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Assessment of Dairy Cattle Management Practices in Gurage Zone, Southern Nation Nationalities and Peoples Region, Ethiopia

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Abstract: Management practices such as feeding, watering, housing and health management of dairy cattle were studied in Gurage zone, Southern Nation Nationalities and peoples Regional State. In all studied areas, crop residues, natural grazing and hay were the three top livestock feed resources. Despite this, households make insignificant quantity of concentrate and face critical feed shortage during the dry season. Critical shortage of water was also noted during the dry season, particularly in Wolkite town. Shortage of animal feeds, land and water scarcity were the major constraints for dairy development in the study area. Supplementary feed and letting the animals to graze were the major utilization practices of feed resource. Three types of diseases namely FMD, Diarrhea and Anthrax were identified as the major health problem of cattle. Rapid urbanization coupled with increase in human population, standard way of life of the urban dwellers and conducive climate of the area can be considered as an opportunity for the development of dairy in the area. Therefore, market opportunity and linkages are the major issues for smallholder dairy development in addition to provision of the required services and resources, provision of credit, extension and training. However, there is a need for intervention to develop infrastructure, enhance input supply system and undertake capacity development and training to enhance the skills of farmers in dairy production and marketing. Attention should also be given to effective veterinary services, improved feed production and conservation systems, feeding strategies and systems.

INTRODUCTION

Currently, the population of livestock found in Ethiopia is estimated to be 53.4 million cattle, 25.5 million sheep, 22.78 million goats and 2.3 million camels[1]. Despite these huge numbers, the contribution of livestock was very low. The contribution of livestock to the total agricultural GDP and the national Foreign

currency is about 30 and 16%, respectively. With an average lactation length of 6 months and an average daily milk production of 1.54 litters per cow/day, the total milk produced during the year 2009 was recorded to be 4.06 billion litters[2] and the per capita milk consumption was only about 16 kg year^{-1} which is much lower than African and world per capita averages of 27 kg year^{-1} and 100 kg year^{-1}, respectively[3].

Additionally, the annual rate of increase in milk yield (estimated to be 1.2%) lags behind the increment in human population (estimated to be about 2.7% per annum)[4] and this resulted in large supply-demand variance for fresh milk[5]. This is due to various factors among which inadequate feed resource both in quantity and quality, lack of appropriate feeding system, prevalent livestock health problems and lack of well-developed dairy health management systems are the major ones[6].

Reproductive performance is often a major determinant of biological and economic efficiency of livestock production in tropics. Previous studies have shown crossbred animals to have better reproductive and productivity performances compared with indigenous stock[6-8]. However, their relative advantage depends upon provision of adequate nutrition and better health management. Failure to attain sexual maturity at early age and prolonged age at first calving, increased number of services per conception, longer calving intervals and great loss of valuable productive animals are the major problems which were mainly related with husbandry practices.

Appropriate reproductive management methods to be implemented across the different dairy production systems of Ethiopia are highly desired. These have to be designed by improving the aforementioned problems. However, in Gurage zone, no work has so far been conducted on husbandry practices of dairy cattle so as to take corrective measurement that increase the productivity and reproductive performance of dairy cows. To meet the ever-increasing demand for milk, milk products and thus, contribute to economic growth, improvement of husbandry practices has been proposed as one of the options. Therefore, this study was conducted to assess the major husbandry practices of dairy cattle in Gurage zone.

MATERIALS AND METHODS

Description of the study area: The study was conducted in Gurage zone, Southern Nation Nationalities and peoples of Regional State, located 155 km South West of Addis Ababa. The zone is located between 7.8°-8.5° North latitude and 37.5°C-38.7° East longitude of the equator. Wolkite, the capital of the zone, is 155 km away from Addis Ababa to south west direction. The zone comprises altitudes ranging from 1.001-3.500 m above sea level (masl). The mean annual temperature of the zone ranges between 13-300°C and the mean annual rain fall ranges 600-1600 mm. According to the land utilization data of the region, 298.369 ha cultivated land, 67.678 ha forest, bushes and shrub covered land, 70.249.31 ha grazing land and 14.234 ha of land is covered by others.

Sampling and data collection

Sampling technique and sample size: For this study, the zone was divided into three using agro- ecological zones as criteria as it is generally believed; the farming systems, mode of life and many more characteristics vary across altitude zones[9]. In the present study, multi-stage and random sampling method was used. In the first step, districts were stratified in to three groups based on agro-ecology (lowland, midland and highland). Accordingly, three Districts (Geta, from high land, Mareko from mid land and Enmore from low land) and Wolkite town administrative were selected purposively by considering that the management system of dairy production might be different from rural areas. In the second step, from each stratum (agro-ecology), two kebeles were selected by using random sampling method with a total eight kebeles. In the same manner, 45 households were selected from each selected district making a total of 180 households.

Methods of data collection: The data were collected from both primary and secondary sources. The primary data was collected through pretested semi-structure questionnaires and field observations. The core points of questionnaires were feed resource and feeding system, water resource and watering system, housing system and cattle health care. While the secondary data were obtained from the zone and woreda agricultural offices, internet, journal, articles and books.

Data analysis: Most of the data were analysed with SPPS Version 20 Software[10]. This involved simple descriptive statistics such as mean, range and percentile for crop and grazing land holdings, livestock holdings, feed resource and feeding system, water, housing and health. Simple and multiple correlations were used to estimate degree of relationship among the parameters such as crop and grazing land holding and number of animal holding.

RESULTS AND DISCUSSION

Household characteristics: Among the investigated households, 81.1% were male-headed while the remaining (18.9%) respondents were female-headed households

Table 1: House hold sex, age and relative frequency with different educational background in study districts

	Enemor		Geta		Mareko		Wolkite		Overall	
Variables	HHC	Percentage	HHC	Percentage	HHC	Percentage	HHC	Percentage	HHC	Percentage
HH head sex	N = 45		N = 45		N = 45		N = 45		180	
Male headed	37	82.2	41	91.1	34	75.6	39	86.7	146	81.1
Female headed	8	17.7	4	8.9	11	24.4	6	13.3	34	18.9
Mean age (SE)	38.5(1.34)[a]		47.2(1.42)[b]		40.5(1.72)[a]		42.4(1.07)[a]		42.1(0.74)	
Educational background	N = 45		N = 45		N = 45		N = 45		N = 180	
Illiterate	29	64.4	34	68.9	22	48.9	18	40.0	103	57.2
Read and write	8	13.3	7	15.6	14	31.1	13	51.1	42	23.3
Primary school	5	11.1	3	6.7	7	15.6	9	20.0	24	13.3
Secondary school	2	4.4	1	2.2	0	0	4	8.9	7	3.9
Above seco. School	1	2.2	0	0	2	4.4	1	2.2	4	2.2
Family size										
Male	2.73±0.15		3.45±0.20		2.80±0.17		2.51±0.15		2.88±0.09	
Female	2.98±0.20		3.36±0.15		2.44±0.18		3.34±0.22		3.03±0.10	
Total	5.59±0.32		6.85±0.21		5.27±0.21		5.78±0.28		5.86±0.13	

N = Number of interviewed; HHC = Household Characteristics

Table 2: Mean of land holding in the study districts

	Enemor			Geta			Mareko			Wolkite		
Ownership (ha)	Min.	Max.	Mean (ha)	Min.	Max.	Mean (ha)	Min.	Max.	Mean (ha)	Min.	Max.	Mean (ha)
Own crop land	0	3	0.96	0.50	3	1.67	0	1.5	0.75	0	0.5	0.25
Rented crop land	0	0.75	0.41	0.25	1	0.57	0	1.0	0.14	-	1.5	0.21
Own pasture land	0	2	0.54	0.00	1.5	0.19	0	2.0	0.8	0	2.0	0.26
Rented pasture land	0.25	1	0.56	0.00	1	0.21	0	1.0	0.17	0	1.0	0.23
Total			2.47			2.64			1.26			0.49

(Table 1). The overall mean age of respondents was about of 42.1 years (Table 1). This indicates that family members in the productive age group were higher than that of the non-productive age groups (dependents). The mean age of Geta districts was significantly higher ($p<0.5$) than other study areas. The overall educational status of the households indicated that majority (57.2%) of them were illiterate followed by read and write (23.3%), primary school (13.3%), secondary school (3.9%) and above secondary school (2.2%). The low level of educational status in the study area may exert adverse impact on technology transfer and hamper the productivity of the interventions being made in the district. The average family size of households in the study area was almost similar with the overall mean family size of 5.86±(0.13) person per family. The mean family size obtained in the study district was higher than the national average (5.2) as reported by CACC[11].

Land holding: Mean value of sample farms land holding and cropping patterns of selected districts of Gurage zone are depicted on Table 2. The mean land holding of study area was 2.12 ha. The mean of farm size allocation to own farm land for food crop, own area under forage/pasture, area under fallow land, grazing land, perennial crop, rented land for food crop, rented land for pasture/forage and rented land for grazing were 1.1, 0.29, 0.23, 0.35, 0.2, 0.28, 0.25 and 0.33 ha, respectively. This implies that a large proportion of farm size was allocated to crop production. Only 0.35 and 0.29 ha were used for grazing and forage development, respectively which have an influence on dairy cattle production. The function of dairy cattle production depends up on the availability of feed resources in quantity and quality which in turn depend up on the availability of land for forage developments. This is due to growing of on farm forage mainly legume species improve the production and reproduction of animals by reducing the cost of production. But with the rapid increase of human population and increasing demand for food, grazing lands are steadily shrinking by being converted to arable lands and are restricted to areas that have little value or farming potential such as hilltops, swampy areas, roadsides and other marginal land.

Herd size and species composition: Cattle, horse, donkeys and chickens were reared by the local community of all study areas (Table 3). There was variation in size of herd per house hold from one woreda to another woreda. Goat and sheep were found in some woredas as it was reported by respondents. This might be due to the unsuitability of agro-ecology as it was known that goat prefers lowlands due to their browsing habit and sheep needs midlands and highlands than lowlands.

Sources of income in the study districts: Major sources of income used as a source of cash in the study district were presented in Table 4. Live animals and crop sale were the major source of cash income for all study

Table 3: Overall composition of livestock (head/HH) in the study areas

Herd types	Enemor Mean±SE N = 45	Geta Mean±SE N = 45	Mareko Mean±SE N = 45	Wolkite Mean±SE N = 45	Overall Mean±SE N = 45
Cattle					
Cow	2.62±0.17	1.05±0.03	2.40±0.18	1.00±0.00	1.94±0.10
Calf	1.32±0.10	-	1.5±0.09	-	1.46±0.07
Heifers	1.68±0.09	3.07±0.15	1.32±0.09	1.84±0.11	2.02±0.08
Oxen	1.50±0.16	2.20±0.29	1.42±0.16	1.25±0.14	1.49±0.08
Sheep	1.18±0.08	3.00±0.44	5.25±0.64	-	2.77±0.30
Goat	5.75±0.99	-	4.00±0.00	-	5.50±0.86
Donkey	1.43±0.12	1.25±0,13	1.60±0.13	1.00±0.0	1.14±0.07
Horse	2..50±0.22	1.22±0.15	1.22±0.15	1.25±0.25	1.76±0.15
Mule	1.00±0.0	1.18±0.08	-	-	1.00±00
Chicken	4.83±0.56	3.63±0.100	7.71±0.77	4.83±0.56	4.85±0.33

N= Number of interviewed households; SE = Standard Error

Table 4: Sources of income in the study districts

	Income sources of the respondents					
	Crop production		Livestock production		Both crop and livestock	
Districts	No	Percentage	No	Percentage	No	Percentage
Wolkite	11	24.44	17	37.78	17	37.78
Enmore	3	6.67	14	31.11	28	62.22
Geta	0	0	0	0	45	100
Mareko	7	15.56	8	17.78	30	66.67
Total	21	11.66	39	21.67	120	66.67

districts. Majority (66.67%) of respondents used both crop and livestock income sources indicating that both of them contribute valuable commodities for the livelihood of farmers. This is important for both home consumption and for other cash need in case of difficulty. But, selling of any crop/livestock for the sources of cash in the household was dependent on the amount of money needed to cover their expense. Cattle were sold to cover large expenses and crop was sold for relatively smaller expenditures. However, crop was used as a source of cash when there is a surplus from household consumption.

Dairy cattle management

Dairy cattle feed resources: The ranking in availability of feed resources and preference of farmers to the feed resources in all study areas were shown in Table 5. The main feed resources to dairy cattle in the study area were natural pasture, crop residues, crop after math grazing, concentrate, Atela and hay which agrees with earlier reports[12, 13]. Crop residues were ranked as the primary source of feed to dairy animals in Geta woreda and Marako woreda (Table 5). Natural grazing was ranked 2nd followed by hay in Geta and Marako woreda. In Wolkite town, hay ranked 2nd next to crop residues followed by natural grazing. However, in Enamor woreda using of hay as a feed resources was ranked first followed by crop residues and natural grazing, respectively. The least in the order of importance as feed resource in the study area was crop after math. This might be due to unavailability of after math grazing in wet season (Table 6).

Table 5: Feed resources for dairy cattle in study districts

Study districts/ Feed resource	Rank (No HHs) 1	2	3	4	Index*
Enemor					
Natural grazing	15	7	4	0	0.052
Crop residue	18	13	8	2	0.076
Crop after math	0	0	4	2	0.006
Concentrate	0	0	21	24	0.039
Atela	0	6	14	15	0.036
Hay	19	13	5	6	0.077
Geta					
Natural grazing	19	5	3	12	0.064
Crop residue	26	10	4	0	0.084
Crop after math	0	0	1	0	0.001
Concentrate	0	0	3	8	0.008
Atela	0	0	1	2	0.002
Hay	15	21	6	1	0.08
Mareko					
Natural grazing	18	13	15	9	0.088
Crop residue	26	11	7	1	0.089
Crop after math	0	0	2	5	0.005
Concentrate	0	0	2	8	0.007
Atela	0	0	6	3	0.009
Hay	22	17		0	0.082
Wolkite					
Natural grazing	2	11	5	4	0.032
Crop residue	12	9	14	11	0.067
Crop after math	0	0	0	2	0.001
Concentrate	0	4	2	13	0.017
Atela	1	0	7	0	0.011
Hay	21	6	5	0	0.066

*Index = sum of single livestock species sale ranks [(4 for rank 1)+(3 for rank 2)+(2 for rank 3)+(1 for rank 4)] divided by sum of all weighed livestock sales mentioned by the respondents in each production system

Hay was an important feed resource which is conserved to feed animals during dry season even if the

Table 6: Dairy cattle feeding systems

	Study areas									
	Wolkite town		Enmore		Geta		Marako		Total	
Grazing system	No	Percentage	No	Percentage	No	Percentage	No	Percentage	No	Percentage
Zero grazing	15	33.33	25	55.56	12	26.67	5	11.11	57	31.67
Semi grazing	30	66.67	20	44.44	33	73.33	38	84.44	121	67.22
Full grazing	0	0	0	0	0	0	2	4.44	2	1.11
Total	45	100	45	100	45	100	45	100	180	100

No = Number of interviewed households

Table 7: Hay making and forage production in the study areas

	Study districts									
	Wolkite town		Enamore woreda		Getta woreda		Marako Woreda		Total	
Variables	N	Percentage	N	Percentage	N	Percentage	N	Percentage	No	Percentage
Prepare hay										
Yes	22	48.89	16	35.56	28	62.22	33	73.33	99	55
No	23	51.11	29	64.44	17	37.78	12	26.67	81	45
Reasons of not making hay										
Lack of awareness	4	17.39	1	3.45	5	29.41	1	8.33	11	13.58
grazing dry grass than hay making	0	0	1	3.45	0	0	8	66.67	9	11.11
Insufficient land	19	82.61	27	93.10	12	70.59	3	25	61	75.31
Practicing improved forage production										
Yes	9	20	3	6.67	0	0	25	55.56	37	20.56
No	36	80	42	93.33	45	100	20	44.44	143	79.44
Types of forage grown										
Forage crops and herbaceous Legumes	7	77.78	2	66.67	0	0	17	68	26	70.27
Tree legumes	2	22.22	1	33.33	0	0	8	32	11	29.73
Reasons for not practicing improved forage production										
Insufficient land	21	58.33	35	83.33	45	0	16	80	116	81.12
Insufficient inputs	15	41.67	7	16.67	0	0	4	20	27	18.88

N = Number of respondents

majority (79.44%) of respondents in the study area were not participated on the development of forage production (Table 7). The major reason why the peoples in the study area were not participated on forage development might be due to insufficient land (81.12%) and insufficient input (18.88%) (Table 7) indicating availability of land was a corner stone for the development of forage.

Generally, in all study areas; crop residues, natural pasture and hay were the top three livestock feed resources. With the rapid increase of human population and expansion of crop land, the use of crop residues is increasing which agrees with earlier report[14].

Dairy cattle feeding systems: The utilization practices of dairy animals were different from one agro-ecology to another which was mainly depend up on the availability of feed resource and the purpose of keeping dairy animals. The >67% of respondents in all study areas mentioned as the utilization practices of the feed in the study area were semi grazing (Table 6). This might be due to the land is not sufficient enough for the growth of forage which was thoroughly used for grazing. Only 1% of them were used full grazing indicating the scarcity of land for entire grazing might be due to the large proportion of farm size was allocated to crop production (Table 2).

Sources of feed in the study areas: There were three sources of feeds in the study area; producing on their own land (11.67%), purchasing from somewhere (65.55%) and combination of them (22.78%). This indicated that, the majority of respondents (65.55%) in the study area bought supplementary feeds and the major supplementary feeds they used were oilseed cakes (56.63%), flour milling by product (37.35%) and brewery spent grains (6.02%) (Table 8).

Seasons and consequences of feed shortage and mechanisms used to reduce it: Feed is one of the major factors that affect the productivity and reproductive of dairy cattle. In the study area, >88% of household respond

Table 8: Sources of feed in the study areas

	Study districts									
	Wolkite town		Enamor		Geta		Mareko		Total	
Variables	N	Percentage	N	Percentage	N	Percentage	N	Percentage	N	Percentage
Sources of feed										
Own production	0	0	0	0	0	0	21	46.67	21	11.67
Purchased	23	51.11	45	100	45	100	5	11.11	118	65.55
Both	22	48.89	0	0	0	0	19	42.22	41	22.78
Purchased feed supplement?										
Yes	44	97.78	45	100	44	97.78	33	73.33	166	92.22
No	1	2.22	0	0	1	2.22	12	26.67	14	7.78
Types of feed supplement purchased										
Oilseed cake	3	6.82	21	46.67	42	95.45	28	84.85	94	56.63
Flour milling by product (frushika)	31	70.45	24	53.33	2	4.55	5	15.15	62	37.35
Brewery spent grains	10	22.73	0	0	0	0	0	0.00	10	6.02
Organizations/place from w/c they purchase										
Farmer association	12	27.27	44	97.78	32	72.73	13	39.39	101	60.84
From industries	0		0	0	2	4.55	0	0.00	2	1.20
From privates retailers	32	72.73	1	2.22	10	22.73	20	60.61	63	37.95

Table 9: Seasons and consequences of feed shortage, and mechanisms used to reduce feed shortage

	Study districts									
	Wolkite town		Enamore woreda		Getta woreda		Marako Woreda		Total	
Variables	N	Percentage	N	Percentage	N	Percentage	N	Percentage	N	Percentage
Shortage of feeds?										
Yes	40	88.89	34	75.56	45	100	41	91.11	160	88.89
No	5	11.11	11	24.44	0	0	4	8.89	20	11.11
Seasons of feed shortage										
Dry season	31	77.5	34	100	0	0	2	4.89	67	41.88
Wet season	0	0	0	0	45	100	9	21.95	54	33.75
Short rainy season	9	22.5	0	0	0	0	30	73.17	39	24.37
Mechanisms used to reduce feed shortage										
Feed conservations	10	25	0	0	0	0	12	29.27	22	13.75
Purchasing crop residues and hay	7	17.5	4	11.76	31	68.89	25	60.98	67	41.88
Sell animals	17	42.5	30	88.24	14	31.11	2	4.88	63	39.37
Purchase concentrate	6	15	0	0	0	0	2	4.88	8	5
Consequences of feed shortage										
Weight loss	1	2.5	4	11.76	11	24.44	16	39.02	32	20
Reduction in milk yield	32	80	30	88.24	34	75.56	23	59.10	119	74.38
Increased mortality	0	0	0	0	0	0	2	4.88	2	1.25
Reduced fertility	7	17.5	0	0	0	0	0	0	7	4.37

as there were problems of feed shortage. Seasons of feed shortage in the study area were during wet season (39.42%), dry season (32.12%) and short rainy seasons (28.47%) (Table 9). The mechanisms used to reduce feed shortage in the study area were; conserving feeds (16.06%), purchasing crop residues and hay (46.72%), purchasing concentrates (5.84) and selling animals (31.39%). The consequence of feed shortage in the study area as ranked by respondents were: reduction in milk yield (71.53%) and ranked 1st, weight loss (21.90) 2nd, reduced fertility (5.11%) 3rd and increased mortality (1.46%) 4th. This indicates that, feed shortage results in reduction of day milk yield so as the lactation milk yield of the animals also decreased. This is due to milk is the conversion of feed.

Source, distance and frequency of water for dairy cattle in the study areas: The main sources of water observed in the present study area were rivers, pond and city pipe according to their importance. The majority (52.22%) of the households in the rural areas obtain water from rivers even though its quality and availability were season dependent while 33.89% from pond water and 13.89% from city pipe line (Table 10). As observed from

Table 10: Source, distance and frequency of water for livestock

Variables	Study districts: Enmor HHC (%)	Geta HHC (%)	Mareko HHC (%)	Wolkite HHC (%)	Over all HHC (%)
Sources of water	N = 45	N = 45	N = 45	N = 45	N = 180
City pipe line	1(2.22)	0(0.00)	10(22.22)	14(31.11)	25(13.89)
Pond	41(91.11)	14(31.11)	5(11.11)	1(2.22)	61(33.89)
River	3(6.67)	31(68.89)	30(66.67)	30(66.67)	94(52.22)
Water distance	N = 45	N = 45	N = 45	N = 45	N = 180
<1km	18 (27.7)	12 (18.5)	20 (30.8)	15 (23.1)	65 (36)
2-5 km	20 (19.2)	33 (31.7)	24 (23.1)	27 (26.0)	104 (57.7)
>5 km	7 (63.6)	0 (0.00)	1 (9.1)	3 (27.3)	11 (6)
Watering frequency					
Wet season	N = 45	N = 45	N = 45	N = 45	N = 180
Once a day	32 (71.1)	33 (73.3)	39 (86.6)	31 (51.1)	136 (70.6)
Twice a day	13 (28.8)	12 (26.7)	6 (13.3)	14 (48.9)	45 (29.4)
Dry season	N = 45	N = 45	N = 45	N = 45	N = 180
Once a day	36 (80)	27 (60)	24 (53.3)	28 (62.2)	115 (63.9)
Twice a day	9 (20)	18 (40)	21 (46.7)	17 (37.8)	65 (36.1)

HHC = Household Count, N = Number of observation/respondents

Table 11: Housing of cattle in the studied districts of Gurage zone

Variables	Enemor HHC (%)	Geta HHC (%)	Mareko HHC (%)	Wolkite HHC (%)	Overall HHC (%)
Housing priority	N = 45	N = 45	N = 45	N = 45	N = 180
Yes	42 (93.33)	39 (86.67)	24(53.33)	45(100)	150 (83.33)
No	3 (6.67)	6 (13.33)	21(46.67)	0(0.00)	30 (16.67)
Type of housing	N = 45	N = 45	N = 45	N = 45	N = 180
Simple crush	4 (8.89)	2 (4.44)	2 (4.44)	0 (0.00)	8 (4.44)
With people	38 (84.44)	42 (93.33)	39 (86.67)	18 (40.0)	137 (76.11)
Tethered at yard and/or kitchen	3 (6.67)	1 (2.22)	4 (15.56)	27 (60.0)	40 (19.44)

HHC = Household Count, N = Number of observation/respondents

the study, households that use river water for their animals do not treat it except in a few cases where households filter the water with the intention of preventing susceptibility to internal parasites.

Frequency of watering to dairy animals varies from one production system to another which is affected by different factors, among which season, accessibility (getting easily), performance and/or breed of the animals (that describes the amount of water) and type of predominant feed (dry or wet) and feeding systems (indoor or outdoor where some water is available). In the wet season, the majority (70.6%) of the respondents water their cattle once a day and minor (29.4%) offer water twice a day (Table 10). During the dry season, 63.9% of the households provide water to their animals once a day except the household that live around or near watering points or rivers (36.1%) which water their dairy animals twice. But, this condition was not persistent in the town since they use tape water; it is relatively freely available irrespective of season.

Housing: The hosing of dairy animals in the current study was prioritized based on the age groups. Among the respondents, 83.33% of them give special attention for calf's and lactating cows where as 16.67% of respondents were used comparable management for all animals. Almost all of the households (76.11%) kept their cattle within family house while 19.45% used a separate shelter for their animals and the rest (4.44%) used open barn/shed or fences within their own compounds (Table 11). Similar housing conditions were also reported by Asrat *et al*.[15] and Bereda *et al*.[16] in Gurage areas. Cattle housed with the family for the fear of thieves, to protect animals from extreme environmental hazards and for ease of husbandry practices such as feeding, watering, milking and waste management. All the interviewed dairy producers in the study area clean the barn every day.

Disease and health management Health care is one of the management aspects of dairy cattle production. To improve the production of dairy cattle, we should keep their healthy, so as to increase our profitability. The most predominant dairy cattle diseases in the study area were FMD, liver fluke, Anthrax, Diarrhea, Blackleg, long warm, Tick, Mastitis, Trypanosomiasis and Dystocia diseases. Diarrhea, FMD and anthrax were the top three prevalent diseases in the study area (Table 12). Their effect is more severe during summer and spring seasons since in those periods, the environment is conducive for different parasites and microbes reproduction.

Table 12: Disease prevalence

	Rank (No of HHs)				
Type of disease	1	2	3	4	Index*
FMD	62	19	3	2	0.154
Liver fluke	19	46	1	0	0.106
Anthrax	15	11	72	0	0.116
Diarrhea	122	11	14	5	0.272
Blackleg	7	6	7	2	0.03
long warm	5	1	1	7	0.016
Tick	18	14	23	20	0.088
Mastitis	2	32	47	7	0.101
Trypanosomiasis	3	0	3	9	0.013
Dystocyia	41	9	8	5	0.104

HH = House characteristics; No = Number of interviewed households

CONCLUSION

The feed resources used for cattle in Gurage area were crop residues; natural grazing and hay were the three top livestock feed resources. Despite this, households make insignificant quantity of concentrate and face critical feed shortage during the dry season. In addition to these major feed resources, Enset by products was also used to feed their cattle.

Three types of diseases were identified as major health problems of cattle in Gurage zone and these involved FMD, Diahorria and Antrax. Livestock health problem was not fully addressed in Gurage zone because of shortage of veterinary expertise and related facilities. Since disease is one of the major threats of livestock production in the zone, livestock health management in Gurage zone as a whole needs urgent attention. Therefore, to improve the situation, use of better feed conservation and utilization techniques, use of improved feeding system and improved animal health services are believed to solve these problems. In order to achieve these, introducing and developing improved forages as sole crops or integrated with cereal crop production (sorghum or maize system), improving sorghum and maize Stover conservation and enhance their utilization by chopping and treating with urea, improving animal health services including private training and drug supply system with close monitoring and supervision and strengthening community diseases surveillance and reporting system were very important for the study zone.

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