa zone of Oromiya to be 18 months. Slightly shorter than from Abergele breed which was reported by Merha (2006) the CI of 24 months. Factors such as the age of cows, breed, and year of calving and feed availability year-round are important considerations to bear in mind. Generally, low reproductive performance of the cattle may be due to management effects, including nutrition and health conditions. Several factors, which could not be clearly indicated in this study, might have contributed to extend CI.

Table 6: Least squares means (± SD) of reproductive and productive traits in three districts

Parameters/Traits	Sheko (N=60)	Semien-Bench (N=60)	Guraferda (N=60)	Overall (N=180)	P-value
	Mean±SD	Mean±SD	Mean±SD	Mean±SD	
Age at puberty in male (months)	44.53±11.8	43.33±10.0	44.17±11.4	44.01±11.0	0.83
Age at first service (months)	41.19±5.9	42.43±5.5	40.78±5.6	41.47±5.6	0.25
Age at first calving (months)	50.77±7.6	50.68±7.2	51.17±6.2	50.87±7.0	0.92
Average lactation length (days)	274.37±86.5	283.10±79.5	276.62±67.7	278.03±77	0.82
Average daily milk yield (liters)	1.98±0.6	2.11±0.5	2.09±0.5	2.06±0.5	0.36
Average lactation yield (liters)	530.01±273.7	600.75±229.5	585.76±222.	572.17±24	0.64
Calving interval (months)	20.92±4.9	21.68±5.3	20.95±4.9	21.18±5.0	0.25
Weaning age (months)	12.60±5.5	12.62±5.5	12.65±5.6	12.62±5.5	1.00
Length of dry period (days)	178.92±54.2	177.50±55.4	178.5±54.2	178.31±54	0.99
Calves given throughout their life (n)	3.84±1.2	3.81±1.2	3.86±1.2	3.84±1.2	0.97
Castrate age (CA) (yrs)	6.86±0.9	6.80±1.0	6.91±0.9	6.86±0.9	0.81

SD=Standard deviation

Production Performances

Daily Milk Yield

The overall average daily milk yield reported in the study area was 2.06±0.5 liters (Table 6). There was no significant districts variation in daily milk yield performances of these cattle. This is similar the average daily milk yield of 2.0 liters reported by Brokken and Senaite (1992), 2.19 liters reported by Mukasa-Mugerwa *et al.*,(1983) for local Zebu cows in different areas of the country. Facil (2006), Merha (2006) reported the daily average milk yield of Fogera and Abergele cattle to be 1.8 liters, and 0.75 liters respectively which was slightly lower than the present result. Azage *et al.*, (2009) opined that the indigenous cattle of North Gonder give daily average milk yield of about 2±0.07 liters which was almost in agreement with the present finding. In this study, the main reasons for low daily milk production as indicated by the respondents were shortage of feed and the interaction of poor health, and management.

Lactation Length

In the present study of the indigenous cattle of the districts' the average lactation length was reported as 278.03±77.9 days and was not significantly varied among the districts (Table 6). The reports of the present study were somewhat similar with the findings of Belay *et al.*,(2012) and Shiferaw (2006) regarding the lactation length of the Keriyu cattle breed (255.75 days) of East Shewa and the lactation length of the crossbred Dairy Cows (273.9 days) in Jimma Town. But slightly lower with finding of Kedja (2008) that the total location length of indigenous cattle in Measo districts is 220 days.

Cattle Husbandry Practice

Feeding and Feed Resources

The sources cattle feeds is natural pasture, crop residues mainly obtained (from teff and maize stover), and aftermath are used as a feed source in the study area. The Feeding systems include communal or private natural grazing and browsing, and cut-and-carry system and stall feeding. In all the season, wet and dry, animals were allowed to graze entirely on natural pasture on communal and private grazing land. This coincides with Alemu (1990) who reported on livestock feed resources of Ethiopia. Though there is critical feed shortage in most of the study area, the use of improved forages was rarely reported. Use of supplementary feeds is very limited. This is similar; about half or more of all animal in the Ethiopian highlands obtain their feed in the form of crop residues (straws, stubble, chaff or weeds from crop plots). The dependence on this feed source is likely to continue along with increasing human population densities and corresponding extension of crop land into traditional grassland (Abate *et al.*, 1993).

Grazing Type

In the study area, cattle production is based on natural pastures under continuous grazing system. About 70 percent of the respondents in Guraferda, 45% in Sheko and 29.31% practiced herded grazing type and the rest of the respondents practiced different grazing and tethering type throughout the year (Table 7).

Table 7: grazing type in the different districts

Grazing type	Semien-Bench(n=60)	Gura-ferda (n=60)	Sheko (n=60)
Open grazing	3.45	5	26.0
Zero grazing	41.38	11.7	1.7
Herded	29.31	70	45
Open grazing and zero grazing	10.34	1.7	-
Open grazing and herded	1.72	1.7	8.3
Zero grazing and herded	5.17	10	13.3

Water Resources, Distance and Watering Frequencies

Rivers springs, borehole water and dam/pond and rain water were the main sources of water for their cattle during the dry and wet season in all the study areas (table 8). Out of the total respondents included in the study areas more than 50% use water for their cattle from river spring except in Semien-Bench (60.3% use water from rain water in wet season 39.7 % use from pipe water).

Shortage of water was not common and watering frequency cattle usually drink freely per day. The distance that the cattle travel to drink water is less than one kilometer (Table 9). In general the area is characterized by high availability of surface water and the availability of water is very variable from place to place.

Table 1: Water source in the three districts (%)

Source of water	Sheko ((n=60)		Guraferda (n=60)		Semien-Bench (n=60)	
	DS	WS	DS	WS	DS	WS
Borehole	3.3	5	1.7	4.6	0	6.7
dam/pond	3.3	3.3	11.7	15.0	16.3	0
River spring	91.7	85	65.0	64.0	41.3	33
Pipe water	1.7	1.7	21.7	13.0	39.7	0
Rain water	0	5	0	3.4	1.7	60.3

Table 9: The distance to watering point in the study areas

Distance to water point	Sheko		Guraferda		Semien-Bench	
	DS	WS	DS	WS	DS	WS
less than 1km	70	88.3	78.3	93.3	23.3	91.7
1-5km	30	10	21.7	5.0	76.7	8.3
6-10km	-	1.7	-	1.7	-	-
>10km	-	-	-	-	-	-

Cattle Housing

All farmers in the study area house their cattle separate house not far from family house at night to protect them from cold, rain, predators and theft. This is in agreement with report of Abraham(2009) that all cattle are housed for protection from adverse weather conditions and predators in western zone Tigray. Calves were always housed separated from their dams in a barn constructed as an expansion of the main houses or separately in and around the family house. Similar system of livestock housing was reported by Solomon (2004) in the Bale highlands. Farmers give especial attention for pregnant animals, young calves and weak/sick animals.

Breeding/Mating

Indigenous cattle have been naturally selected for adaptive rather than for productive traits. Selection takes a long time and requires sustained effort to make substantial genetic progress and impact on productivity. In the traditional cattle production system of study areas, uncontrolled breeding is dominantly practiced. It has been observed from both individual interviews and group discussion in this study that there is little or no attempt by farmers to improve their stock by selection or by any other method.

Disease Prevalence and Control

The major diseases reported by the farmers were, trypanosomosis, black leg, anthrax, bovine pasteurellosis, and gastro-intestinal parasites in order of their importance. The sources of veterinary services are government (78.9%), government and shopping drugs from private (20.6%). In addition to taking sick animals or to vaccinate their animals in veterinary health clinics, 18.3% farmers travel <1km, 68.9% farmers travel 1-5km and 12.2% of them travel 6-10km. The rest treat their sick cattle by themselves using different traditional knowledge. In areas where vet clinics are unavailable, farmers travel long distances to get veterinary services during which many animals die before reaching the clinic. Farmers, during the discussion, emphasized that it would be of great help for them if veterinary clinics are established in the near vicinity.

Cattle Production Constraints

Farmers were asked to indicate the most important constraints to cattle production and to prioritize them. Based on the result of the responses of the sampled households, the cattle they owned were not in good condition in terms of performance. As shown in table 10 there are several constraints that affect the cattle production in the study area. They included shortage of grazing land (73.3%), shortage of feed (51.4%) in the months of January, February and Martch, scarcity of labour (50.8%), water scarcity (35%) low productivity (32.7%) and disease (28.8%), which is in agreement with the report of Sisay (2006). The major constraints faced to farmers were somewhat in concomitant with the problems in most areas of Ethiopia (Abrahm, 2009; Daniel, 2008; Fasil, 2006; Ketema, 2007). In all districts it was associated with lack of adequate grazing land due to subdivision of land. Therefore to achieve optimum carrying capacity farmers need to do one of the following. First, reduce the livestock numbers; Secondly, livestock feed can be improved and increased through planting

of fodder trees along the fences and on terraces. Since the farmers were using crop residues to supplement grazing they should also conserve feeds during wet and harvesting seasons to be used later. Thirdly, the productivity per animal can be improved through improving management, proper selection (breeding) and probably grading up. This is easier to implement because it is not expensive to the farmers.

Table 10: Cattle production constraints study area

No.	Constraints	Rank (%)							
		1st	2nd	3rd	4th	5th	6th	7th	8th
1	Shortage of feed	19.2	51.4	19.2	3.4	2.1	-	3.4	1.4
2	Shortage of grazing land	73.3	13.9	8.5	3.6	-	-	0.6	-
3	Health problem/disease	9.6	28.8	26.9	21.2	10.9	1.3	-	-
4	Shortage of veterinary service	3.4	9.0	11.2	20.2	18.0	31.5	3.4	2.2
5	Predators	-	10.5	14.0	19.3	33.3	3.5	7.0	5.3
6	Low productivity	8.2	10.9	32.7	31.8	10.0	6.4	-	-
7	Water scarcity	-	3.6	28.6	35.7	8.9	7.1	3.6	12.5
8	Scarcity of labor	6.2	10.8	50.8	9.2	9.2	6.2	3.1	1.5

CONCLUSION

The overall livestock production system in the area was identified as traditional management system. The existing reproductive and productive performance observed in the study area is low under the existing environmental challenges. The most important constraints of cattle production system were problems of grazing land, feed shortage, and disease, low productivity of cattle and shortage of veterinary service. The sources cattle feeds is natural pasture, crop residues (mainly obtained from teff and maize Stover), and aftermath are used as a feed source. In cattle health management majority of the farmers used either traditional or both veterinary and traditional treatments together. The cattle are kept in the different shelter with differentiation by age groups. The dominant cattle house type was enclosures without roofing.

Natural mating was the only method used for livestock breeding. Farmers in the area have no experience in using improved system for increasing their livestock productivity. Rivers and rain water were the major cattle water sources in the area. Most of farmers in the study area travel less than 1 km in searching water.

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REFERENCES

Abereham, H. (2009). Phenotypic characterization of Begait cattle breed and their traditional production systems in West zone of Tigray, Northern Ethiopia. MSc thesis, School of Graduate Studies, Mekelle University, Mekelle, Ethiopia.

Alemu, T. (1990). The unexploited potential of improved forages in the midaltitude and lowland areas of Ethiopia. PANESA/ARNAB (Pastures Network for Eastern and Southern Africa/African Research Network for Agricultural By-products. *Utilization of research results on forage and agricultural by-product materials as animal feed resources in Africa*. Proceedings of the first joint workshop held in Lilongwe, Malawi, 5-9 December 1988. PANESA/ARNAB, Addis Ababa, Ethiopia. 833 p.

Azage, T., Tesfaye, M., Tesfaye D, Worku, T., and Eshete, D. (2009). Transhumance cattle production system in North Gondar, Amhara Region, Ethiopia: Is it sustainable? IPMS (Improving Productivity and Market Success) of Ethiopian Farmers Project. Working Paper No. 14. ILRI (International Livestock Research Institute), Nairobi, Kenya. 73 pp.

Belay, D., Yisehak, K., and Janssens, G.P.J. (2012). Productive and Reproductive Performance of Zebu X Holstein-Friesian Crossbred Dairy Cows in Jimma Town, Oromia, Department of Animal Science, Jimma University, Ethiopia, *Global Veterinaria*, 8 (1): 67-72.

Brokken, R.F., and Senaite, S. (1992). Dairy marketing in sub-Saharan Africa. pp: 123-130. In: Proceeding of a symposium held at ILCA. Addis Ababa, Ethiopia, 26-30 Nov. 1990, International Livestock Centre for Africa (ILCA).

CACC (Central Agricultural Census Commission) (2002). Ethiopian agricultural sample enumeration report, held 2001/02 (1994 EC). Addis Ababa, Ethiopia

Daniel, T. (2008). Beef Cattle Production System and Opportunities for Market Orientation in Borena Zone, Southern Ethiopia an M Sc Thesis, Haramaya University.

Dereje, T. (2005). On-Farm Phenotypic Characterization Of Cattle Genetic Resources And Their Production Systems In South And North Wollo Zones Of Amhara Region, North Eastern Ethiopia An MSc Thesis The School of Graduate, Haramaya University, Ethioipia.

Dessalegn, G., Mekonnen, H., and Kelay, B. (2012). Morphometric characteristics and livestock keeper perceptions of "Arado" cattle breed in North-West Zone of Tigray, Ethiopia, M.Sc. thesis, School of Veterinary Medicine, Addis Ababa University, Debre-Zeit, Ethiopia.

Fasil, G. (2006). On-Farm Phenotypic Characterization Of Cattle Genetic Resources And Their Production Systems In Awi, East And West Gojjam Zones Of Amhara Region, Ethiopia M.Sc. Thesis, Alemaya University.

Getachew, A., Haily, B. Workineh, N., and Gezahegn, A. (1993). A survey of the farming system of vertisol areas of the Ethiopian highlands. pp: 29-49. In: M. Tekaligne, A. Abiye, K.L. Srivastava and D. Asegelil (eds.). Improved management of vertisols for sustainable crop-livestock production in the Ethiopian highlands: Synthesis report 1986-92. Technical Committee of the joint vartisol project. International Livestock Centre for Africa.

Kedija, H., Azage, T., Mohammed-Yousuf, K., and Berhanu, G. (2008). Traditional cow and camel milk production and marketing in agro pastoral and mixed crop–livestock systems: *The case of Mieso District, Oromia Regional State, Ethiopia.* IPMS (Improving Productivity and Market Success) of Ethiopian Farmers Project Working Paper 13. ILRI (International Livestock Research Institute), Nairobi, Kenya. 56p.

Ketema, T. (2007). Biomass production, utilization practices and range condition in the Nuer Zone of Gambella, M.Sc. Thesis, Haramaya University, Ethiopia.

Merha, Z. (2006). Genetic Diversity in Northern Ethiopian Cattle Breed: An on-Farm and Molecular Characterization, Ph.D Dissertation, Agricultural University, Wageningen, The Netherlands. Mortimore, M., 1991. Livestock economics division. A review of mixed farming systems in the semi-arid zone of sub-Saharan Africa. ILCA/LED Working Documents No. 17. International Livestock Centre for Africa (ILCA), Addis Ababa, Ethiopia. 181p.

Mukasa-Mugerwa, E., Ephrem, B., and Tadesse, T. (1983). Reproductive performance of indigenous cattle in the Ada district of central Ethiopian highlands. Mimeograph. International Livestock Centre for Africa (ILCA), Addis Ababa, Ethiopia. 99p.

Ray, N., Goswami, A. Sarkar, S. K., Dhara, A., and Ghosh, K. C. (2007) Physical characteristics, productive and reproductive performances of comparatively high yielding Deshi Cattle Department of Animal Genetics and Breeding, West Bengal University of Animal and Fishery Sciences, Kolkata-700 037, West Bengal, India.

Shiferaw, G. (2006). *IN-Situ* Phenotypic characterization of Kereyu cattle type In Fentalle District of Oromia Region, Ethiopia, An M.Sc Thesis, presented to the school of graduate studies of Haramaya University, Ethiopia.

Sisay, A. (2006). Livestock production systems and available feed resources in different Agro-ecologies of north Gonder zone, Ethiopia. An MSc Thesis Presented to the School of Graduate Studies of Haramaya University. 80p.

Solomon, B. (2004). Assessment of livestock production systems and feed resources base in Sinana Dinsho Districts of Bale Highlands, Southeast Oromia. M.Sc. Thesis. Haramaya University, Ethiopia, 141p.

Takele, T. (2005). On farm phenotypic characterization of Sheko Breed of cattle and their habitat in Bench maji Zone, Ethiopia. M.Sc Thesis, Haramaya University, Ethiopia.

Tesfu, T. (2006). Chicken production systems and monitoring around the villages of Dire Dawa town, M.Sc. Thesis, Haramaya University, Ethiopia.

Tsedeke, K. (2007). Production and marketing systems of sheep and goats In Alaba, Southern Ethiopia, an M.Sc Thesis, Hawassa University, Ethiopia.