Assessment Of Cattle Husbandry Practices In Burji Woreda, Segen Zuria Zone Of SNNPRS, Ethiopia

Seid Guyo, Berhan Tamir

Madawalabu University, school of Agriculture, Department of Animal and range science P.O Box 247; Bale Robe; Ethiopia
Addis Ababa University, College of veterinary medicine and agriculture, Department of Tropical Animal Production and Health, P.O. Box 34; Debre-Zeit, Ethiopia
Email: mesayseid@gmail.com

ABSTRACT: This study was conducted to assess cattle husbandry practices in the crop-livestock production system areas of the highland and mid-altitude and pastoralists in the lowlands of Burji woreda of Segen Zurea zone of southern Ethiopia. The cattle husbandry practices were assessed based on one time field visit, questionnaire survey and focus group discussions in highland, mid-altitude and lowland altitude. A total of 100 farmers were selected randomly from 10 peasant associations, which are selected based on proportion of peasant associations exist in each altitude zones of peasant association. The survey showed that the majorities 81% of household heads under investigation were males and the rest 19% were female. The average family size in the highlands, mid-altitudes and pastoral areas were 9.0±0.5, 9.4±0.3 and 11.1±0.5 respectively. Average livestock holding per household varied across the altitude zones, especially cattle and oxen holding per household in highland, midland and lowland altitude zones were, 13.7±2 cattle and 4.1±0.4 oxen, 11.6±1 cattle and 3.98±0.3 oxen and 29.3±2.5 cattle and 6.2±0.4 oxen respectively. Natural pasture is the major feed resource of the woreda, but communal grazing land in their area is dwindling at an alarming rate. Crop residues provided the second major feed resources for livestock, particularly during the dry season when biomass of natural grazing lands is very low. The constraints to cattle production system were feed shortage, drought, and diseases and parasites particularly Trypanosomiasis, shortage of grazing land, veterinary services, extension services, marketing and other infrastructures. Hence, more emphasis should be given to improving livestock productivity through strong extension services in proper management of the rangelands, feed conservation, crop residues treatment, healthcare and provision of credit facility.

Keywords: cattle husbandry, constraints, crop residues, natural pasture and rangelands

ABBREVIATIONS

BwOARD	Burji woreda Office Agriculture and Rural Development
CSA	Central Statistical Authority
ESAP	Ethiopian Society of Animal Production
GDP	Gross Domestic Product
Ha	hectare
HHs	Households
ILRI	International Livestock Research Institute
m.a.s.l	Meters above sea level
PAs	Peasant Associations
SE	Standard Error
SNNPRS	Southern Nations, Nationalities and Peoples Regional State
SPSS	Software package for social science

INTRODUCTION

Ethiopia, with 49.3 million heads of genetically diverse cattle, has the largest population in Africa [15]. Cattle production plays an important role in the economies and livelihoods of farmers and pastoralists. Cattle produce a total of 3.2 billion liters of milk and 0.331 million tones of meat annually [13]. In addition, 14 million tones of manure are used annually primarily for fuel. About 6 million oxen provide the draught power required for the cultivation of cropland [8]. Livestock are therefore closely linked with the economic, social and cultural lives of millions of resource-poor farmers for whom animal ownership ensures varying degrees of sustainable farming and economic stability. The diversity of Ethiopia's topography, climate and cultural conditions make it difficult to generalize about livestock production systems in the country. Numerous authors used different criteria to classify livestock production systems in Ethiopia [23]. However, about five production systems have been identified based on integration of livestock with crop production, level of input and intensity of production, agro-ecology and market orientation. The following systems have been defined viz. pastoral, agro-pastoral, mixed crop-livestock farming, urban and peri-urban dairy farming and specialized intensive dairy farming systems [23]. The highlands (those above 1500 m.a.s.l) in Ethiopia comprise nearly half of the land area of the country and hold more than 85% of the total human population and about two thirds of the livestock population, which are dominantly crop-livestock systems areas and are recognized to be under stress because of shrinking cultivated areas per household, land degradation and reduced feed availability [7]. The lowlands (<1500 m.a.s.l) cover 78 million ha, and support 12% of the human and 26% of the livestock population. Ethiopia is a tropical African country in which mobile pastoralism is dominant in the arid and semi-arid areas in the eastern, northeastern and southeastern parts of the country, while agro-pastoralism represents an increasing practice in the semi-arid areas in the northwestern, southern and eastern parts of the country. In general, they represent the major pastoral constituency in the Horn of Africa [5]. In spite of the existing enormous livestock resource, the contribution of the sub sector to the agricultural production, foreign currency earnings and total GDP is not up to expectations [19]. Thus, the contribution of this sector in the agricultural economy of the country remains lower. Indeed, it accounts

for merely 30% of the national agricultural output and 40% of the agricultural export [22]. Although ,it is a general fact that the role of animals pertaining to traction power in the areas of crop production and household food consumption is remarkable, the effective and efficient exploitation of the resources could not be made in the full fledged manner [19]. The potentials for increased livestock production and the productivity is proportionally lowered by various livestock management problems, prevalence of major endemic diseases, poor feeding and high stocking rate on grazing lands, lack of support services such as extension services, veterinary services, insufficient data to plan improved services and inadequate information on how to improve animal breeding, marketing, and processing [22]. Accordingly, existing range-livestock management practices and the perception of the farmer and pastoral communities towards rangeland degradation and deterioration were important, as this will provide the way for designing different rangeland interventions to be undertaken in the area to enhance the livestock productivity. Identification of overall management activities with their constraints and opportunities associated to cattle production are preconditions for designing suitable cattle production development strategies [20]. In general cattle husbandry practices has not been studied in the study area. Therefore, the study was proposed with the general objective of assessment of cattle husbandry practices with assessing associated opportunities and constraints. The specific objectives are:

- To describe the existing range-livestock management practices
- To assess cattle feed resources and conservation systems
- Identify major constraints of the production systems

MATERIALS AND METHOD

The study was conducted in Burji Woreda, Segen zurea Zone of the Southern Nations Nationalities and Peoples Regional State (SNNPRS). The land area of the woreda is estimated to be 1374.6 square kilometers, and bordered with Oromia Region to the East and to the South, Amaro Woreda to the North and Konso Woreda to the West. Based on agro-climatic zones, the Woreda can be divided into three broad climatic zones, namely highland areas of Dega >2,300 m.a.s.l, which accounts for 21.3% of the total land, mid-altitude of Woina Dega and Kolla in between 1500-2300 m.a.s.l, which accounts for 42.46% of the total land and lowland areas of Kolla and Bereha < 1500 m.a.s.l, which accounts for 36.24% of the total land areas of the Woreda. The elevation of the study areas vary from 501-2,500 m.a.s.l. It is located between 50 23" latitude and 50 70" longitudes. The mean annual rainfall ranges from 801-1000 millimeters while the mean annual temperature ranges from 15.1 to 27.5^0 centigrade [12].

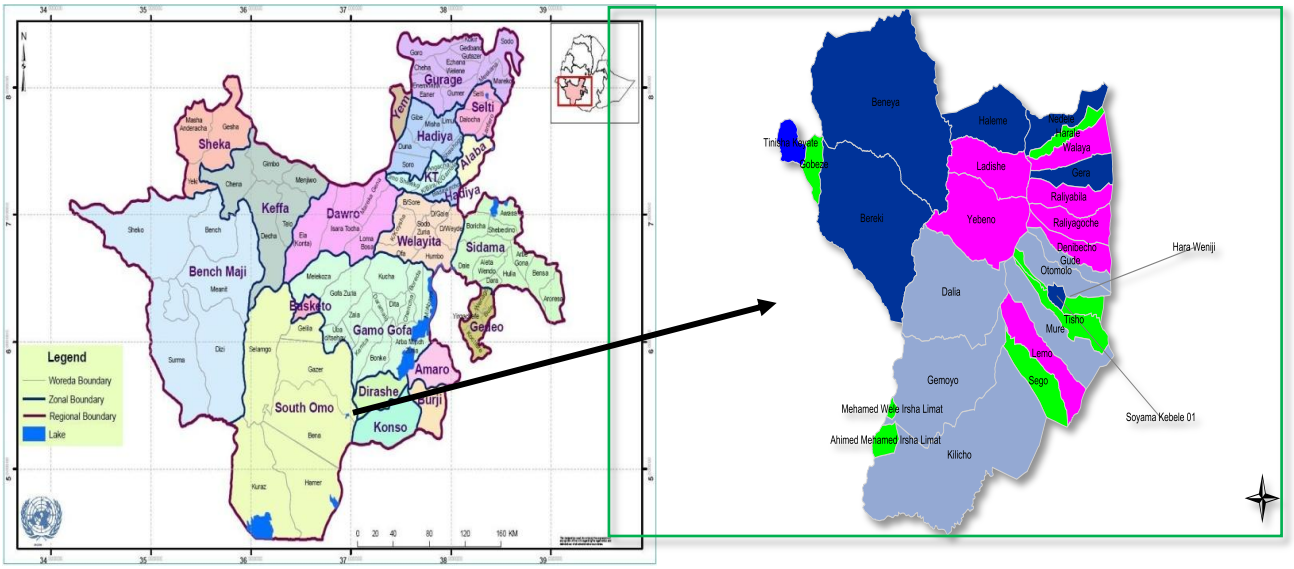

Figure1: Map of Burji woreda

Administratively, the Woreda is divided into 25 peasant associations of which 23 are rural peasant associations and two are urban. The population of the woreda is estimated to be 57,949 and composed of about equal proportion of males and females (i.e. 49.57: 50.43), respectively. The populations reside in the different agro-ecological zones living on sedentary agriculture growing different varieties of crops with a mixture of animal husbandry [14]. Depending on the production systems and land use pattern the Woreda is classified into two production systems. These are livestock and crop-livestock production systems. From total area of the Woreda 37,669 ha were cultivated land, 4,230 ha were protected forest, bushes and shrub land, 16,461 ha were grazing land and 25,133 ha were unusable land/infertile, 38,109 ha mountains and gorge area and 83,599 ha of land is uncultivable. The livestock population of the study area includes; 54,047 cattle, 52,009 goats, 4313 sheep, 134 horse, 3,871 donkey, 243 mule, 84,886 chicken and 4,500 bee colonies.

Study Population and Study Design
Households of the peasant association were constituted as the study population. The study design was cross sectional study.

Sample size determination
Sample size was determined according to the [6] ;

$N=0.25/SE^{2,}$ where N =sample size, SE=standard error, Standard error considering confidence level of 95% at $\alpha \leq 0.05$. The total sample size computed was 100 smallholders (households).

Sampling procedures
Multi-stage sampling procedures (purposive and random) were employed to select the study sites, peasant associations and households (HHs) of the "woreda". Three altitude zones of highland, midland and lowland sites were purposively selected based on altitude. Peasant associations were selected based on proportion of peasant associations exist in each altitude and randomly from each altitude zones. HH was selected randomly from selected peasant associations. Accordingly, two peasant associations (Yebeno and Shule) were selected from highland, six peasant associations (Berek, Beneya, Nedele, Ralayabila, wordeagude and Lemo) were selected from mid-altitude zone of mixed crop-livestock production area and two peasant associations (Gamiyo and Burjekilicho) were selected from lowland areas. From each selected peasant associations, 10 HHs were selected randomly and used for the study. Thus, a total of 100 households were included in the survey. For focus group discussion from each altitude zones eight to twelve key informants were selected in collaboration with extension service workers.

Data Collection
Both formal and informal surveys were conducted from July 2011 to 2012 March covering rainy and dry seasons. Both qualitative and quantitative data from both primary and secondary sources were collected. The techniques included were reviewing secondary data, questionnaire survey, interviewing key informants, focus group discussions and one time farm visit. Also secondary data from published and institutional documents were reviewed to generate baseline information on cattle production (Appendix).

Questionnaire survey
Questionnaire was administered to a total of 100 household heads in three altitude zones of 10 peasant associations. Questionnaires having open-ended and closed-ended questions developed with main focus on cattle husbandry practices, feed and feeding systems and land use patterns of the households (Appendix 1).

Focus group discussion
Focus group discussion was done with 8 to 12 informants selected considering their age and experience with cattle husbandry activities. These comprised a cross section of individuals with firsthand knowledge and experience on the cattle husbandry practices. Issues presented in the focus group discussions included the priority of feed conservation systems and utilization of communal resources, and major constraints and opportunities for cattle production practices (Appendix 2). Key informants were HHs selected in all altitude zones of the study woreda considering their experience in production system. In each of the study peasant association, discussion was made with Agricultural Development Agents, veterinary assistants and peasant association administrators (Appendix 2).

Farm visit (field observation)
A onetime farm visit (field observation) was made to enrich the data about feeding, watering, housing, healthcare of the cattle, utilization of resources and management of communal grazing land, feed conservation systems and feed resource situation of the households.

Statistical Analysis
The collected data were coded and entered into Microsoft Excel (2007) computer software program and analyzed using statistical package for social science (SPSS) Ver. 16 [30]. Survey results were summarized using descriptive statistics like mean, range, standard error of mean and percentage values of various parameters. To make comparisons among different group's chi square test and one way ANOVA were employed. Differences were said significant when $P < 0.05$. The highest number of responses or respondents was given the first rank and the lowest number of the responses (respondents) the end rank of variables.

RESULTS AND DISCUSSION

Socio-Economic Characteristics
Cattle production practices of the study area were characterized based on different parameters. One of the tools used was socio-economic aspects of households. These include sex, age, and family size of households (HHs), labour force, educational level, livestock holding, landholding, and cattle holding together with other management practices. Household's sex, age, family size, age structure and educational level were as shown in (Table 1)

Table 1: Households sex, age, family size, age structure and educational level

Parameter		Altitude zones			Overall	p-value
		Highland	Mid-altitude	Lowland		
Sex of HHs	M	75	76.7	100	81	
	F	25	23.3	0	19	
Average age of HHs/year	Maximum	65	68	65	68	0.025
	Minimum	33	25	31	25	
	Mean ±SE	45.6±2.24	41.3±1.3	47.7±2.1	43.4±1.0	
Average family size	Maximum	13	16	17	17	0.015
	Minimum	6	5	7	5	
	Mean ±SE	9.0±0.5	9.4±0.3	11.1±0.5	9.65±0.25	
Average number of Family in age/year	≤ 5	1.6±0.13	2.5±0.13	2.3±0.16	2.3±0.1	
	>5-≤15	3.2±0.3	3.6±0.18	4.0±0.3	3.57±0.2	
	>15-≤ 45	3.8±0.4	3.23±0.2	4.1±0.44	3.52±0.15	
	≥45	1.67±0.24	1.44±0.13	1.21±0.1	1.41±0.1	
Level of education (%)	Illiterate	55	53.3	55	54	
	Basic education	20	15	15	16	
	Elementary school	20	18.3	25	20	
	Junior 2^{ndry} school	5	8.3	5	7.0	
	High school	0.0	5	0.0	3.0	

In the highland, about 75% of the respondents were male farmers, while 25% were females. In the mid-altitude 76.7% and 23.3% of the respondents were males and females respectively. The average (Mean ± SE) age of the HHs was 43.4±1.0 with an age interval of 25-68 with significance value P ≤ 0.05 (0.025) which was significantly different among altitude zones. Average family size in lowland and midland area were higher than that of highland. According to the survey result indicated that educational status of the HHs was 54.0% illiterate people in Burji woreda. This result of illiterate people in study area is low compared to that of Alaba district of SNNPRS (65%) reported by [34]. Being have more literate people is better to have opportunity for livestock production in study area. In general, the level of education was very low (nearly above half) 54.0% of the HHs were without any kind of education and this represents a serious limitation to transfer technology and emphasizes the importance of education that must be improved.

Farming System Characteristics Livestock holding and cattle holding

Average livestock holding of HH vary across altitude zones as shown in (Table 2) below. There were no camel herds in the study area.

Table 2: Average livestock holding and cattle herd structure

Livestock species	Highland	Mid-altitude	Lowland	Overall
	Mean ±SE			
Dry cow	1.6±0.3	2.0±0.2	2.0±0.2	2.4±0.2
Calves female	2.3±0.4	1.35±0.1	2.1±0.3	1.7±0.14
Calves male	1.4±0.2	1.32±0.1	2.3±0.3	1.6±0.1
Oxen	4.1±0.4	3.98±0.3	6.2±0.4	4.4±0.3
Heifers	2.5±0.3	1.96±0.2	6.6±0.8	3.2±0.3
Milking cows	2.2±0.3	1.7±0.14	4.2±0.4	2.4±0.2
Bull	2.3±0.3	1.83±0.2	4.1±0.4	2.5±0.2
Total cattle	13.7±2	11.6±1	29.3±2.5	15.6±1
Sheep	4.9±0.7	4.2±0.5	2.7±0.7	4.4±0.4
Goat	3.5±0.6	8.1±0.5	9.7±1.6	7.6±0.5
Equine	1.8±0.5	1.7±0.2	2.8±0.3	1.99±0.2
Chicken	6.7±0.9	12.7±0.7	9.6±1.8	11.8±0.7

The average livestock holding, especially total cattle and oxen holding per HH was 13.7±0.2 cattle and 4.1±0.4 oxen, 11.6±1 cattle and 3.98±0.3 oxen and 29.3±2.5 cattle and 6.2±0.4 oxen in highland, midland and lowland altitude zones respectively. There was significant difference ($P < 0.05$) 0.0 and 0.02 for cattle and oxen herd size respectively among altitude zone. The difference showed that number of livestock holding and objective of the farm production systems differs among altitude zones depending on the resources they have in the area. This study is similar to the study of [16] indicated that cattle production systems and livestock holding differ markedly due to differences in resource endowments, climate, human population, disease incidences, level of economic development, research support and government economic policies. The overall mean cattle holding was 13.7±0.2 heads/HH and this was higher than cattle holdings in most highland areas of the country such as in Mekele, 8.01 heads/HH reported by [24] and Awassa area, 6.85 heads/HH reported by [21]. However, the current finding was lower than the holdings in Metema woreda (15.5 ± 0.7) heads per household reported by [32]. Availability of vast communal grazing land may account to higher cattle holdings than other areas. The result indicated that cattle were the largest species of livestock reared by the smallholder producers. This proportion and the response of farmers reflected that cattle rearing were important husbandry practices and almost all HHs depends on cattle for the farm activities. According to these information sources unlike other places there is no way by which a farmer faces difficulty of ploughing their plot of land because of shortage of draught animal, since the minimum holding can enable them farming effective.

Landholding and land use pattern

The average landholding per HHs in the high, medium and low altitude zones was 3.6±0.3, 3.8±0.2 and 3.6±0.2 ha respectively, which was arable and private grazing land of the respondents and excludes other communal lands. According to the results of the study maximum and minimum landholding of HH in woreda level was 8.25ha and 1.25 ha respectively (Table 3).

Table 3: Maximum, minimum and average landholding in hectares

Altitude zones	Maximum	Minimum	Mean ±SE	P-value
Highland	6.25	1.25	3.6±0.3	
Mid-altitude	8.25	1.38	3.8±0.2	
Lowland	8.25	1.75	3.3±0.34	P >(0.05)0.35
Overall	8.25	1.25	3.6±0.2	

There are two types of farming systems found in the study area such as crop-livestock and livestock (pastoral) production systems. From the total land area coverage, 46.64% are suitable for crop production. This showed that the area favorable for crop production and for livestock rearing activity. About 78.2% sampled HH in the study area depended on crop-livestock and about 21.8% of them relied on livestock production. The area receives a bimodal rainfall where small rains occur between September-November while the main rain occurs between half of March-June [10]. The average landholding and land use pattern of the HHs were 3.6±0.2 have no significance difference $P \geq 0.05$ (0.35) among altitude zone. This landholding in study area was higher than that of Southern Ethiopia at Alaba district, [37] reported that the average land size owned by a farmer is about 2.5 ha. This result is smaller than the mean average landholding of 5.28 ± 0.215 ha per household in Metema district [32].

Types and status of communal grazing land

Status and types of communal grazing land differs from altitude areas. The HHs rank depending on the types of land available in their area for grazing by total coverage of the land size in their agro-ecology and status of grazing land by comparing to the previous land. The majority of sampled households 95% of them indicated that the status of communal grazing land was decreasing. The majority of respondents, 70% in highland, 100% in mid-altitude and 95% in lowland areas believed that the status of communal grazing land was decreasing. About 30% HHs in highland and 5% HHs in lowland indicated that no change in communal grazing land, but mentioned that loss of its fertility from time to time. Erosion leads to reduction in production and creates unusable land area, which was being changed to gorges and valley.

Table 4: Types and status of communal grazing land

	Highland	Mid-altitude	Lowland
Types of communal land	N=20(%)	N=60(%)	N=20(%)
Gorge land	1st (55)	5th (30)	5th (90)
Stone covered	2nd (55)	6rd (30)	4th (30)
Swampy	3rd (80)	7th (63.3)	7th (95)
Bush/shrub	4th (70)	1st (75)	3rd (40)
Tree covered	5th (75)	2nd (51.7)	1st (50)
Open grass land	6th (30)	4th (51.7)	2nd (45)
Infertile land	7th (95)	3rd (16.7)	6th (43)
Status of communal land			
Decreasing	70	100	95
No change	30	0.0	5

Types of communal grazing land exist in the study area also vary from altitude to altitudes. The survey result showed that the highland areas were dominated by gorge land ranked 1st (55%) followed by stone covered. In midland bush/shrub land was ranked 1st (75) followed by tree covered ranked 2nd (51.7). In lowland area tree covered land was ranked 1st (50) (Table 4)

Causes of communal grazing land deterioration

Causes of grazing land deterioration vary from altitude to altitude. Thus, the survey result indicated that 60% of HHs ranked overgrazing as 1st cause of grazing land deterioration in highland area followed by reduction in forage species composition ranked 2nd and at 3rd place expansion of farm land. In mid-altitude expansion of farm land ranked 1st (78.3%) followed by conflict 2nd and at 3rd overgrazing. In lowlands overgrazing was ranked 1st (50%) as cause of grazing land deterioration followed by reduction of forage spices composition 2nd (Table 5).

Table 5: Causes of grazing land deterioration

	Highland	Midland	Lowland
Possible reason	N=20(%)	N=60(%)	N=20(%)
Overgrazing	1st (60)	3rd (53.3)	1st (50)
Reduction in forage species composion	2nd (30)	5th (35)	2nd (30)
Expansion of farm land	3rd (35)	1st (78.3)	5th (35)
Reduction in forage biomass production	4th (30)	6th (40)	3rd (45)
Infestation with weed	5th (35)	4th (48.3)	4th (55)
Conflict	6th (30)	2nd (23.3)	6th (50)

The majority of HHs (93%) believed that the status of communal grazing land in their areas was decreasing. About 7% of the HHs in highland area indicated that no change in communal grazing land, but loss of its fertility and erosion leads to its production reduction and unusable as changed to gorges and valley area, which is in agreement with reports of [18] as the decline in grazing land production has become one of the most important causes of feed shortage and drop in livestock productivity. Since, sample HHs indicated that expansion of farm land ranked 1st (52%) as causes of communal grazing land reduction followed by overgrazing ranked 2nd (45%) and 3rd reduction in forage biomass production of the communal grazing land. Also focus group discussion indicated that livestock and human population pressure contributed to the current degradation of the grazing land in the high and mid-altitude zones while, shortage and erratic rainfall were the major contributing factors in the lowlands. Expansion of farm land was the major contributor for shortage of grazing land in mid-altitudes. Differences in opinion as to the cause of reduced land productivity and land deterioration were due to the climatic condition of the area and utilization potential of the communal resources in altitude zones and human population pressure, which is in agreement to the study of [2]. Moreover, Poor knowledge of the farmers on management of the grazing land was also another factor and wild fire (sometimes fire purposively) destroys a wide area of the grazing lands in the months of February and march to obtain the first showers induce quick growth of grass feed with favorable influence on the availability of feed in May and June months. However, with the decline in the size of the grazing land and degradation through overgrazing and the expansion of arable cropping, agricultural by-products have become increasingly important [2]. Seasonality in feed availability and lack of knowledge on feed conservation has created feed shortage both in the highland and lowland ecologies of Ethiopia.

Cattle feed resources

Cattle feed resources were ranked depending on the abundance of feed resources for their cattle and availability both in dry and wet seasons. The survey results indicated that majority of HHs used natural pasture and crop residues as feed resources both in dry and wet seasons. Natural pasture was ranked 1st in all altitude of the study area both in dry and wet seasons. Similarly crop

residues ranked 2nd; both in highland, and in midland for dry and wet seasons, but browse was ranked 2nd as source of livestock feed in lowland area (Table 6). Focus group discussion with key informants indicated that availability of feed resources and crop residues varied among the altitude zones. The major crops grown by farmers in the high and midland altitude zone were barley, wheat, field pea, millet, sorghum and bean, while teff, maize, wheat, millet, haricot bean and chickpea are the main crops grown in medium altitude zone. Maize and sorghum were the dominant crops grown in the low altitude zone. Barley constituted the largest share of crop residue fed to livestock in highland in addition to enset, banana leaf and sweet potato leaf. Long season sorghum was widely grown, although its stover was so dry that it loses its feed value. Teff straw was the 1st feed resource in mixed farming areas of mid-altitude followed by maize stover, wheat straw, field pea straw, haricot bean straw, sorghum stover. Pastoralists depended both in dry and wet season on natural pasture and browse (Table 6).

Table 6: Cattle feed resources

	Dry season			Wet season		
	Highland	Midland	Lowland	Highland	Midland	Lowland
Feed resources	N=20(%)	N=60(%)	N=20(%)	N=20(%)	N=60(%)	N=20(%)
Natural pasture	1st (100)	1st (76.7)	1st (100)	1st (95)	1st (80)	1st (100)
Crop residues	2nd (100)	2nd (75)	3nd (35)	2nd (70)	2nd (73.3)	4th (15)
Stubble grazing	3rd (95)	3rd (78.3)	5th (15)	4th (35)	5th (88.3)	5th (15)
Browse	4th (85)	4th (73.3)	2nd (50)	3rd (90)	3rd (86.7)	2nd (85)
Hay	5th (90)	5th (83.3)	4th (55)	5th (65)	4th (83.3)	3rd (80)
Feed supplement	6th (45)	6th (3.3)	-	6th (45)	6th (3.3)	6th (61)

The survey results indicated that natural pasture were the major feed resource and contributes 92.6% as feed resource and ranked 1st in both dry and wet season of year followed by crop residues contribute 58.1% of total feed resource and ranked 2nd in highland and mid-altitude area. Browse ranked 2nd in lowland areas as source of cattle feed, which is in agreement with the study of [17] in the lowland agro-pastoral system. Other feed resources have taken minor place as source of livestock feed and there was no practices of silage making and urea treated with crop residues used as feed source and feed supplements, but Atela, Amole chewu/salt, Bole and magado used as feed and mineral supplements. The lowlands were characterized by grass-dominant pastures. In this farming system, permanent pastures provide 100% and ranked 1st depending on the feed resources available followed by browse and in the pastoral area grazing on natural pasture and browsing provide 100% of feed resources in both dry and wet seasons. It was reported that forage development program were on training for farmers and seedlings were distributed to farmers in some kebeles of woreda. Accordingly respondents indicated that the absence of forage development programs in study area, which is in agreement to the report of [3]. According to focus group discussion in all altitude zones; the natural pasture were abundantly available to animals for about eight months in mid-altitude and pastoral areas starting from April to mid July (main rainy season) and from mid September to November (short rainy season) including crop harvesting periods of both seasons. Many of the farmers who live in mid-altitude involved in crop production practice uses stubble grazing and fallow land as an animal feed resource during crop harvesting time (half of June to end of July) and from December to half of January and severe dry season followed by heavy rain fall from half of January to end of May; during this season farmers use crop residues as an animal feed. Also focus group discussion indicated that browsing plants were available and used throughout of the year, but mainly in the dry season when the production of the herbaceous layer is very negligible, i.e., from mid January to end of March at which sever dry season of the year both in midland and pastoral area used as feed resource. In highland area the season was to the opposite as there was no dry season, but affects cattle production as starting from April to end of June there was heavy rain fall existed in highland. There were no crop production activity and animals are endangered of swampy and unproductiveness of natural pasture due to mud occurring in the area and farmers use enset, banana, sweet potato, gode and sugarcane leaves used as animal feed in addition to wheat and barley straw. This study result is in agreement to the study of [25] indicated that the availability of feed resources in the highlands depends on the intensity of crop production, population pressure, the amount of rainfall, and distribution pattern of rainfall and seasons of the year. Pasture growth is a reflection of the annual rainfall distribution pattern.

Feed utilization and conservation practices

From the one time farm visit (field observation) the major constraints associated with crop residues utilization for livestock feeding were collection, transportation, storage and feeding problems. Although natural pasture and crop residues were produced in large amounts, their full and efficient utilization for livestock feeding has been hindered partly by inadequate knowledge of the farmers. Indeed, some farmers had a great concern to store the crop residues in a separate cottage constructed houses merely for storages of crop residues or on the roof in their cottages and on their farm land. Such farmers are observed to efficiently utilize these feed resources which they give to their animals bunch by bunch or some even soak with water to improve palatability and digestibility. The residues are piled in stacks near homesteads and animals were let to eat from the stacks or given small quantities in the morning and evening, or for working oxen, before and after work. Alternatively, the residues are left in the threshing ground and consumed by animals together with the standing straws which are left for aftermath grazing. Thus, feed conservation practice causes huge

wastage of feed on ground as during feeding and when rain starts residues rotten on ground. In the study area measures were taken to cope up with critical feed shortage period. The survey result indicated that 72% respondents relied on stored crop residues and ranked 1st showing significantly difference at (P <0.05) 0.028 among the study sites. About 49% HHs relied on migration and travelling long distance in search of feed to grazing area showing significantly difference (P <0.05) 0.009 among the study sites and 38% of them resist the condition through relied on farm residues and natural pasture. The most coping mechanism was conserving crop residues and sending animals to other areas of the feed availability were the main coping mechanisms used against critical feed shortage. Which is in agreement with reports in central and southern highlands of Ethiopia as indicated that there is increasing importance of crop residues as a livestock feed [29; 35]. According to [35], shortage of grazing lands and the absence of alternative feed resources accentuate the increased dependence on crop residues in the central highlands of Ethiopia.

Months of feed availability and shortage

According to the study, feed supply is adequate from September to half of January while, half of January to half of April represented critical feed shortage time. The majority of HHs indicated that feed supply was inadequate between months of December and April. About 75% of HHs indicated that huge loss of their asset occurs at starting of rainfall from March-May and June-August (Table 7).

Table 7: Months of critical feed shortage

	Highland	Mid-altitude	Lowland
Months	N=20(%)	N=60(%)	N=20(%)
September-November	0.0	1.7	0.0
December -February	0.0	1.7	0.0
December -February	0.0	5.0	75.0
March-May	25.0	91.7	25.0
March-May and June-August	30.0	0.0	0.0
June-August	45.0	0.0	0.0

Focus group discussion indicated that grazing on private and communal lands, crop residues (maize and sorghum stover and straws from barley, teff, wheat), parts of root and tuber crops (cassava, sweet potato), sugar cane, grains, parts of enset and banana plants, weeds and tillers from crop fields and leaves and browses from local trees were major feed resources in different seasons of the year. Feed leftovers, local mineral sources and by-products from local beverages were occasionally supplemented to improve utilization of crop residues and roughages. After crops harvested, livestock freely graze on grazing and crop lands and afterwards either tethered or kept by herdsmen. Also crop stubble grazing was important feed resource after harvesting the crops, livestock were allowed to graze stubble of different crops like maize, barley, sorghum, wheat, teff, and haricot bean mainly from July to half of August and December. For the first two months, the stubble were grazed by the animals of the farm owner and later it becomes accessible to all animals in the community when dry season start from mid January.

Strategies to cope up feed shortage in dry and wet season

In the study area different measures were taken to cope up critical feed shortage. Survey results indicated that 24% of the HHs relied on stored crop residues and about 55% of them depended both on migration and natural pasture. Thus, the strategies to cope up feed shortage in dry and wet seasons were feeding on farm residues and on natural pasture. Also 40% in highland, 21.7% in mid-altitude and 25% in lowlands send their animals to others areas of ample natural pasture. About 30% in highland, 10% in mid-altitude and 40% in lowlands resist the condition through relaying both on farm residues and natural pasture (Table 8).

Table 8: Feed shortage copes up strategies

	Highland	Mid-altitude	Lowland	Overall
Feed shortage coping mechanism	N=20(%)	N=60(%)	N=20(%)	N=100
Rely on stored feed	0.0	1.7	0.0	1
Rely on farm residues	20	33.3	0.0	24
Rely on the natural pasture	10	33.3	35	29
Rely on natural pasture and on farm residues	30	10	40	20
Send animals to other areas	40	21.7	25	26

In the study area measures were taken to cope up with critical feed shortage period. The survey result indicated that 72% respondents relied on stored crop residues and ranked 1st showing significantly difference at (P <0.05) 0.028 among the study sites. About 49% HHs relied on migration and travelling long distance in search of feed to grazing area showing significantly difference (P <0.05) 0.009 among the study sites and 38% of them resist the condition through relied on farm residues and natural pasture. The most coping mechanism was conserving crop residues and sending animals to other areas of the feed availability were the main coping mechanisms used against critical feed shortage. Which is in agreement with reports in central and southern highlands of Ethiopia as indicated that there is increasing importance of crop residues as a livestock feed [29; 35]. According to [35], shortage of grazing lands and the absence of alternative feed resources accentuate the increased dependence on crop residues in the central highlands of Ethiopia. According to the survey result, 80% of respondents indicated that the grazing area was dramatically shrinking. Therefore, conserving crop residues as feed sources were preferable than depending on pasture such as wheat, barley and millet straw, and enset (E. ventricosum) where preferred in highlands, because of the availability in areas. This study is in agreement with [27] as preference for barley and wheat in Sinana Dinsho of Bale high land area. Teff, maize and haricot bean crop residues were more preferable in mid-altitudes due to availability and production potential areas. The measures taken to solve feed shortage in lowland pastoralists were migration as travelling long distance to search feed for livestock instead of conservation. Supplementing lactating, sick animals, and calves with collecting grasses and leaves of shrubs were another way of feed shortage solving problem in lowlands. Additionally farmers in mid-altitude and highlands cope up feed shortage through purchase of grasses and crop residues from neighbor farms or local markets and conserved fodder. Fodder conserved by cutting, drying and pooling in protected place or leaving it uncut on the fenced fields.

Types of cattle breed

The survey result indicated that cattle breeds in study area were indigenous. Through focus group discussion farmers in the study area were asked about the kinds of breeds they keep in their herds. A total of 63.8% of them stated that they kept pure Boran cattle breed. About 36.2% of them stated that they kept Boran cattle as well as their crosses with other breeds.

Purpose of cattle rearing

The survey result indicated that HHs in highland and midland areas (100%) reared cattle for draught purpose. Fattening of cattle was practiced on natural pasture and with local beverage by-products. In lowlands, HHs reared 75% cattle for selling and 25% of cattle for both sale and farming. HHs do not slaughter cattle for home consumption in normal times but consume cattle products such as milk, meat and by-products (butter and yogurt). However, HHs slaughter animal during cultural ceremonies such as wedding and funeral days. The major decisions concerning livestock sales, lending, borrowing of animals and giving animals for bride payment, and ownership is the responsibility of the family head (male) except in the case of widow woman. Respondents indicated that 48% of cattle owner in HH was husband, 32 % both husband and wife and 17% cattle owner was the family member (Table 9).

Table 9: Purpose of cattle rearing and ownership

	Highland	Mid-altitude	Lowland	overall
Purpose of cattle rearing	N=20(%)	N=60(%)	N=20(%)	N=100
Selling	0.0	10	65	10
Farming	65	65	0.0	55
Both	15	15	15	15
Consumption/milk and meat	20	10	20	20
Owner of cattle				
Husband	15	66.7	25	48
Wife	5	3.3	0.0	3
Husband and wife	65	18.3	40	32
The family	15	11.7	35	17

The survey result showed that objectives of cattle rearing in the highland and mid-altitude areas were to fulfill multipurpose functions of the HHs of which the source of draught power ranked 1st, income source ranked 2nd, milk and milk products ranked 3rd, social functions as a gift ranked 4th, organic fertilizer ranked 5th and meat ranked 6th. The current result of the study is in agreement with reports of [11]. The major objectives of HHs in lowlands were income source followed by product consumption, and draught purpose. Selling of any commodity for the sources of cash in the HH depends on the amount of money needed to cover their expense. For example, in most instances, HHs sell cattle to cover large expenses, where as they sell crop and/or butter for relatively smaller expenditures. However, butter and crop were used as a source of cash when there was a surplus.

Cattle herding practices and feeding management

Similar herding management practice was existed in all altitude zones. According to the survey result about 75%

of them herded by individual, 15% by rotational herding and 10% herded by individual in highland area. In midland about 66.7% herded by individual, 18.3% herded by hiring a person and 15% herded by rotational herding. In pastoral areas about 55% herded by individual herding, 30% herded by rotational herding and 15% by hiring a person. In the subsistence farming of the smallholder producer feeding patterns include tethering, cut-carry (zero-grazing) and grazing. According to the survey result 90.0% of the HHs in highland, 95% HHs in mid-altitude and 95% in pastoral area relied on natural pasture by grazing. In highlands animals were grazed around homestead and were supplemented with weed, by-products of enset and crop residues (Table 10).

Table 10: Cattle herding and feeding systems

	Highland	Mid-altitude	Lowland	Overall
Herding system	N=20(%)	N=60(%)	N=20(%)	N=100
Rotational	15	15	30	18.0
Individual	75	66.7	55	66.0
Hiring a person	10	18.3	15	16.0
Feeding system				
Cut and carry/zero grazing	0.0	1.7	0.0	1.0
Grazing	90	95	95	94
Tethering	0.0	0.0	5.0	1.0
Cut and carry and grazing	5.0	3.3	0.0	3.0
Grazing and tethering	5.0	0.0	0.0	1.0

According to the study result 66%, 18% and 16% of HHs were herded cattle by individual hiring, rotational/communal hiring and hiring a person respectively. This study result is in agreement with report [4] as rotational/communal herding through farmers in a village together herded their cattle and herding were performed by rotation of herders from each household. The second one is individual herding in that every household herds his/her own cattle by any of the family member. The third is hiring a person: This is the case where a sort of hired man herds cattle of an individual family or a group of families.

Housing management

House is basically important to protect animals from predators, theft and from adverse weather conditions. Thus, about 35% HHs in highland, 80% HHs in mid-altitude and 85% HHs in lowland constructed barn for their cattle. About 15% HHs in highland and mid-altitude live their animals in a homestead shade and 50% of the HHs in highland area lived together with their animals at separated rooms with the family in the home. About 5% of HHs in midland kept their cattle on field and tie with rope on head and feet at night (Table 11).

Table 11: Housing systems

	Highland	Mid-altitude	Lowland	Overall
Housing system	N=20(%)	N=60(%)	N=20(%)	N=100
Home stead shades	15	15	0.0	9.0
In living rooms with the family	50	0.0	0.0	9.0
Barn	35	80	85	69
On field and thigh with rope	0.0	5	15	13

Watering management

Distribution and types of watering facilities varied and influenced the frequency of watering and distance travelled in search of water bodies. The survey result indicated that major sources of water for livestock were rivers, springs/streams and temporary water in order of importance. The main sources of water in the highlands during the dry season were streams ranked 1st followed by river, temporary water and ponds. In midland river ranked 1st followed by stream, ponds and temporary water and there was no practice of hand dug watering. For lowland areas river ranked 1st followed by streams and temporary water and similarly also no practices of using pond and hand dug in lowland. However, during the wet season, temporary water ranked 1st followed by streams was the main source of water in all altitudes (Table 12).

Table 12: Water sources across seasons and altitudes

	Dry season			Wet season		
	Highland	Midland	Lowland	Highland	Mid-altitude	Lowland
Water sources	N=20(%)	N=60(%)	N=20(%)	N=20(%)	N=60(%)	N=20(%)
Streams	1st (41.7)	2nd (73.2)	2nd (26.8)	2nd (20.8)	2nd (66.7)	2nd (12.5)
River	2nd (43.2)	1st (64.7)	1st (35.3)	3rd (23.4)	3rd (66.2)	3rd (10.4)
Pond	4th (39)	3rd (61)	-	4th (28.1)	4th (71.9)	-
Temporary water	3rd (34.4)	4th (75)	3rd (25)	1st (22.4)	1st (62.4)	1st (15.3)
Hand dug	5th (100)	-	-	5th (100)	2nd (100)	-

The survey result indicated that water shortage existed in months of December to February in mid-altitude and lowland**.** Alternate day watering was much more common in dry than in wet periods both in mid-altitude and pastoral areas than in highlands. With regard to the frequency of watering of different animal species, most of the farmers water their animals once in a day, ad-libitum (free choice) and once in two days where, 36.0%, 4.0% and 60.0% respectively. About 90% respondents offered water once in a day in the high altitude. About 65% and 100% of the respondents offered water once in two days in mid-altitude and lowlands respectively in both dry and wet seasons. The survey result indicated that distance travelled for watering livestock cover less distance as 73% respondents travelled <1.0 km. About 22% respondents travelled 1-5 km and 4% respondents travelled 6-10 km to reach water source (Table 13).

Table 13: Months of water shortage, frequency of watering and distance travelled

	Highland	Mid-altitude	Lowland	Overall
Months of water shortage	N=20(%)	N=60(%)	N=20(%)	N=100
December- February	0.0	16.7	100	30
No shortage	100	83.3	0.0	70
Frequency of watering				
Once in a day	90	30	0.0	36
Ad-libitum	5.0	5.0	0.0	4.0
Once in two days	5.0	65	100	60
Distance travelled				
watered at home	5.0	0.0	0.0	1.0
<1 km	95	86.7	10	73
1-5 km	0.0	13.3	70	22
6-10 km	0.0	0.0	20	4.0

Healthcare management

Major animal diseases and parasites were discussed through involving key informant farmers, and veterinary technicians. They indicated that Trypanosomiasis (Gande/ Sumute), Contagious Bovine Pleuro Pneumonia (Shomibi), Blackleg (Chechesa), Foot and mouth disease (Masa/ Oyale/ Aita), Fasholasis (Afala/ Tiru), Anthrax (Abasanga), Lumpy skin disease (Robe'a), Pasteurellosis (Huda), Dermatophylosis (Chito), Lice (Eba), Rabies (Wochokadukubi) and Mastitis (Ununakdukubi) were major diseases of cattle in the study area. From the survey results Trypanosomiasis cited by 82% of the HHs ranked 1st, Contagious Pleuro Pneumonia (52.3%) ranked 2nd and Blackleg (54.4%) ranked 3rd were the most ranked diseases in terms of distribution and frequency of occurrence. The survey result indicated that about 46% HHs of the woreda have disease problem throughout the year and only 1% HHs indicated that no disease problem, but they follow up their cattle health in different ways. About 53% of respondents indicated that cattle disease problem depended on seasons of the year. The survey result indicated that 73.9% HHs in highland, 70.9% in mid-altitude and 1% in the lowlands have access to veterinary service, but the service was characterized by inadequate or shortage of veterinarians and veterinary supplies. Therefore, sample farmers of 71% in highland, 65% in mid-altitude and 58% in pastoral used alternative measures of private, ethno-veterinary treatments and indigenous knowledge. Overall the survey results on animal health services indicated that 68.0% of the respondents used the government medication center, 12% of respondents used government, private and traditional medications. Private medication center existed only in pastoral area covering only 6% and the private services charge them for the drug marketing (Table 14).

Table 14: Disease problems and health service centers

	Highland	Mid-altitude	Lowland	Overall
Disease problems	N=20(%)	N=60(%)	N=20(%)	N=100
Yes	65.0	40.0	45.0	46.0
No	0.0	1.7	0.0	1.0
It depends on season	35.0	58.3	55.0	53.0
Assist health service				
Government	60.0	90.0	10.0	68.0
Private &government	0.0	5.0	0.0	3.0
Government, private and traditional medications	15.0	3.3	35.0	12.0
Government &traditional medication	25.0	0.0	0.0	5.0
Private veterinarians	0.0	1.7	25.0	6.0
Private and traditional	0.0	0.0	30.0	6.0

Government is the major animal health service provider with limited involvement of the private sector. From the survey results on animal health services, 60 %, 90% and 10% of the HHs in highland, mid-altitude and lowland use the government medication center respectively. Private medication centers existed only in pastoral covering the service of pastoral with 25% and there was no private service in highland and mid-altitude area. Those who used government, private and traditional services were 15% in highland, 3.3% in mid-altitude and 35% in pastoral respectively and those who used government and traditional medication centers were 35% in lowland and none in both altitudes (Table 14). The survey result indicated that average medication expense were 184.65±7.38 ETB per year and 15.85±0.37 ETB per day/trip of medication (Table 15).

Table 15: Average expense of HHs for medication (ETB)

	Mean ±SE	
Altitude zones	Medication per year	Medication per trip
Highland	151.25±8.552	15.90±0.619
Mid-altitude	168.92±6.584	15.28±0.408
Lowland	265.25±22.459	17.50±1.193
Overall	184.65±7.38	15.85±0.37

Constraints of Cattle Production

Constraints of Cattle Production were ranked in the study area depending on effect/causes loss for their production practices. The following constraints were ranked according to its effect/severity on production were as shown in (Table 16).

Table 16: Cattle production constraints

	Highland	Mid-altitude	Lowland
Constraints of cattle production	N=20(%)	N=60(%)	N=20(%)
Feed shortage	1st (75)	1st (80)	1st (75)
Disease &parasites	2nd (60)	4th (30)	3rd (65)
Grazing land	3rd (80)	3rd (21.7)	12th (95)
Market	4th (60)	9th (35)	8th (30)
Veterinary services	5th (80)	5th (53.3)	5th (55)
Extension service	66th (75)	6th (45)	6th (35)
Road	7th (75)	8th (35)	7th (35)
Drought	8th (75)	2nd (46.7)	2nd (35)
Credit	9th (70)	10th (35)	8th (35)
Predators	10th (55)	8th (16.7)	11th (100)
Improved breed	11th (50)	12th (36.7)	9th (50)
Conflict	12th (70)	4th (33.3)	13th (100)
Water	13th (75)	13th (51.7)	4th (35)

Livestock plays a critical role in the livelihood of smallholder farmers. However, sample households reported that productivity and contribution of their animals is low due to several constraints. The majority 77% of them ranked feed shortage as the number one problem that hindered cattle production greatly having no significant difference as (P >0.05) 0.63 among the three study sites. About 45% of HHs in highlands indicated that production loss existed from June-August. Also, 34.2% in highland, 45% in mid-altitude and 35.3% in pastoral area HHs reported that mortality loss of animals mainly due to feed shortage, difficulty of grazing land and drought were high. The crop residues used as animal feed resources were teff straw, stover of maize and sorghum and the straws of wheat, chicken pea, haricot bean and barley were available as feed and supplementing for three months of the dry and wet season of feed shortage. Sampled households in pastoral area reported that there were critical feed shortages during the dry season from January to half of March. Therefore, the current study is similar to [33] as seasonal variations in feed quality and quantity is the main limitation to animal production and cause fluctuation in productivity throughout the year, particularly in the dry seasons during which feed is scant and poor in nutritive value. Relatively the feed available in Kolla agro-ecology is good compared to Woina Dega agro-ecology. The 2nd (35%) ranked constraint of the HHs was drought (stressful period: a focus on ensuring survival of breeding stock) and the primary problem for livestock production in low lands, which was followed by disease and shortage of grazing land, which were more or less similar to the constraints faced by animals of different pastoral areas in Ethiopia [9]. But, no drought problem in highlands and ranked shortage of grazing land in 2nd. Importantly, sample farmers of 34% ranked disease and parasites in 3rd as reported that animal disease and parasites were major threat of their livestock production showing significantly higher difference at (P <0.05) 0.0 among the study sites due to difference in altitude area. This study is in agreement to the study of [19], which indicated that meat and milk yields are low and losses high, especially among calves and young stock. Contagious diseases and parasitic infections are major causes of death, factors that are exacerbated by malnutrition and starvation due to frequent drought. Recurring drought is a factor for the loss of huge livestock resource that influences the animal population, although it is difficult to determine the extent of losses. Practically all animals are range-fed. During the rainy seasons, water and grass are generally plentiful, but with the onset of the dry season, forage is generally insufficient to keep animals nourished and able to resist disease [28]. Therefore farmers need up to date and accurate information on how best to manage and care for their animals, new veterinary health practices, the best ways to treat diseases and news of the domestic as well as the international markets. According to the survey result in study area animal disease problem was ranked 3rd where as differently animal health problem was mentioned as a second constraint according to the report of [26] especially in waterlogged areas due to Liver-fluke and Lung-worm infestation; and also prevalence of Trypanosomiasis that affect cattle health. Moreover, Leech and Ticks were mentioned among the parasites that hindered cattle performance as they are blood sucking parasites, which is similar to the current study result in highlands ranked diseases and parasites in 2nd rank. According to the survey result 28% of respondent's ranked shortage of grazing land in 4th rank and reported that shortage of grazing land was an overriding constraint both in highland and midland areas. This rank could be attributed to grazing habit of cattle on marginal lands and expansion of farm land. Thus, the shrinking communal pastureland seems to be the most economically important constraint of cattle production compared to disease/parasite prevalence and veterinary service. Similarly 25% of respondent's ranked market problem in 4th rank and reported market were an overriding constraint both in highland and midland areas due to poor road infrastructure in general was seen as a major constraint to efficient trade and rate of the transport is the highest cost for livestock trading. Traders trucked animals from primary and secondary markets to terminal market for domestic consumption, which is in agreement to the study of [36] indicated that poor infrastructure and uneven access to market information is a well-known constraint to livestock trade in the country in order to make timely and well-informed decisions, sellers and buyers need access to a wide range of market information, including prices, sales volumes, disease status and the levels of national and international demand. Veterinary service ranked 5th with total weighed score of 59% followed by extension service at 6th rank. This compared to the first four major constraints due to lack of enough specialists. The low veterinary service performance was the outcome of few government veterinary staffs in number and cannot cover such a vast area to adequately address the veterinary needs of livestock keepers. Besides government staffs need adequate mobile facilities for which currently the government does not have the capacity to provide which is in agreement with study of [31]. Depending from this bench mark the sample farmers were indicated to be: - feed shortage particularly in the dry and wet seasons, drought, disease and parasites, market, inadequate veterinary services, shortage of grazing land and in adequate infrastructure supplies were ,major constraints which face households similarly with [1]for North and West Shewa Zones where the most important livestock production constraints prioritized by The interaction of these constraints affects the performance of the genetic potential of animals leading to subsistence level of livestock production. Therefore, prioritizations of all major and minor constraints in altitude zones have shown different ranks in according to its severity in which the households face in their area.

CONCLUSIONS AND RECOMMENDATIONS

In this study, assessment of cattle husbandry practices were conducted in two livestock production systems of highland and mid-altitude zone of mixed-crop livestock and livestock production systems of lowland area. In mixed farming system of the highlands and mid-altitude crop production is common and day to day activities of the people and cattle rearing were the major activities of the lowland pastoralist. Cattle are the most important livestock species of households for their day to day activities such as cultivation, threshing, transporting, manure and income

source. Communal grazing lands were the main source of livestock feed with poor management of the resources. Natural pasture, crop residues, crop stubbles, browse, leaf and pseudo-stem of enset, weed and sugarcane leaves were the feed resources of the study area. Pasture areas were decreasing as cropped areas expand due to this subsistence-oriented smallholder has limited means with which to boost production. Overall, the main constraints of livestock production and productivity can be summed up as feed shortage, drought, overgrazing, land degradation, livestock disease and parasites, backward breeding practice and lack of marketing and unwise utilization of feed and feed resources due to high number of livestock was added to further deterioration. Therefore, to sustain the production system in the study area the following points are recommended:-

- Improve the current condition of communal rangelands through management of degraded areas by awareness creation on the value of these common resources and development of rules and regulation to sustain the existing resource and implement over the utilization of communal/pastoral rangeland management systems to reduce constraints such as shortage of feed, drought and grazing land deterioration which perpetuated through time due to land use changes and seasonal fluctuation.
- Awareness creation to minimize feed shortage through conservation of forage/pasture in the form of hay at the end of rainy season due to abundant pasture existence in wet season. However, lack of experience in haymaking hinders the practice. Hence, due consideration should be given to train the farmers in haymaking and feed conservation practices.
- Further research and development work should be encouraged to alleviate dry season feed shortage through different options such as utilization of non conventional feeds, forages development program, use of irrigation, alternative means of crop residue utilization and conservation practices**.**
- Provision of strong extension services to farmers for feed resource development and training them in basic principles of collection, storage of harvested feed resources and crop residues should be sought. It was noted that farmers lack awareness on the production and use of improved forages and hence consolidated extension service and training is required for the farmer by agricultural development professionals.
- Improve animal health service delivery including training, increasing health service centers and drug supply system with close monitoring and supervision.
- In generally there is a need from government to provide extension services with the capacity, support and physical means to expose small scale farmers to markets and by so doing, efficiency in production and marketing of cattle to achieve huge profit.

ACKNOWLEDGEMENTS

First of all, I would like to thank God for his grace and immeasurable love, giving me strength and patience to bring me out humble piece of work in to light throughout the study period. I take it as an extreme privilege to express my heartfelt thanks and sincere gratitude to my major advisor Dr. Berhan Tamir for his noble hearted help, guidance, co-operation, encouragement, earnest and constructive comments throughout the analysis and preparation of the manuscript which have installed me on the right track, timely accomplishment and the spirit of confidence to successfully complete this MSc. thesis paper.

REFERENCES

[1]. Agajie, T., Ebrahim, J., Sitotaw, F. and David, G. S. 2005. Technology Transfer Pathways and Livelihood Impact Indicators in Central Ethiopia. Journal of Tropical Animal Health and Production. **37 (**1): 101-122.

[2]. Alemayehu, M. 2004. Pasture and Forage Resource profiles of Ethiopia. Ethiopia/FAO. Addis Ababa, Ethiopia. pp19.

[3]. Alemayehu, M. 2005. Feed resources base of Ethiopia: Status limitations and opportunities for integrated development. In: Proceedings of the 12th Annual Conference of the Ethiopian Society of Animal Production (ESAP) held in Addis Ababa, Ethiopia, August 12-14, 2004. Addis Ababa, Ethiopia. pp410.

[4]. Alganesh, T., Mathewos, B. and Gizaw, K. 2004. Survey on Traditional Livestock Production Systems in Manasibu District of West Wallaga, Ethiopia. Farm Animal Biodiversity in Ethiopia: Status and Prospects. In: Proceedings of the 11th Annual conference of the Ethiopian Society of Animal Production (ESAP) held in Addis Ababa, Ethiopia. pp 441

[5]. Amaha, K. 2006. Characterization of rangeland resources and dynamics of the pastoral production system in the Somali region of eastern Ethiopia. PhD thesis, University of the Free State, Bloemfontein, South Africa. pp 232

[6]. Arsham, H. 2007. Questionnaire design and survey sampling. http//www.mirror service. Org/site/hom.ubaltedu/ntsbarsh/Business-stat.

[7]. Aune, J., Bussa, M., Asfaw, F. and Ayele, A. 2001. The ox ploughing system in Ethiopia: can it be sustained? Outlook on Agriculture. **30:** 275-280.

[8]. Azage, T. and Alemu, G. 1998. Prospects for peri-urban dairy development in Ethiopia. In: Proceedings of 5th national conference of Ethiopian Society of Animal Production (ESAP), May 15–17, 1997, Addis Ababa, Ethiopia. pp 248.

[9]. Beruk, Y. 2003. Drought and Famine in the pastoral areas of Ethiopia**.** In: Proceedings of Conference on Pastoral Development in Ethiopia. Pastoral Forum of Ethiopia. Addis Ababa, Ethiopia. pp156-189.

[10]. BwOARD. 2008. Report of Burji woreda Office Agricultural and Rural Development, on Rural

Development Principles, Policies and communal resource management and protection.

[11]. CARE-Ethiopia. 2009. CARE-Ethiopia has contracted out YONAD Business Promotion and Consultancy Service in May 2009 to analyze the milk and milk products value chain in Borana pastoral community.

[12]. CSA. 2007. Ethiopian Agricultural Census. Sample Enumeration, Results for the SNNPS Region. Part IV

[13]. CSA. 2008a. Livestock and Livestock Characteristics, Agricultural Sample Survey. Volume II, Statistical Bulletin, 446, pp 188.

[14]. CSA. 2008b. The Federal Democratic Republic of Ethiopia. Central Statistical Agency. Agricultural sample survey. Volume. IV, Report on land utilization, Addis Ababa, Ethiopia. pp 12-23.

[15]. CSA. 2009. Agricultural Sample Survey 2008/2009, Volume II Report on Livestock and Livestock Characteristics (Private and Peasant Holdings) Statistical Bulletin 446. Addis Ababa, Ethiopia.

[16]. Devendra, C. and Thomas, D. 2002. Crop-animal systems in Asia: importance of livestock and characterization of agro-ecological zones. Agricultural Systems, **71:** pp5-15.

[17]. Elias, M., Berhanu, G., Hoekstra, D. and Jabbar, M. 2007. Analysis of the Ethio-Sudan cross-border cattle trade: The case of Amhara Regional State. IPMS (Improving Productivity and Market Success) of Ethiopian Farmers Project Working Paper 4. ILRI (International Livestock Research Institute), Nairobi, Kenya. pp41.

[18]. ESAP. 2002. Livestock in Food Security Role and Contributions. In: Proceedings of 9th annual conference of the Ethiopian Society of Animal Production (ESAP), August 30-31, 2001. Addis Ababa, Ethiopia.

[19]. Girma, Z. 2010. Bringing livestock development Actors into a uniplatform. In: Proceedings of the cahnet-ethiopia launching workshop held at ghion hotel, Addis ababa, 15th April 2010, Addis Ababa, Ethiopia.

[20]. Heffernan, C. 2004. Livestock and the Poor: Issues in poverty focused livestock development. Chapter 15, in: Responding to the Livestock Revolution: the role of globalization and implications for poverty alleviation. British Society of Animal Science, publication 33. University of Reading, Reading, United Kingdom.

[21]. Ike, A. 2002. Urban dairying in Awassa, Ethiopia. University of Hohenheim. Institute of Animal production in the tropics and sub tropics. Stuttgart-Hohenheim, Germany.pp133

[22]. Kedija, H., Azage, T., Mohammed, Y. 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 Farmer, Project Working Paper, 13. ILRI (International Livestock Research Institute), Nairobi, Kenya. **56**:1-3.

[23]. Mohamed, A., Ahmed, A., Ehui, S. and Yemesrach, A. (2004): Dairy Development in Ethiopia. EPTD discussion paper No. 123. International Food Policy Research Institute. Washington, DC. U.S.A. pp41.

[24]. Negussie, G. 2006. Characterization and evaluation of urban dairy production system of Mekele city, Tigray Region, Ethiopia. M.Sc.thesis, HawassaUniversity. Awassa, Ethiopia.

[25]. Seyoum, B. Getnet, A. and Abate, T. 2001. Present Status and Future Direction in Feed Resources and Nutrition Research Targeted for Wheat Based Crop-Livestock Production System in Ethiopia. In: Wheat and Weeds: Food and Feed. Proceeding of the Two Stake Holder Workshops, CIMMYT, Santa Cruz, Bolivia. Pp 207-226.

[26]. Shitahun, M. 2009. Feed Resources Availability, Cattle Fattening Practices and Marketing System in Bure Woreda, MSc. thesis. Faculty of Dry Land Agriculture and Natural Resources. Livestock Production and Pastoral Development. Mekelle university, Ethiopia.

[27]. Solomon, B. 2004. Assessment of livestock production system and feed resource base in Sinana Dinsho Distirct of Bale highlands, South East Oromiya. M.Sc. Thesis presented to the school of graduate studies of Alemaya University of Agriculture.

[28]. Solomon, B., Solomon, M. and Alemu, Y. 2008a. Influence of rainfall pattern on grass/legume composition and nutritive value of natural pasture in Bale highlands of Ethiopia. Livestock Research for Rural Development. http://www.cipav.org.co/lrrd/lrrd20/3/.Accessed on January 21,201.

[29]. Solomon, B., Solomon, M. and Alemu, Y. 2008b. Potential Use of Crop Residues as Livestock Feed Resources under Smallholder Farmers Conditions in Bale highlands of Ethiopia. Journal of Tropical and Subtropical Agro ecosystems. **8**(2008):107-114.

[30]. SPSS. 2007.Statistical package software for social science (2007) version 16.00. SPSSin.c.1989-2007, USA

[31]. Tafesse, M. 2001. What should a pastoralist development strategy continue towards poverty reduction among pastoral communities in Ethiopia? In: Proceeding of 2nd Annual Conference on Pastoral development in Ethiopia. Pastoral Forum in Ethiopia, May 22-23, 1999. Addis Ababa, Ethiopia. pp136.

[32]. Tesfaye, M. 2007. characterization of cattle milk and meat production, Processing and marketing system in metema district, Ethiopia. M.sc. Thesis. Awassa College of agriculture, school of graduate studies Hawassa University Awassa, Ethiopia.

[33]. Tessema, Z., Aklilu, A. and Ameha, S. 2003. Assessment of the livestock production system, available feed resources and marketing situation in Belesa Woreda: A case study in drought prone areas of Amhara Region. In: Proceedings of the 10th annual conference of the Ethiopian Society of Animal Production (ESAP) held in Addis Ababa, Ethiopia, August 22-24, 2002. Addis Ababa, Ethiopia. Pp165-175.

[34]. Tsedeke, K. (2007): Production and Marketing Systems of sheep and goatsin Alaba, southern Ethiopia MSc Thesis. University of Hawassa. Awassa, Ethiopia.

[35]. Tsegaye, B., Tolera, A. and Berg, T. 2008. Livestock production and feed resource constraints in Akaki and Lume districts, central Ethiopia. Outlook on Agriculture. 37(1): 15–21.

[36]. Umar, A. and Baulch, B. 2007. Risk Taking for a Living: Trade and Marketing in the Somali Region of Ethiopia, UN OCHA-PCI, April, 2007.

[37]. Yeshitila, A. 2008. Efficiency of livestock feed resources utilization and forage development in Alaba Woreda, Southern Ethiopia. MSc. Thesis, Haramaya University, Dire Dawa, Ethiopia, pp128.