academicresearchJournals

Vol. 6(6), pp. 357-369, July 2018
DOI: 10.14662/ARJASR2018.054

ISSN: 2360-7874
http://www.academicresearchjournals.org/ARJASR/Index.htm

Academic Research Journal of Agricultural Science and Research

Full Length Research

Smallholder Dairy Cows Husbandry Practices in Selected Districts of Sidama Zone, Southern Ethiopia

Abera Yetera [1]*, Mengistu Urge [2], Ajebu Nurfeta [3]

[1]Lecturer, Department of Animal Science, College of Agriculture, Salale University, PO Box 245, Fitche, Ethiopia.
Address: Tel (Mobile) +251945158054, email:- aberayetera@gmail.com
[2]Associate Professor of Animal Physiology and Nutrition, Department of Animal Science, Haramaya University, PO Box 138, Haramaya, Ethiopia.
Address: Tel (Mobile) +251945388585, email:- urgeletta@yahoo.com
[3]Professor of Animal Feeds and Nutrition, Department of Animal and Range Sciences, Hawassa University, PO Box 222, Hawassa, Ethiopia.
Address: Tel (mobile): +251916032359, Email: ajebu_nurfeta@yahoo.com

Accepted 25 July 2018

The study was undertaken with the objective of assessing the husbandry practices prevailing at smallholder dairy cow producers in selected districts of Sidama Zone southern Ethiopia. Mult-stage sampling technique was used to undertake the study in that three districts were selected based on the agro ecology which represents highland, midland and lowland represented by Wenisho, Dale and Loka Abaya respectively. Three kebeles were selected from each districts based on production potential and accessibility of individual kebeles. A total of 135 respondents were selected from three districts (45 from each district) having at least one dairy cow. The data was collected through semi structured questionnaires and focus group discussion. The overall mean for total land owned by farmers was 1.59±0.3ha. The land allocated for the crop and grazing differs significantly across agro-ecology (P<0.05). About 77.78% in wet season and 46.7% in dry season reported that natural pasture, and crop residues as the main feed resource, respectively, in the study area. Almost all respondents noted that the breeding practice was entirely natural mating. Majority of respondents (59.25%) used river as major water source followed by pond, tap and spring water. All respondents provides traditional barn which is made from locally available materials. The most important diseases affecting dairy cattle are trypanosomosis *(Shillo),* Anthrax *(Abba Senga),* Mastitis *(Gaddanissa),* blackleg (*Lamootta*), Contagious Bovine Pleuroneumonia (CBPP) *(Woraanitto)* and Lumpy skin disease (*Qadda*). All of the respondents milked their dairy cows twice a day and milking of cows was undertaken by mainly suckling before milking as reported by 59.3% of respondents. The present study revealed that smallholder dairy cattle production was relied on traditional husbandry practices and this calls for improvement of the smallholder livelihoods via improving the existing traditional husbandry practices including better breeding strategy by introducing crossbreeding strategy of the local dairy cattle in order to enhance the productivity of local cows in the study area.

Key words: *Dairy cattle, Sidama Zone, Husbandry practices*

Cite this article as: Yetera A., Urge, M., Nurfeta, A. (2018). Smallholder Dairy Cows Husbandry Practices in Selected Districts of Sidama Zone, Southern Ethiopia. Acad. Res. J. Agri. Sci. Res. 6(6): 357-369

INTRODUCTION

Ethiopia is the home of diversified landscape and climatic conditions and the country is endowed with larger number of cattle population in Africa with about 59.5 million heads cattle (CSA 2016).The huge and diverse livestock population, varied and favourable agro-ecology for dairying, increasing demand for dairy products in urban and peri-urban areas, long-standing culture of dairy products consumption, and favourable policy are indicators of the importance and potential of dairying in the country (Azage *et al.,* 2013). However, productivity of dairy animals in general is limited. This results in shortage of supply of dairy products and requires the country to spend hard currency to import dairy products from abroad.

Dairying is one of the livestock production systems practiced in almost all over the world including Ethiopia, involving a vast number of small, medium, or large sized, subsistence or market-oriented farms. Based on climate, land holding and integrated with crop production; dairy production can be; pastoralism, highland smallholder, urban and peri-urban and intensive dairy farming system are recognized in Ethiopia (Tadesse and Mengisitie, 2016).

According to CSA (2008), about 93% of the total milk production in Ethiopia is produced by the smallholder dairy farmers living in the rural community and exercising, in most instances, traditional dairying. In the country dairy production is constrained by various factors including genotype, inadequate feed resources, inadequate veterinary services and milk market. Milk production is as low as 0.5 to 2 liters per day across the lactation period of 160 to 200 days. Improving the feeding, water availability and health care of the indigenous cattle did not increase the quantity of milk per day to allow the animals to be used for commercial market-oriented milk production (Zelalem *et al.,* 2011).

Smallholder farmers rear livestock for various reasons. These are wealth accumulation and storage food (nutritional security), draught power, manure, and serving towards social cohesiveness besides many times they are used for faunal medicine amongst some ancient societies. In many situations, the "livestock ladder" may allow the poor to escape out from the vicious cycle of poverty (Ayele, 2012). National livestock genetic improvement programs can thus significantly help to reduce poverty by helping millions of family farmers upgrade their traditional subsistence livestock production systems to market-oriented, profit-making, enterprises that directly improve livelihoods and reduce food insecurity. Transformation of the livestock sector will also benefit Ethiopia's growing urban consumers by offering them more, and more affordable, meat, milk and eggs.

Livestock production, having such great role and in relation to endowed huge opportunity and potential of the livestock sector in the country, the productivity of dairy cattle is low in general in the country and in Sidama Zone in particular due to various problems highlighted above including smallholder farmers. The dairy cattle production is one sector among livestock production and provides arrays of function to the livelihoods of the country. In order to ensure increased production of milk and other products of the cow assessing the outlook of husbandry practices is crucial for further improvement interventions from various responsible agents. In addition to that the availability of information on the pattern of dairy cattle production is mandatory to improve the productivity of dairy cow in various areas of the country since it serve as the base to enhance the income; the productivity of the dairy cow and ensure the better future of smallholder farmers. Moreover, Ethiopian Livestock Master Plan (2015) stated that genetic improvements together with essential improvements in livestock feed, health and husbandry, can increase Ethiopia's cow milk production by 93%, poultry meat production by 270% and its egg production by more than 200% by 2020. Therefore, the current study was undertaken to assess the husbandry practices to provide baseline information on the prevailing practice of dairy production with particular emphasis on smallholder farmers in Sidama Zone.

METHODOLOGY

Description of the study area

Sidama Zone is one of the Fourteen Zones and two special woredas in Southern Ethiopia. The Zone is located at between $5^0$45' and $6^0$45' N latitude and $38^0$39' and $38^0$29' E longitude with altitude ranging from 1100 to 3500 meter above sea level (masl) (SDC, 2000). The zone is characterized by mixed crop livestock farming. Rainfall pattern of the zone is bimodal type with small rainfall during the months of February to April followed by the main rainy season from July to September.

The current study was undertaken in three districts of the Zone such as Dale, Wenisho and Loka Abaya districts representing midland, lowland and highland respectively. Dale district is partly located in the Great Rift Valley. The District is situated at about 40 km south of Hawassa and at about 320 km south of Addis Ababa. It is located at 6º44' to 6º 84' N and 37º 92' to 38º 60' E with an altitude range of 1001–2500 masl (average 1624 masl). The District receives an annual mean average rainfall of 1170 mm and the average annual temperature of 19ºC (SEDPSZ, 2004). Loka Abaya is lowland district which was located at western border of the Sidama Zone and situated at about 50 kilometers southwest of Hawassa. The District has low rainfall with an erratic

pattern during the two rainy seasons; the *belg* (February to April), and the *kiremt* rains (July to early October) (USAID 2005). Wensho is one of the districts in the Southern Nations, Nationalities, and Peoples' Region of Ethiopia part of the Sidama Zone located in the Great Rift Valley, it is bordered on the southwest by Aleta Wendo, on the west by Dale, on the north by Shebedino, on the northeast by Gorche, and on the southeast by Bursa.

Research Design

A cross sectional survey, which is a formal and single visit technique, was used in order to collect data on dairy cow production practices such as feeding, breeding, housing, health management, and watering practices and others prevailing in the study area.

Sampling procedure and sample size of survey

The households in the study area who owned at least one local dairy cows were involved. The study employed multistage sampling technique. Three districts were selected based on agro-climatic distribution namely Wenisho representing highland (2300 up to 3200 masl), Dale (midland, 1500 to 2300) and Loka Abaya (Lowland, 1170 up to 1500 masl). In the second stage representative Kebeles from respective strata (agro-ecology or district) were selected based on production potential and accessibility and a total of nine, i.e., 3 Kebeles from each agro-ecological zone (District) were selected. Finally, a total of 135 households (15 from each Kebeles or 45 from each strata) were selected using purposive sampling method for interview who owned local cows.

Data Management and Analysis

Data collected was analyzed by using Statistical Package for Social Sciences (SPSS) Version 20, 2007 and presented using descriptive statistics such as percentage, mean and frequencies. The data on quantitative variables like age distribution of the farmers and family size was analyzed using One Way Analysis of Variance (ANOVA).The differences were considered statistically significant at 5% (0.05) level of Significance. List Significance Difference (LSD) test was used to separate the means.

RESULTS AND DISCUSSION

Household Characteristics

The overall mean family size was 6.61±0.12 (Mean±SD) and differs significantly among agro ecologies (P<0.05). Higher family size was encountered in midland followed by lowland and highland, respectively (Table 1). The reason for the higher family size in midland could be associated with more favorable conditions for settlers to live in midland by growing different cash crops like coffee and chat and also have better infrastructure for transport of their goods to the market place. The average family size in the current study was lower than 8.9±0.5 and 7.5±2.5 reported by Zewide, (2010), and Debir (2016), respectively, while comparable with average family size of 6.5 reported by Central Agricultural Census Commission (CACC, 2011). The mean overall age of respondents was 42.59±1.0 (Mean±SD) and there was no significant difference in age distribution in the study area (P>0.05). The current result obtained for age of respondents was lower than average age of 47±1.7 reported by Zewidie (2010). The majority (88.9%) of the respondents was male and 11.1% were female. This indicates that engagement in rearing of dairy cattle is responsibility of males in the present study area. The current result was comparable with that reported by Ketema (2014) who found 80% males and 20% females in their study area in Kersa Malima woreda.

The respondents have various educational backgrounds. Overall, 26.63% of total respondents were illiterate of those higher percentage encountered from Loka Abaya (53.3%). The higher percentage of illiteracy in lowland (Loka Abaya) could be due to shortage of access to education centers as compared to Highland (Wenisho) and Midland (Dale). In general, farmers who were engaged in rearing of dairy cattle in present study area got varied education access. This indicates that an opportunity to improve dairy sector via intervention from different agents as education is a great tool to change the standards of settlers by adoption of improved technologies. The current result was comparable with result reported by Debir (2016) who reported 31.1% of illiteracy, 24.4% 1-6 grade, 23.3% 7-8 grade and 21.1% 9-12 grade in Highland of Sidama.

Land holding and land use system

The land holding and land use system in the area are presented in Table 2. The overall mean for total land owned by farmers was 1.59±0.3ha. The land allocated for the crop and grazing differs significantly across agro-ecology (P<0.05). In midland even though the household size were larger than the two agro-ecology, the land holding per household was lower and farmers allocate larger portion of their land for cultivating different food crops to meet their food requirement. The major crops cultivated were coffee, *enset,* maize, haricot bean and chat, sweet potato and also fruit plants such as Mango, Papaya, Avocado and also they cultivate banana which serve as valuable feed source particularly during dry season for livestock. IPMS (2005) also reported coffee,

Table 1. Household characteristics in the study area

	Agro ecology			
Variable	Highland(N=45)	Midland(N=45)	Lowland(N=45)	Overall (135)
Family Size	**5.71±1.21^{c}**	**7.71±0.99^{a}**	**6.42±1.15^{b}**	**6.61±1.39**
Age distribution	42.29±9.76	43.71±16.52	41.76±9.54	42.59±12.31
Sex				
Male	42(93.3)	40(88.9)	38(84.4)	120(88.9)
Female	3(6.6)	5(11.1)	7(15.5)	15(11.1)
Education Level				
Illiterate	7(15.5)	5(11.1)	24(53.3)	36(26.63)
Primary	28(62.2)	21(46.7)	11(24.4)	60(44.43)
Secondary	7(15.5)	10(22.2)	6(13.3)	23(17.04)
Above secondary	3(6.7)	9(20)	4(8.9)	16(11.85)
Marital Status				
Married	41(91.1)	43(95.5)	39(86.6)	123(91.1)
Single	2(4.4)	1(2.2)	5(11.1)	8(5.92)
Divorced	2(4.4)	1(2.2)	1(2.2)	4(2.96)

N= Numbers of respondents, Number in brackets indicates proportion of respondents, Means with different superscripts in the same row deferrers significantly at P<0.05.

Table 2. Land holding capacity in the study area

	Agro- ecology			
Variable	Highland(N=45)	Midland(N=45)	Lowland(N=45)	Overall(135)
Total land (ha)	1.92±0.3	1.22±0.51	1.64±0.276	1.59±0.37
Crop land (ha)	1.78±0.1^{a}	1.17±0.31^{c}	1.53±0.13^{b}	1.49±0.32
Grazing land(ha)	0.025±0.03^{b}	0.013±0.03^{c}	0.054±0.065^{a}	0.31±0.05
Forest and other land	0.011±0.02	0.041±0.06	0.052±0.081	0.035±0.06

N= Numbers of Respondents, Means with different superscripts in the same row differs significantly at (P<0.05)

enset, maize, haricot bean and chat as the major crops in the study area. The total land owned by households in the current study was lower than 4.2±0.4 reported by Zewidie (2010).

Dairy cow husbandry practices in the Study Area

Feed resources and feeding system in the study area

Feed resource availability and its seasonal variations are presented in the Table 3. Out of 135 farmers interviewed, 77.78% of the farmers used natural pasture as the major feed resources followed by 17.03%, 3.7%, and 1.48% for cut and carry, homemade byproduct and crop residues and conserved hay, respectively, during wet season. The current finding was in line with that reported by Albe *et al.* (2016), who noted that natural pasture and stover were the most frequently used feed resources, and also with Beriso (2015) who reported grass as major source of feed for the livestock followed by crops and crop residue, industrial by-products and improved forage in Dale and Chuko district of Sidama Zone Southern Ethiopia respectively.

However, in dry season, out of the total interviewed farmers 46.7% of the respondents reported that crop residues and conserved hay shared larger proportion of feed resource followed by 21.48% for natural pasture. Even though its potential is reduced, natural pasture provides a considerable provision of feed for dairy cows during dry period also particularly in lowland (48.9%) which could be related to the optional grazing land including communal grazing land than highland and midland. Moreover, cut and carry system plays significant role in contribution of feed for dairy cows in dry period. The common feed resources used for cut and carry in dry season includes *enset* (*Enset ventricosum*) parts, leafy and false stem parts of sweet potato other than tuber, leafy and false stem part of banana (*Musa paradisiaca*). *Enset* (*Enset ventricosum*), though it plays a significant role to ensure food security for farmers in the study area, it has vital role in sustaining dairy cows with feed particularly during dry season when there is feed shortage. The current finding is in agreement with

Table 3. Feed resources and feeding system in the study area

Variable		Agro-ecology			Overall N=135
		Highland N=45	Midland N=45	Lowland N=45	
Feed Resources					
	Natural pasture	38(84.4)	25(55.5)	42(93.3)	105(77.78)
In wet season	Crop residue	1(2.2)	1(2.2)	0	2(1.48)
	Conserved hay				
	Cut and carry	4(8.9)	18(40)	1(2.2)	23(17.03)
	Home-produced byproducts	2(4.9)	1(2.2)	2(4.9)	5(3.7)
In dry season					
	Natural pasture	5(11.1)	2(4.4)	22(48.9)	29(21.48)
	Crop residue and Conserved hay	22(48.9)	23(51.1)	18(40)	63(46.7)
	Cut and carry	10(22.2)	15(33.3)	3(6.6)	28(20.74)
	Supplementary and home-produced by products	8(17.8)	5(11.1)	2(4.4)	15(11.1)
Feeding system	Tethering	23(51.1)	33(73.3)	1(2.2)	57(42.2)
	Free grazing	11(24.4)	2(4.4)	31(68.9)	44(32.6)
	Both tethering and free grazing	11(24.4)	10(22.2)	13(28.9)	34(25.2)

N= Number of respondents, Numbers in the brackets represent proportion of respondents.

Tsegaye (2001) who reported that *Enset* leaf is the major source of feed to the livestock in midland of Sidama during dry season.

Supplementary feeds and home produced by-product, obtained as byproduct from processing of food for human consumption, also provides feed for dairy cows in dry season. The common supplementary feeds and home-made byproducts includes sugarcane tops, *Attella,* mixed with salt, false stem and residual parts of tuber of *enset, Fufuraamme, Moocca,* (Fluid which is obtained while *Qocco* is processed) *Gurumibo* obtained as byproduct of processing *Kochcho or Waassa* for human consumption particularly for milking cows in the study area.

Feeding systems practiced by farmers in the study area were tethering, grazing and both tethering and grazing. Tethering was practiced by majority of respondents (42.2%) in the area. In midland tethering was the most common system of feeding dairy cows followed by highland whereas in lowland cows mainly practiced free grazing. This may be related to shortage of grazing land due to encroachment of majority of land with food crops cultivation in midland. Feeding systems revealed in current study area were in line with that reported by Adebabay (2010) who found that communal grazing and stall feeding were common types of feeding systems in Bure district. Beriso (2015) also illustrated that communal gazing (43%), private grazing (25%) and stall feeding (32%) were major feeding system in Chukko district Sidama Zone Southern Ethiopia.

Feed shortage and its consequences on the performance of dairy Cows

Majority of respondents (62.96%) reported presence of feed shortage in the study area and the higher proportion of respondents were encountered from midland (80%) followed by highland (62.2%) and lowland (46.7%) (Table 4). This could be attributed to shortage of land in midland compared to the two agro ecology since the midland farmers used majority of their land for cropping food crops to meet the food requirements as it is densely populated area than the others.

As revealed by majority of respondents (57.03%) feed

Table 4. Shortage of feed, season of feed shortage and consequence of feed shortage

Variables		Agro-ecology			Overall (N=135)
		Highland (N=45)	Midland (N=45)	Lowland (N=45)	
Shortage of feed	Yes	28(62.2)	36(80)	21(46.7)	85(62.96)
	No	17(37.8)	9(20)	24(53.3)	50(37.04)
Season of feed Shortage	Dry season	25(55.5)	33(73.3)	19(42.2)	77(57.03)
	Wet season	1(2.2)	2(4.4)	1(2.2)	4(2.96)
	Both dry and wet season	2(4.4)	1(2.2)	1(2.2)	4(2.96)
Consequence of feed shortage	Weight loss	6(13.3)	9(20)	4(8.9)	19(14.1)
	Reduced milk yield	18(40)	24(53.3)	12(26.7)	54(40)
	Remain unproductive for longer period	2(4.4)	1(2.2)	2(4.4)	5(3.7)
	Mortality	2(4.4)	2(4.4)	3(6.7)	7(5.2)

N= Number of respondents, Numbers in the brackets represent proportion of respondents.

shortage occurred during dry season particularly from January to March. The current finding is in line with Beriso *et al*. (2015) who reported that feed shortage to occur in dry period in Aleta Chuko district, Southern Ethiopia and also by Albe *et al.* (2016) who reported that feed shortage is the main problem especially during dry season in Sidama Dale district area.

The major consequences of feed shortage perceived by farmers in the present study areas were reduced milk yield (40%), weight loss (14.1%), mortality (5.2%) and remaining unproductive for longer period of time by dairy cows (3.7%). The result of the current finding was in agreement with Zewide (2010) who reported weight loss and low milk yield as the major consequences of feed shortage in Debre Birhan, Jimma and Sebeta areas.

Breeding practices

Mating system and source of the bull

The breeding practice used by dairy cow owners was entirely (100%) natural mating (Table 5). The current result is in line with Beriso *et al. (*2015), who reported that majority of farmers (91%) in Aleta Chuko District practiced natural mating and also with Debir (2016) who indicated that natural mating was the common practice of mating followed by both (natural mating and artificial insemination) methods in Sidama Zone, Southern Ethiopia. The breed of the bull kept by farmers was also local breed. In the study area, breeding bull obtained from different sources. Accordingly, only 37.8% reared at their home while remaining (62.2%) obtain freely from neighbor (50.4%) and rent from neighbor (11.85%) which was in agreement with (Debir, 2016).

Selection and culling practices of dairy cow in the study area

Selection and culling practices are shown in Table 6. Selection of animals with superior performance plays a crucial role in improving the productivity of the animals. In addition, culling of less productive animals from herd increases the productivity of herd by reducing cost of production and competition between animals. Information obtained from group discussion revealed that information regarding performance of dairy cows in the current study area is obtained from different sources. When new foundation stock is brought to the herd, the performance of foundation stock were assessed from the owner of the dam on previous performance and phenotypic observation of the cow including body size, the length of the tail (short or long) and the length of the teat and age

Table 5. Mating system and source of bull in the study areas

Variables		Agro-ecology			Overall (N=135)
		Highland (N=45)	Midland (N=45)	Lowland (N=45)	
Mating practice	Natural mating	45(10)	45(100)	45(100)	135(100)
Source of the bull	Freely from neighbor	20(44.4)	21(46.7)	27(60)	68(50.4)
	Rent from Neighbor	9(20)	7(15.5)	0	16(11.85)
	Reared at Home	16(35.5)	17(37.8)	18(40)	51(37.03)

N= Number of respondents, Numbers in brackets indicates proportion of respondents.

Table 6. Selection and culling practices in the study Areas

Variable		Agro ecology			Overall N=135
		Highland N=45	Midland N=45	Lowland N=45	
Selection practice	Yes	34(75.5)	38(84.4)	17(37.8)	89(65.9)
	No	11(24.4)	7(15.5)	28(62)	46(34.1)
Preferred performance trait	Long lactation length	4(8.9)	4(8.9)	0	8(5.9)
	Higher milk Yield	25(55.6)	27(60)	9(20)	61(45.2)
	Fast growth Rate	0	0	1(2.2)	1(0.74)
	Shorter age at first Calving	5(11.1)	7(15.5)	6(13.3)	18(13.3)
	Shorter calving Interval	0	0	1(2.2)	1(0.74)
Culling practice	Yes	38(84.4)	37(82.2)	15(33.3)	90(66.7)
	No	7(15.5)	8(17.8)	30(66.7)	45(33.3)
Reason for Culling	Age	2(4.4)	3(6.6)	1(2.2)	6(4.4)
	Low milk yield	15(33.3)	10(22.2)	2(4.4)	27(20)
	Feed shortage	9(20)	10(22.2)	1(2.2)	20(14.82)
	Disease	4(8.9)	3(6.6)	9(20)	16(11.85)
	Financial constraint	8(17.8)	11(24.4)	2(4.4)	21(15.5)

N=Number of respondents, Numbers in the bracket indicate proportion of respondents.

also considered. They observe on body size since they assumed that the size of the dairy cows could be associated with production performance in that they perceive large cows produce more milk than small sized and it also has importance in reducing difficulties during the time of birth delivery. The length of the tail is also considered; if it was long they assume that cows have good performance for milk production. The phenotypic observation may support in verifying information obtained from the cow owners on the performance of the dairy cows. The source of information may not be accurate but farmers practiced in the study area since record keeping on the performance of dairy cows was not practiced. The result of current finding obtained from focus group discussion was supported by Desta (2002) who reported indirect information about cow's own performance in situations where there are no performance recording activities helps to obtain information on production performance even though the information might not be accurate.

In the current study area, 65.9% of farmers practiced selection of dairy cows with better performance. The remaining 34.1% do not undertake selection practice where majority corresponds for lowland farmers (62%). The result illustrated in the current study revealed that in both highland and midland area, farmers targeted more for milk production than lowland through keeping more selected local breed of dairy cows and also this was consistent with focus group discussion during data collection. In lowland, dairy cow owners undertake indiscriminate mating and this may cause reduction in production potential of dairy cows. The current finding is in agreement with Azage (2013). The major preferred trait in the study area was higher milk yield (45.2%). The current finding was in line with Desta (2002) who reported high daily milk yield as the most important preferred trait mentioned by farmers in all the study areas.

About 66.7% of respondents reported that they undertake culling practice. However, about 33.3% of respondents revealed that they do not undertake culling practice and they kept even unproductive dairy cows particularly with those in lowland farmers. The major reasons for culling of dairy cows in the study area were age, low milk yield, feed shortage, disease and financial constraint. About 20%, out of those who undertake culling practice, reported that they undertake culling due to low milk yield of those 33.3%, 22.2% and 4.4% from highland, midland and lowland, respectively. In lowland, the major factor that obligated farmers to cull their dairy cows was disease as reported by 20% of respondents in lowland. The result of current finding is in line with Brukitawit (2016) who reported that 73.2% of the respondents practiced culling in their farms due to different reasons and 26.8% respondents do not practice culling of any animals during their production activity in Addis Ababa.

Watering practices

Sources of water and average distance to watering point

The smallholder farmers in the current study depend on various sources of water. The most common sources of water are river, pond, tap and spring water (Table 7). Majority of respondents (59.25%) used river as major water source in study area followed by pond, tap and spring water. River was most common source in highland and midland while pond was major source of water in lowland. The finding was in agreement with Sintayehu *et al.* (2008) who indicated that the major source of water for livestock was river in Shashemene-Dilla area. Beriso *et al*. (2015) also reported that about 59% of the respondents used river as source of water for their dairy cows in Aleta Chuko district.

The distance to watering point depends on the availability of water source nearby the settlement area and season. About 31.83% of the respondents said that dairy cows were provided water at home during the wet season. On the other hand, in dry season the respondents travelled about 1-10km distance in search of water, but for only 1-5 km during the wet season. Zewidie (2010) obtained similar result with current finding and illustrated that water shortage is the major constraint during the dry season for rural kebels situated far away from Lake Ziway and main rivers and thus herders in these areas traveled long distances with their cattle for 9 to 12 hours in every other day to reach to the watering points.

Housing practices of dairy cows in the study area

It is very crucial to provide appropriate conditions for rearing dairy cows by reducing the extreme effects of climate such as heat and moisture which reduces their productivity. In this regard good housing management plays an important role in reducing stress due to exposure to tremendous temperature and moisture which in turn affect their performance.

The type of house used, ways of housing, and provision of separate house based on stage of cows were presented in Table 8. All respondents provides traditional barn which is made from locally available materials. Regarding ways of housing, majority of respondents (67.4%) noted that dairy cows shared common house with family, corresponding to highland (64.4%), midland (66.7%) and lowlands (71.1%). The current finding is in line with that recorded by Beriso *et al. (*2015) who reported that 89% of the households housed their dairy cattle together with family house and only 11% provide separate house. However, Asaminew (2007) reported that the majority of the respondents provide separate house in Bahirdar Zuria and Mecha district and also Ketema (2014) reported that only 2.5% of the

Table 7. Sources of water and average distance to watering point in the study areas

Variables		Agro ecology			Overall (N=135) %
		Highland (N=45) %	Midland (N=45) %	Lowland (N=45) %	
Sources of water	River	75.5	77.8	24.4	59.25
	Pond	20	8.9	68.9	32.6
	Spring	0	8.9	0	2.96
	Tap water	4.4	4.4	6.7	5.2
Distance traveled in wet season	Watered at home	44.4	40	11.1	31.83
	<1km	46.6	49	49	48.16
	1-5km	8.9	11.1	40	20
	6-10km	0	0	0	0
Distance traveled during dry season	Watered at home	17.8	8.9	2.2	9.63
	<1km	40	37.8	31.1	35.5
	1-5km	35.5	42.2	40	34.8
	6-10km	6.7	11.1	26.7	20

N= Numbers of respondents, % Percentage of respondents.

Table 8. Housing practices of dairy cows in the study areas

Variables		Agro ecology			
		Highland (N=45)	Midland (N=45)	Lowland (N=45)	Overall (N=135)
Type of House used	Traditional barn	45(100)	45(100)	45(100)	45(100)
Ways of housing dairy cattle	Share common House with family	29(64.4)	30 (66.7)	32(71.1)	91(67.4)
	Housed Separately	16(35.5)	15(33.3)	13(28.9)	44(32.6)
Provide separate house for different groups	No	45(100)	45(100)	45(100)	45(100)
Floor of house used	Compacted soil	45(100)	45(100)	45(100)	45(100)

N= Numbers of respondents, Numbers in brackets represents proportion of respondents.

respondents provide common house with family in Kerisa Melima district.

The sharing of common house with family by dairy cows could be advantageous and suitable for

Table 9. Major diseases, their local and veterinary name and measures taken

Veterinary name	Local name *(Sidamigha)*	Agro ecology: Highland (N=45) %	Midland (N=45) %	Lowland (N=45) %	Overall (N=135) %
Black Leg	Lamootta	13.3	13.3	2.2	9.6
CBPP	Woraanitto	26.7	33.3	4.4	21.5
Trypanosomiosis	Shillo	2.2	2.2	77.8	27.5
LSD	Qadda	28.9	20	4.4	17.8
Mastitis	Gadanissa	11.1	13.3	6.7	10.36
Anthrax	Abba senga	17.8	17.8	4.4	13.3
Measures taken	Traditional treatment	8.9	2.2	17.8	9.63
	Veterinary measures	91.1	97.7	82.2	90.3

N=Numbers of Respondents, %= Percentage of respondents, CBPP=Contagious Bovine Pleuroneumonia, LSD= Lumpy Skin Diseases.

management such as to offer feeds, water and milking. The current finding is in line with Tsegaye *et al.* (2015) who indicated that sharing of common house by cattle with family provides easy access for husbandry practices such as feeding, watering and milking as farmers perceived in study undertaken in selected districts of Sidama highland. As observed by the researcher and reports by respondents indicated, the owners do not provide separate house for different age group of animals but calves were separated from their dam by tethering them for prevention of suckling. The floor of house used is compacted soil. The finding is in agreement with Beriso *et al.* (2015) who reported that the floor house is compacted soil.

Major diseases and health management practices

The major diseases identified in the study area are presented in Table 9. The most important diseases affecting dairy cows are trypanosomosis *(Shillo),* Anthrax *(Abba Senga),* Mastitis *(Gaddanissa),* blackleg (*Lamootta*), Contagious Bovine Pleuroneumonia (CBPP) *(Woraanitto)* and Lumpy skin disease (*Qadda*). Trypanosomiosis was encountered by 27.5% in general and was said to be the most important diseases of dairy cows particularly in lowland (Loka Abaya) as reported by (77.8%) from lowland area. The risk of trypanosomiosis in the lowland area particularly could be associated with the prevalence of Tsetse fly in Lake Abaya during wet season. Farmers living in other area do not want to obtain even foundation stock and they ask the place of cows even if they want to purchase from locally available market due to the risk of trypanosomiosis in the lowland area.

The second important disease in the study area was Contagious Bovine Pleuropneumounea (CBPP) as reported by 21.5% of the respondents. According to the information and discussions undertaken with districts' veterinary technicians and farmers, the disease was characterized by shallow respiration, soft and moist cough, difficulty in breathing and swelling of large movable joints. Anthrax and blackleg diseases were also mentioned as important diseases in the area as reported by 13.3%, 9.6%, respectively. Blackleg was more dominant in the cattle of age of six months to two years of age. This could be related to feeding style of farmers for their calves in this range of age. Lumpy skin disease (LSD) and Mastitis are also mentioned as the important diseases hindering dairy cows in the study area. Thus, the major diseases identified in the current study area in order of importance were trypanosomiosis, CBPP, LSD, anthrax, mastitis and blackleg. The current finding was in line with that reported by Desalegn (2015) who mentioned trypanosomiosis as major diseases in Bench-Maji Zone, South west Ethiopia, followed by blackleg, anthrax, bovine pasteurolosis and gastro-internal parasites in the order of their importance.

The majority of respondents (90.3%) obtained veterinary services such as vaccination provided from respective Agricultural Bureau before the onset of the disease outbreak. They also get extension service from respective Agricultural Extension Agents and these also

Table 10. Milking, processing, and utilization practices of milk in the study areas

Variable		Agro ecology			
		Highland N=45	Midland N=45	Lowland N=45	Overall N=135
Milking time after calving	In first week	17(37.8)	18(40)	16(35.6)	51(37.8)
	In second week	28(62.2)	27(60)	29(64.4)	84(62.2)
Frequency of Milking	Twice per day	45(100)	45(100)	45(100)	135(100)
Milking practice	Milking without suckling	4(8.9)	5(11.1)	0	9(6.6)
	Brief suckling before and after milking	11(24.4)	15(33.3)	20(44.4)	46(34.1)
	Suckling before milking only	30(66.6)	25(55.5)	25(55.5)	80(59.3)
Cleaning equipment	Yes	45(100)	45(100)	45(100)	45(100)
Frequency of cleaning	Once per day	25(55.6)	29(64.4)	17(37.8)	71(52.6)
	Twice per day	10(22.2)	8(17.8)	8(17.8)	19(14.1)
	Once in two day	10(22.2)	8(17.8)	27(60)	44(32.6)
Methods used to increase shelf life	Smoking of containers	45(100)	45(100)	45(100)	45(100)
Milk processing	45(100)	45(100)	45(100)	45(100)	45(100)

N= Numbers of Respondents, Numbers in the Bracket indicates proportion of Respondents.

were raised as an issue for the opportunity of dairy production in the current study area during focus group discussion. However, farmers noted that insufficient provision of drugs in case of the occurrence of diseases and said that they purchase drugs or tablets from illegal providers from open market in order to treat their dairy cows and this may have health risk for the animals as well as can hurt the health of farmers.

Milking, processing, and utilization practices of milk

Milking, processing and utilization practices of milk in the study area are summarized in Table 10. Majority of respondents (62.2%) illustrated that milking started during the second week after calving and they called this period locally as *"Lamme Lamalla",* meaning two weeks in order to start milking of cows after delivery of birth particularly for home consumption by house member and other purposes. These issue was mainly due to the habit of community in the study area to collect and keep the milk until that period and they drunk fermented milk (Yoghurt) together by arranging the date to members of family and Church leaders since they perceive that blessings should be obtained from church leaders after provision of first round milk for them.

All of the respondents milked their dairy cows twice a day. The current finding was supported with Ketema (2014) who reported majority (98%) of the respondents milked cows twice a day and also with Tsegaye *et al*.(2015) who reported milking frequency were twice a day in selected districts of Sidama Zone.

Milking of cows was undertaken by suckling before milking (59.3%) followed by few suckle before and after milking (34.1%) and milking without suckling. Milking without suckling practiced mainly when the calf died and is done through stimulating the udder by washing udder with boiled water in order to stimulate the letdown of milk and supplementing the dam with *"Attela*", wheat bran *"Furishika"* and home produced byproducts obtained via

processing of ”*Kochcho*” or “*Waassa*”, which is produced from processing fermented stem and corn parts of *enset* after it was fermented after several time, etc.

The cleaning of milking equipment was practiced by all of the respondents entirely in the study area. Majority of respondents (52.6%) clean their milking equipment once per day. All respondents in the district used smoking of containers in addition to cleaning assuming to increase the shelf life of the milk. They smoke the utensils by natural plants such as “*Ejerisa*” (*Olea Africana) and “Bireessa*” (*Terminalla brownie).* Smoking of milking equipment with these plants is believed by the group discussants to provide a good taste of milk and also prolongs the shelf life of milk.

CONCLUSIONS

The major feed resources identified were natural pasture, crop residues and conserved hay, cut and carry, Supplementary and home-produced by products. The feeding system practiced by smallholder dairy producers was tethering, free grazing and both tethering and free grazing. The study revealed that the dominant breeding practice was entirely natural mating and the smallholders obtained bull from various sources. The dairy cattle provided water from different sources starting from home provision to trekking the animals towards rivers for various distances in search of water. Housing system of the dairy cattle involves provision of traditional barn and there is no trend of separating different classes of dairy cattle in the current study area. Both vaccination and traditional measures was undertaken to combat the effect of diseases hindering the production of dairy cattle. The current study showed that the husbandry practices of the dairy cattle in the current study area were traditional and interventions to improve the prevailing husbandry practices plays critical role to increase the productivity of dairy sector.

ACKNOWLEDGEMENTS

The authors want to thank, Ministry of Education for the financial support and great thanks also goes to the smallholder dairy cattle producers of three districts of Sidama zone.

REFERENCES

Adebabay K (2009). Characterization of milk production systems, marketing and on-farm evaluation of the effect of feed supplementation on milk yield and milk composition of cows at Bure District, Ethiopia. Msc thesis, Bahirdar University, Ethiopia.

Albe A, Feyera T and Gebeyew K (2016). Major Animal health constraints of market oriented livestock development in Sidama Dale District Southern Region Ethiopia.
Journal of Veterinary Science and Technology,7:355.

Asaminew T (2007). Production, handling, traditional processing practices and quality of milk, the Case of Bahir Dar milk shed area, Amhara Rerion, Ethiopia, MSc Thesis, Haramaya University, Ethiopia.

Ayele A (2012). Small-holder farms livestock management practices and their implications on livestock water productivity in mixed crop-livestock systems in the highlands of Blue Nile basin: A case study from Fogera, Diga and Jeldu districts (Ethiopia). Hawassa University, MSc Thesis.

Azage T, Berhanu G, Dirk H, Berhanu Belay and Yoseph M (2013). Smallholder dairy production and marketing systems in Ethiopia: IPMS experiences and opportunities for market-oriented development. IPMS (Improving Productivity and Market Success) of Ethiopian Farmers Project Working Paper 31. Nairobi: ILRI.

Beriso K, Tamir B and Feyera T (2015). Characterization of smallholder cattle milk production system in Aleta Chukko District, Southern Ethiopia. Journal of Advanced Dairy Research, 3: 132. doi:10.4172/2329-888X.1000132.

Bruktawit S (2016). Physicochemical properties and microbial quality of cow milk collected from selected sub city of Addis Ababa, Ethiopia. MSc Thesis, Addis Ababa University, Bishoftu, Ethiopia.

CACC (Central Agricultural Census Commission) (2011). Ethiopian Agricultural Sample Enumeration, 2011/12. *Result at country level*. *PP.*27-29. Statistical report on socio-economic characteristics of the population in agricultural household, land use and area and production of crops. Part I (May 2011), Addis Ababa, Ethiopia.

CSA (Central Statistical Agency) (2016). Agricultural sample survey report on livestock and livestock characteristics, volume II, Addis Ababa, Ethiopia.

Debir L (2016). Assessment of breeding practice and evaluation of estrus synchronization of dairy cattle in Sidama zone, Southern Ehiopia. M.sc. Thesis, Hawassa University, Hawassa, Ethiopia.

Dessalegn G (2015). Assessment of production and reproductive performances of cattle and husbandry practices in Bench-Maji Zone, Southwest Ethiopia. Global Journal of Animal Scientific Research, 3(2): 441-452.

Ethiopia LMP Brief 4 (Ethiopia Livestock Master Plan) 2015. Animal breeding and genetics in the Ethiopia livestock master plan. Ministry of Agriculture (MOE) International Livestock Research Institute (ILRI), Addis Ababa, Ethiopia.

IPMS (Improving Productivity and Market Success). 2005. Dale thematic maps. IPMS, Addis Ababa, Ethiopia.

Ketema W(2014). Assessment of dairy cattle feed resources and milk yields under smallholder farmers in kersa malima woreda. Department of Animal Production Studies MSc program in Tropical Animal Production and Health, Bishofitu, Ethiopia.

SDC (Sidama Development Corporation). (2000). Planning and statistics bulletin.

SEDPSZ (Socio-economic and demographic profile of Sidama zone). 2004. Finance and Economic Development Coordination Department. SEDPSZ, Awassa, Ethiopia.

Sintayehu Y, Fekadu B, Azage T and Berhanu Gebremedhin. (2008). Dairy production, processing and marketing systems of Shashemene–Dilla area, South Ethiopia. IPMS (Improving Productivity and Market Success) of Ethiopian Farmers Project Working Paper 9. Nairobi, Kenya: ILRI (International Livestock Research Institute).

Tadesse G. and Mengistie A., (2016). Challenges, Opportunities and Prospects of Dairy Farming in Ethiopia: A Review. World Journal of Dairy & Food Sciences 11 (1): 01-09.

Tsegay Lijalem, Agengew Asefa and Ashenafi Sharo. (2015). Dairy cattle production at small holder level in Sidama Zone selected Districts, Southern Ethiopia. Journal of Food Science and Quality Management. ISSN 2224-6088 (Paper) ISSN 2225-0557 (Online). www.iiste.org.

Tsegaye Y (2001). Coffee-Ensete-livestock interaction for sustainable livelihood in the Sidama area of Southern Ethiopia. Journal of Agriculture in the Tropics and Subtropics, 102(2): 119 – 131.

USAID (2005). SNNPRS Livelihood Zone Profile Report (unpublished), Addis Ababa [web page] http://pdf.usaid.gov/pdf_docs/pnadj866.pdf.

Zelalem Y, Emmannuelle G. and Ameha S. (2011). A Review of the Ethiopian Dairy Sector. Ed. Rudolf Fombad, Food and Agriculture Organization of the United Nations, Sub Regional Office for Eastern Africa (FAO/SFE), Addis Ababa, Ethiopia. Pp. 81.

Zewdie W (2010).Livestock production systems in relation with feed Availability in the highlands and central rift valley of Ethiopia. MEd. Thesis, Haramaya University, Haramaya, Ethiopia.