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ASSESSMENT OF MAJOR LIVESTOCK FEED RESOURCES AND FEEDING SYSTEMS IN BENCH-MAJI ZONE; SOUTH WESTERN PART OF ETHIOPIA

Tesfaye Feyisa[1]✉ and Melese Dejen[2]

[1]*Wolkite University, College of Agriculture and Natural Resource, Department of Animal Production and Technology, P.O.Box 07, Wolkite, Ethiopia*

[2]*Debra-Tabor University, College of Agriculture, Department of Animal Sciences, P.O.Box 5, Tabor, Ethiopia*

✉Email: tesfaye.feyisa@gmail.com

ABSTRACT: The study was conducted with the objectives of assessing major livestock feed resources and its utilization practices in Bench-Maji Zone, South Nations, Nationalities, Peoples Region (S.N.N.P.R). The average farm size owned per household (hh) in Surma (3.03 ha) were significantly higher (P<0.001) than the average farm size owned by Shey-Bench (2.48ha) and Semen Bench (1.95ha). Farm size allocation to crop production in Surma, Shey-Bench and Semen Bench was 2.49, 1.96 and 1.15 ha, respectively. Out of the total land owned per household; about 0.56, 0.18 and 0.29, and 0.00, 0.21 and 0.07 hectares were allocated for grazing and forage, respectively in Surma, Shey-bench and Semen Bench. The number of cattle and goats reared per hh in Surma Woreda was significantly higher (P<0.05) than that of Shey-bench and Semen Bench. Similarly, there was significantly large number of chickens in Surma woreda than Shey-bench. But, there were no significance difference for chicken's production in Surma and Semen Bench woredas. Contrast to chickens; there were significantly higher sheep and equine production in Shey-Bench than Semen Bench and Surma woredas. Moreover, there was no Equine production in Surma woreda might be due to the feeding habit of Equines in addition to prevalence of disease. The major feed resources to livestock in the study area were: natural pasture, crop residues, cultivated pasture, hay, left over of banana and/enset and taro leaf. Out of these, Natural pasture was the primary source of feed to animals in the study area. The most limiting constraint to livestock was shortage of grazing land and healthy problems.

Keywords: Livestock, Feed resource, Feeding system, Bench-Maji zone

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INTRODUCTION

In the smallholder production systems of Ethiopia, food crops are produced for subsistence and livestock are raised to provide mainly draught power for crop cultivation and other secondary outputs like milk, meat, hide/skin, dung and manure. Livestock production is an integral part of the farming systems in all parts of Ethiopia indicating its large contribution to the country's economy in the livelihoods of many Ethiopians (Helina and Schmidt, 2012). However, rate of livestock productivity is very slow and lag behind the growth of the population mainly due to insufficient supply of feeds (both quantity and quality) and poor management practices (Tsegay et al., 2015). From all, poor nutrition is the corner stone in limiting the productivity and reproductive performance of livestock. A majority of Ethiopia's livestock production depend mainly on natural pastures for their feed requirements. Natural pastures which provide more than 90% of the livestock feed are generally very poorly managed and its availability depends on rainy season (Alemayehu, 2005). There is abundant natural pasture during rainy season but at the dry season there is scarcity of natural pasture both in quality and quantity. Seyoum et al. (2001) noted that pasture growth is a reflection of the annual rainfall distribution pattern. In the mixed farming areas, better soils are used for cropping and the main permanent natural pasturelands are found on the upper slopes of hills and seasonally water logged areas in which overstocking taking place which result severe land degradation. A majority of Ethiopia's livestock production is focused in the highlands due to availability of crop residues for feed (Gizaw et al. 2010) and

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less risk of disease (Knips, 2004). However, crop residues are restricted to harvesting period and also low in nutritive value. Agro-industrial by products is mainly restricted to urban and per-urban areas where agro-industry (factory) distributed. Improved forages were not well established in the country. In this respect, Bench Maji Zone is not an exception and the same trend was observed by prioritizing better lands for cultivation to compete for grazing lands. There is no agro-industry (factory) which has the ability to process different grains to different by products which will be used as livestock feed. The farmers were not knowledgeable to treat low quality feeds such as crop residues and others. There is no well establishment of improved forage crops, and conserving forages are not well known. Low feed supply both in terms of quality and quantity results in retarded reproductive and growth performance of animals (Sisay, 2006). Poor nutrition in addition to causing low rates of production and reproduction also increases susceptibility of livestock to diseases and subsequently mortality. It is recognized that animal performance and especially milk production is much more dependent on the quantity and quality of feed eaten rather than on the genetic makeup of the animal (Tsegay et al., 2015). Biologically, about two-thirds of the improvement in livestock productivity is often attributed to nutrition since animal production is basically a conversion of feed into animal products. In economic terms, feed cost can account for up to 70% of the total cost of production of an animal product (Makkar, 2016). Therefore, efficient use of the feed resource by producing more productivity with less feed decreases the costs of feed and increases the profitability of the livestock operation (Makkar and Beever, 2013).

Regardless of all of these, there is no documented information about livestock feed resource and utilization practices in the Bench Maji zone in which this study was conducted. Therefore, documenting the livestock feed resources and utilization practices are important to exactly address the problem and so as to find the solution. Therefore, this study was conducted to assess the major livestock feed resources and its utilization practices in selected Woredas of Bench- Maji zone.

MATERIALS AND METHODS

Description of the Study Area

The study was conducted in Bench Maji Zone of the South Nations, Nationalities, Peoples Regional state (S.N.N.P.R). Mizan is the town of Bench Maji Zone located between 06059 '27.4" north south latitude and 035o35'9" east west longitude. It is located at an altitude of 1430 m.a.s.l and found at distance of 561km south west of Addis Ababa and 842 km from the regional capital Hawassa (BWRDO, 2005).

The amount and distribution of rain fall ranges between 300 mm to 2800 mm, about ten months rainfall per year. The average minimum and maximum temperature is 22 ^{o}C and 27 ^{o}C, respectively, (BMZBOFED, 2005). The common agricultural systems practiced in the zone are pastoralism, Silvo-pastoralism and mixed farming activities. The dominant crop grown in the area are cash crop (coffee, tea and spices), vegetables (cabbages), root and tuber crops (taro, cassava, yam, and sweet potato), cereal crops (maize, barely, rice, and wheat) and fruits (mango, avocado, papaya, anannas, and banana), all grown for household consumption and income generation.

Assessment of livestock feed resources and its utilization practices

Feed resources and its utilization practices were conducted by interviewing 180 randomly selected households (HHs), 60 households from Surma, 60 from Shey-bench and 60 from Semen Bench woredas. A semi-structured questionnaire was used for the interview. Farmers who reared at least one animal and were willing to participate in the survey were selected. The survey was conducted between September 2013 and July, 2014. Livestock holders were interviewed with a pre-tested questionnaire. Secondary data were also collected from the Woredas and Zonal Agricultural and Rural Development Offices on the issue related to livestock feed resources and its utilization practices, such as livestock population, land holding, livestock production constraints, income of household, feed resource, utilization practices, water availability, and feed conservation mechanisms in the area.

Statistical Analysis

The collected data was organized and analyzed using the Statistical Package for the Social Sciences (SPSS, 2003) and descriptive statistics such as frequency, means, and percentages.

RESULTS AND DISCUSSIONS

Household Characteristics

Educational levels of the respondents (%) in selected woredas of Bench Maji zone was presented in Table 1. The studied households had an average total family size of 7.1 (Semen Bench = 6.2; Shey Bench = 7.3 and Surma = 7.9) which was higher than the average family size reported by Ahmed et al. (2010) and less than the result

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reported by Dawit et al. (2013). The age of respondents varied between 25 and 70 years with an average of 39.3 years. The educational level attended by the household heads was very low (Table 1) especially in the Shey-Bench and Surma woredas. The low level of education can adversely affect the use of modern technologies which in turn decrease the income of household.

Land Holding per Household

The mean land holding per house hold in the study area were 2.48; which were very high compared to the findings of Ahmed et al. (2010) in the central highlands of Ethiopia. The average farm size owned per household (hh) in Surma was about 3.03 hectares, which were significantly higher (P<0.001) than the average farm size (2.48 hectares) owned by Shey-Bench or Semen Bench (1.95) (Table 2). Farm size allocation to crop production was 2.49, 1.96 and 1.15 hectares in Surma, Shey-Bench and Semen Bench, respectively with the total mean of 1.86ha indicated that large proportion of farm size was allocated to crop production which was in agreement with the reports of Tesfaye (2008) and CSA (2013). The crop land in Surma was significantly higher (P<0.001) than Shey-Bench and Semen Bench woredas. Similarly, the land allocated for grazing in Surma woreda was significantly larger (P<0.001) than in Shey-bench and Semen Bench woreda indicated its pastoral area. But, the land allocated for grazing in Shey-bench and Semen Bench was similar statistically. The land used for forage production in Shey-bench was significantly higher (P<0.01) as compared to Surma and Semen Bench woreda. However, there was no forage development in Surma woreda.

Purpose of Keeping the Cattle

Greater than half of the contacted house hold in Semen Bench and Shey-Bench woreda keep cattle for milk, traction and saving. Milk, saving and marriage contribute the major purpose of keeping cattle in Surma woreda. Even though the banks were developed now at the Mizan-Aman sub city, during the past times there were no banks to save their money. This trend also continued with the farmers and most farmers put their money on cattle rather than saving in the bank to sale and use it as an immediate cash income in the case of difficulty in addition to the selling of milk for house hold commodities. Similarly, the oxen kept in the Shey-Bench and Semen Bench woreda were used for traction to produce food crops. Generally, the livestock in the study area were not reared for single purpose rather for multi-purpose.

Table 1 - Educational levels of the respondents (%) in different woredas of Bench Maji zone

Woredas	Illiterate	Basic Education	Primary	Secondary
Semen Bench	32.5	32.5	25	10
Shey-Bench	47.5	30	7.5	15
Surma	100	-	-	-

- = not available (Respondents; Semen Bench = 60, Shey-Bench = 60, and Surma = 60)

Table 2 - Land holding per household in the study Area

Variable	Surma Mean± SE N= 60	Shey-Bench Mean ± SE N=60	Semen Bench Mean ± SE N=60	Total Mean ± SE
Total (ha)	3.03+0.13^{a}	2.48+0.24^{b}	1.95+0.17^{c}	2.48+0.11
Cropland (ha)	2.49+0.14^{a}	1.96+0.19^{b}	1.15+0.13^{c}	1.86+0.10
Fallow (ha)	0.00+0.00	0.02+0.01	0.09+0.04	0.04+0.01
Grazing (ha)	0.56+0.06^{a}	0.18+0.048^{b}	0.29+0.05^{b}	0.34+0.03
Forage (ha)	0.00+0.00^{b}	0.21+0.06^{a}	0.07+0.03^{b}	0.09+0.02
Other (ha)	0.00+0.00^{b}	0.13+0.04^{b}	0.36+0.09^{a}	0.16+0.03

Means with different letters within a raw are significantly different (P<0.05); N = number of respondents; SE =standard error

Table 3 - Purpose of keeping cattle in the Study Area

Woredas	Milk and saving	Milk and traction	Traction and saving	Milk, traction and saving	Milk, saving and marriage
Semen Bench	17.5%	2.5%	5%	75%	-
Shey-Bench	-	45%	-	55%	-
Surma	-	-	-	-	100%

- = not available

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Livestock Holding per Household

Cattle, sheep, goats, poultry and equines were reared by the local community of the three woredas. The number of cattle and goats reared per house hold in Surma woreda was significantly higher (P<0.05) than that of Shey-bench and Semen Bench (Table 4). Similarly, there was significantly large number of chickens in Surma woreda than Shey-bench. But, there were no significance difference for chicken's production in Surma and Semen Bench woredas. In general, there were high number of cattle, goat and chickens in Surma woreda might be due to its pastoral area which was comfortable for livestock production. There was no sheep population among the contacted respondents in Surma woreda might be due to pastoral areas were more comfortable for the production of goat, cattle and camel than sheep probably due to adaptability of these species to the hot climatic conditions. There was significantly higher sheep and equine production in Shey- Bench than Semen Bench and Surma woredas. There was no Equine production in Surma woreda might be due to the feeding habit of Equines (Equines needed around rivers to graze which was not mostly found in pastoral area) in addition to prevalence of disease. Variation in size of herd per house hold from place to place with the availability of water and grazing lands, prevalence of diseases and parasites as well as the management of the livestock owner have also been reported earlier researcher (Tessema et al., 2003).

The number of cows, Heifers and bulls per house hold in Surma woreda were significantly higher than in Shey-bench and Semen bench woredas. But, there was no significance difference between Shey-bench and Semen Bench woredas. Similarly, the number of Oxen and Calves per household in Surma woreda was significantly higher (P<0.05) than in Shey-Bench and Semen Bench woredas. The number of cows, Oxen and calves in Shey-Bench were also significantly higher than in Semen Bench. Higher number of cattle herd structure was registered in Surma woreda might be due pastoralist keep large number of livestock for the sake of drought.

Table 4 – Number of livestock owned and cattle herd composition per household in different woredas of Bench Maji zone

Livestock species	**Surma** (N=60) Mean + SE	**Shey-B.** (N=60) Mean + SE	**Semen B.** (N=60) Mean + SE	Total mean +SE
Cattle (No)	30.65+1.51^{a}	10.88+0.88^{b}	7.53+0.48^{c}	16.35+1.11
Sheep (No)	0.0 ^{c}	6.15+0.67^{a}	1.98+0.26^{b}	2.71+0.33
Goat (No)	9.40+1.17^{a}	3.15+0.51^{b}	1.93+0.33^{b}	4.83+0.53
Chickens (No)	13.30+1.26^{a}	10.03+0.75^{b}	12.28+1.15^{ab}	11.87+0.63
Equines (No)	0.00+0.00^{b}	2.70+0.46^{a}	0.15+0.06^{b}	0.95+0.19
Cattle herd Composition				
Calves	5.05+0.45^{a}	2.53+0.26^{b}	1.60+0.16^{c}	3.06+0.22
Heifers	5.43+0.35^{a}	1.05+0.19^{b}	0.73+0.11^{b}	2.40+0.24
Bull	5.40+0.42^{a}	1.13+0.18^{b}	0.80+0.16^{b}	2.44+0.25
Oxen	5.88+0.39^{a}	2.58+0.20^{b}	1.48+0.15^{c}	3.31+0.23
Cow	8.90+0.59^{a}	3.60+0.31^{b}	2.93+0.22^{b}	5.14+0.34

Means with different letters within a raw are significantly different (P<0.05); N = number of respondents; SE =standard error

Major Constraints of Livestock Production

The most limiting constraint to production of cattle, small ruminant and equine in Shey-Bench and Semen Bench woredas were shortage of grazing land. Reduction in pastureland and expansion of farm land were more prominent in Semen Bench and Shey-Bench than Surma woredas. This might have been caused by the high human population density that demanded more land for crop production leading to a reduction in grazing areas as a result overstocking of communal grazing lands. Thus, communal grazing lands are not any more productive to supply livestock with adequate quantity of quality forages. Similar finding also indicated by Dawit et al. (2013) who indicated that increment in crop land at the expense of grazing land, shortage of land for forage production, renting and allocation of open grazing lands around Lake Zeway for investors which has resulted in a decrease grazing land. Similarly, Healthy problem, feed problem and cultural practices (use of blood as a food) were the major constraints which hindered livestock production in Surma woreda. Shortage of feed in Surma woreda might be due to the invasion of the communal grazing land by less palatable species of forages like Hyparrhenia, which have bushy nature and hinders development of other species resulting in feed deficit. Disease and parasites problem in the Surma woreda might be due to high infestation of tsetse fly that causes trypanosomiasis and cross border movement of cattle from the Sudan also causes the transmission of livestock diseases of economic importance like blacklegs and pastuerollosis.

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Table 5 - Major constraints of livestock production in the study area

Major constraints	Woredas		
	Semen Bench (%)	Shey Bench (%)	Surma (%)
Feed problem	62.5	45	100
Healthy problem	52.5	22.5	100
Breed problem	45	20	-
Shortage of grazing land	70	82.5	-
Lack of forage seed	10	47.5	-
Lack of awareness	-	42.5	-
Lack of knowledge (skilled man power)	-	35	-
cultural practices (use of blood as food)	-		100

Major Livestock Feed Resources

The main feed resources to livestock in the study area were natural pasture, crop residues, cultivated pasture, hay, left over of banana and/enset and taro leaf which was similar to the finding of Ahmed (2006) and Tesfaye (2008).

Natural pasture

Natural pasture was the primary source of feed to animals in all study areas as it was ranked first (Table 6) which is in agreement with the finding of Tesfaye (2008). Of the sampled households, 100% in the Semen Bench and Surma woreda, and 90% in the Shey-Bench woreda ranked natural pasture as the primary source of feed to their animals (Table 6). In Surma woreda, natural pasture is the only main feed resource used by livestock throughout the year might be due to the mode of life in Surma woreda which was pastoral production system. This is in agreement with the study conducted by Malede and Takele (2014) who reported natural grazing land as a predominant feed source for livestock in pastoral and agro-pastoral areas. Grazing occurs on permanent area, fallow land and a land following harvest. In the study area, there are two type of grazing land which was private grazing land and communal grazing land. The communal grazing land was digging out (ploughed) for the sake of cultivation. This indicated that, the communal grazing land was now the days changed to cultivated land which decreases the livestock feed resource for the livestock. So after it was cultivated, the pasture land was invaded by less palatable species of forages, which have bushy nature and hinders development of other species resulting in feed deficit. The result is similar to the report of Ahmed (2006) in Basona Worana Wereda of North Shoa.

Crop Residues

Crop residues were the second major feed resource next to natural pasture in both Shey-Bench and Semen Bench woreda. The known crop residues in the study area were maize and sorghum stover, rice and teff straw. Rice straw was the most important livestock feed followed by sorghum stover and teff straw in both Semen Bench and Shey-Bench woreda. This was mainly due to the suitability of the area for cereal crops that provide straws and stovers for the animal feeding. The feeding of crop residue mostly begins soon after threshing crops in both woredas. In general, crop residues and natural pasture are the major feed resources of the area which agree with the report of Dawit et al, (2013) who reported natural pasture and crop residues as a major feed resource for highlands of Ethiopia. Even if they are using crop-residues as animal feed, improving the crop-residues like chemical treatment was not well known in the study area.

Table 6 - Percentage of respondents using Grazing Lands as an animal feed in different woredas of the study area

No	Woredas	Grazing lands (natural pasture) ranked		
		1st	2nd	3rd
1	Semen Bench	100	-	-
2	Shey- Bench	90	5	5
3	Surma	100	-	-

Table 7 - Percentage of respondents using crop residues as an animal feeding in the different woredas of Bench-Maji zone

No	Woredas	Feeding crop residues ranking			
		1st	2nd	3rd	4th
1	Semen Bench	5	75	20	-
2	Shey-Bench	5	50	40	5
3	Surma	-	-	-	-

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Stubble grazing

After harvesting the crops, livestock are allowed to graze stubbles of maize, sorghum and teff in both Shey-Bench and Semen Bench woredas. The stubbles are accessible to all animals in the community. The highest proportion of respondents from both woreda allows their animals to graze on aftermath of sorghum as compared to Surma woreda. The stubbles are grazed by the animals of the farm owner and later it becomes accessible to all animals which was in agreement with the finding of Ahmed et al. (2010) and Ahmed (2006).

Hay

Hay was an important feed resource which is conserved to feed animals mainly during dry season. In Shey-Bench woreda during the study time, 50% of respondents ranked hay as third next to crop-residues. But, farmers in Semen Bench and Surma woreda were not engaged in hay making to feed to their animals during the dry season might be due to lack of awareness, and qualities of grass species for hay making were less available in those Woredas. This showed that, conservation in the form of hay and silage is not a common practice in those study areas.

Left over of banana and/Enset

By products of banana and/enset also used as animal feed even if it is not widely used. In Semen Bench woreda it was ranked as third next to crop residues. The main product was used as human food, but it's left over was very important as animal feeds. However, farmers in Shey-Bench and Surma woreda were not used byproducts of banana/enset as animal feed.

Feeding taro leaf

Like banana/enset left over, taro leaf also an important feed resources in Semen Bench woredas. Its root was used as human food while its leaf part was used as animal feed. But, the percentage that provided to the animals depends up on its utilization for human food.

Table 8 - Percentage of respondents using hay as an animal feeding in different woredas of the study area

No	Woredas	Feeding Hay ranking				
		1st	2nd	3rd	4th	5th
1	Semen Bench	-	-	-	-	-
2	Shey-Bench	-	15	50	20	15
3	Surma	-	-	-	-	-

Table 9 - Percentage of respondents using left over of banana and/enset as an animal feeding in different woredas of Bench Maji zone

No	Woredas	Feeding left over of banana and/enset ranking				
		1st	2nd	3rd	4th	5th
1	Semen Bench	-	-	50	30	20
2	Shey-Bench	-	-	-	-	-
3	Surma	-	-	-	-	-

Table 10 - Percentage of respondents using taro leaf as an animal feed in the different woredas of study areas

No	Woredas	Feeding Taro leaf ranking				
		1st	2nd	3rd	4th	5th
1	Semen Bench	-	-	30	65	5
2	Shey-Bench	-	-	-	-	-
3	Surma	-	-	-	-	-

Cultivated forage species

The least in the order of importance as animal feed in the study area was cultivated pasture. This is due to the farmers in these woredas were not aware regarding cultivated pasture and conserved forage. In other words, cultivated forage species are not widely produced in the study area. However, attempts were made to improve the supply and quality of traditional forage in a few weredas by the Zonal and woredas Agriculure offices. From cultivated pasture, Elephant grass has been introduced in Semen Bench and Shey Bench. But, very small proportions of the house hold were practicing for improved forage to alleviate feed shortage.

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Agro-industrial by Products

All of the respondents from all study areas reported that, there were no agro-industrial by-products available on local market for their animals might be due to the remoteness of the area. This means the study area was far from the center which was known for different factory like flour milling, oil factory and beer factory. Taking different by products from the center (Addis Ababa) fetches high transportation cost. Due to lack of supplemental feed resources, livestock are fed on natural pasture, different by products and crop residues.

Livestock Feeding Systems

A utilization practice of livestock in different areas differs depending on availability of roughage. All respondents in Surma woreda used free grazing throughout the year. But, majority of them (60% and 65%) used free grazing in the case of Shey-Bench and Semen Bench, respectively. Few of them used tethering on fallow land, road side and in collection yard using group feeding. When natural pasture becomes less available during the dry season, farmers in the study area uses forages for their livestock by cutting and carrying feeding system from the forest areas.

Water Resources

The main sources of water in the study area were rivers. River is the main water sources to livestock in Surma and Semen Bench woredas throughout the year. But, some of the respondents in Shey-Bench woreda used ponds at home. Adult animals were watered by trekking a distance of less than 1km in Semen Bench and Shey-Bench woredas. But in Surma woreda, cattle watered by trekking 1-5km.The relatively longer distance in Surma woreda indicated that herds were wasting much of their energy in travelling to and from the watering points and hence contributed towards lower productivity of dairy cattle which was in agreement of the study conducted by Dejene et al. (2014) in Borana zone. Calves and weaker animals were watered at home on fetched water. Watering frequency of cattle was varied from one agro-ecology and season to the others. In Surma woreda cattle has been believed to be watered every other day. However, the frequency was shorter in Shey-Bench and Semen Bench woredas since the area was relatively enriched with water source. So most of the farmers in these woredas watered their animals twice a day, only very small number of them water once in a day.

Table 11 - Percentage of respondents using cultivated pasture as an animal feed in different woredas of the study areas

No	Woredas	Feeding cultivated pasture ranking				
		1st	2nd	3rd	4th	5th
1	Semen Bench	-	20	10	5	65
2	Shey-Bench	10	30	30	25	5
3	Surma	-	-	-	-	-

Table 12 - Livestock feeding system in the study area

Feeding systems	Woredas		
	Surma	Shey-Bench	Semen Bench
Indoor feeding individually	-	-	5%
In a collection yard feeding by group	-	7.5%	5%
Free grazing	100%	60%	65%
Tethering	-	32.5%	25%

Table 13 - Distance travelled by animals during watering

Distance travelled	Woredas		
	Surma	Shey-Bench	Semen Bench
Watered at home	-	10	-
<1Km	-	90	100%
1-5km	100%	-	-

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CONCLUSSION

It can be concluded that, the main feed resources to livestock in the study area were natural pasture, crop residues, cultivated pasture, hay, left over of banana and/enset and taro leaf. Natural pasture contributes the bulky of feed resources in all study areas. However, the quantity and quality of natural pasture was diminishing from time to time may be due to expansion of grazing land by crops, overgrazing and/ in general lack of management. Crop-residues were also the major livestock feed resources next to natural pasture. Free grazing was the major feeding system /utilization practices of livestock in all study areas. Shortage of grazing land was the most limiting constraint to production of livestock which was caused by the high human population density that demanded more land for crop production leading to a reduction in grazing areas with the resultant overstocking of communal grazing lands.

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Authors' contribution

TF and MD designed the research, analyzed the collected data, interpret the results and finalized the manuscript writ up. Finally, the authors re-read and approved the final manuscript.

Conflict of interests

The authors have not declared any conflict of interests.

REFERENCES

Ahmed H (2006). Assessment and utilization practices of feed resources in Basona worana wereda of north Shoa. An MSC thesis presented to the school of graduate studies of Haramaya University. 131p.

Ahmed H, Abule E, Mohammed K and Treydte A (2010). Livestock feed resources utilization and management as influenced by altitude in the Central Highlands of Ethiopia. Livestock Research for Rural Development 22. Institute of Plant production and Agro-ecology in the Tropics and Subtropics, University of Hohenheim, Garbenstr. 13,70599 Stuttgart, Germany.

Alemayehu M (2005). Rangelands: Biodiversity Conservation and Management and Inventory and Monitoring. Addis Ababa University, Faculty of Science, Addis Ababa, Ethiopia. Pp. 103.

Bench Maji Zone Beauro of Finance and Economics Development (BMZBOED), 2005. Unpublished Report.

Bench Wareda Rural Development Office (BWRDO). (2005). Unpublished Report.

Central Statistical Authority (CSA) (2013). Agricultural Sample Survey Statistical Bulletin. Addis Ababa, Ethiopia.

Dawit A, Ajebu N and Sandip B, (2013). Assessment of feed resource availability and livestock production constraints in selected Kebeles of Adami Tullu Jiddo Kombolcha District. Adami Tullu Agricultural Research Center, Ziway, Ethiopia.

Gizaw S, Tegegne A, Gebremedhin B and Hoekstra D (2010). Sheep and goat production and marketing systems in Ethiopia: Characteristics and strategies for improvement. IPMS (Improving Productivity and Market Success) of Ethiopian Farmers Project Working Paper 23. Nairobi, Kenya: International Livestock Research Institute ILRI (ILRI).

Helen A (2009). Feed resource availability, biomass production, nutritional characterization and pattern of utilization in gursum district, somali region, eastern Ethiopia. An MSC thesis presented to the school of graduate studies of Haramaya University. 134p.

Helina T and Emily S (2012). Spatial Analysis of Livestock Production Patterns in Ethiopia .Development Strategy and Governance Division, International Food Policy Research Institute – Ethiopia Strategy Support Program II, Ethiopia.

Knips V (2004). Livestock sector report Horn of Africa, Review of the Livestock Sector in the horn of Africa (EGAD Countries). Rome: Food and Agriculture Organization of the United Nations (FAO).

Makkar HPS and Beever D (2013). Optimization of feed use efficiency in ruminant production systems. Proceedings of the FAO Symposium, 27 November 2012, Bangkok, Thailand. FAO Animal Production and Health Proceedings, No. 16. Rome, FAO and Asian-Australasian Association of Animal Production Societies (available at: http: //www.fao.org/docrep/018/i3331e/i3331e.pdf).

Makkar HPS (2016). Animal Nutrition: Beyond the boundaries of feed and feeding. Food and Agriculture Organization of the United Nations, Animal Production and Health Division, Rome, Italy.

Malede B and Takele A (2014). Livestock Feed Resources Assessment, Constraints and Improvement Strategies in Ethiopia. Middle-East Journal of Scientific Research. 21 (4): 616-622, 2014.

Seyoum B, Getinet A, Abate T and Dereje F (2001). Present status and future direction in feed resources and nutrition research targeted for wheat based crop livestock production system in Ethiopia. In: P. C. Wall (eds.). Wheat and Weed: Food and Feed. Proceedings of Two Stakeholder Workshops. CIMMYT, Mexico City. Improving the productivity of Crop Livestock Production in Wheat-based Farming Systems in Ethiopia, Addis Ababa, Ethiopia, 10-11 October 2000. pp. 207-226.

Sisay A (2006). Qualitative and Quantitative Aspects of Animal Feed in Different Agro-ecological Areas of North Gonder. MSc. Thesis. Alemaya University, Dire Dawa.

Statistical Packages for the Social Sciences (SPSS), 2003 Cary, North Carolina, USA.

Tesfaye D (2008). Assessment of feed resources and rangeland condition in Metema district of north Gondar zone, Ethiopia. AN MSC thesis presented to the school of graduate studies of haramaya university. 142p.

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 area of Amhara Region. In: Proceeding of the 10th annual conference of the Ethiopian society of Animal Production (ESAP) Held in Addis Ababa, Ethiopia. pp. 165-179.

Tsegay L, Agegnew A. and Ashenafi S (2015). Challenges and Opportunities of Dairy Cattle Production in Selected Districts of Sidama Zone, Southern Ethiopia. Food Science and Quality Management. Vol. 44, 2015

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