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Survey on Farmers Husbandry Practice for Dairy Cows in Alefa and Quara Districts of North Gondar Zone, Amhara National Regional State, Ethiopia

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Keywords Alefa district; Husbandry practice; Quara District

Abstract

The aim of the study was to describe the dairy cow's husbandry practice of farmers in Alefa and Quara districts of North Gondar Zone Amhara National Regional State Ethiopia. Three Kebeles from each district, a total of six Kebeles were selected through purposive sampling procedure. Finally, 376 households (208 households from Quara and 168 households from Alefa) who had at least one lactating cow were selected through systematic random sampling procedure. Data were collected by using structured questionnaire and the collected data were analyzed by using statistical package for social science (SPSS Version 20). The main source of feed for Alefa district was, crop residue and private grazing land (36.7%), crop residue, communal and private grazing land (41.4%), while for Quara district, communal grazing land (49.8%) and private, communal and crop residue (39.6%)were the main feed sources. In respective order, about 70.8 and 81.3% of respondents for Alefa and Quara districts were confirmed that river water was the main source for dairy cows. Housing system in Alefa district was simple shied adjacent to farmer's house (97.6%), but in Quara district, it was barn system (95.2%). Trypanosomiasis (58.7%), Lumpy skin disease (18.8%) and Babesiosis (8.7%) was the most challenging livestock disease in Quara district, while in Alefa district Blackleg (30.5%), Lumpy skin disease (21%) and Trypanosomiasis (20.4%) was challenging disease. The major livestock production constraint in Quara district was feed and disease with the same indices value of 0.32 and Water 0.20 were observed. Similarly, feed followed by disease was the major constraint in Alefa district with index value of 0.5 and 0.2, respectively.

Introduction

Livestock production is one of the most important means to achieve better living standards in many regions of the developing world. The national economies and the livelihood of rural communities in sub-Saharan African countries are largely depended on livestock production [1]. The total cattle population of Ethiopia is estimated to be about 57.83 million. Out of this total cattle population, the female cattle constitute about 55.38 percent and the remaining 44.62 percent are male cattle [2]. According to CSA survey result, about 98.59 percent of the total cattle in the country are local breeds, the remaining are hybrid and exotic breeds that accounted for about 1.22 and 0.19 percent, respectively. Of the total livestock population, dairy cows are estimated to be around 6.74 million and milking-cows are about 11.33 million heads [2].

Challenges, like health infestation, shortage of feed and water availability, absence of proper housing and breeding management, lack of trained manpower and poor marketing practice are some of the major reasons for poor performance of dairy cattle production and cause a huge loss of production and productivity of dairy cattle in the country [3]. Similarly, [4] noted that, challenges of disease, absence of crossbreed dairy cows, insufficient feed resources both in terms of quality and quantity, poor management practice, health problem and veterinary service are affecting reproductive and productive performance of dairy cows. Inadequate quality and quantity feed, disease and parasites occurrence, poorly management of dairy animals like, housing, feeding and absence of good marketing practice are affecting productive and reproductive performance of dairy cows [5].

Amhara National Regional State is one of the most potential areas in the country for dairy production. In this area cattle types like, Semen, Dembia, Wogera, Fogera, Qocherie, Mahbre Silasie composite, Gojam and Wollo highland zebu and Raya Sanga are the major milk source of the communities [6]. However, its productivity is declining time to time, because of different problems like, shift of grazing lands to crop production, poor management practices, feed and water scarcity, disease prevalence and absence market access [7].

North Gondar is a part of Amhara national regional state, which dairy production is a common way of life for the communities. Dembia and Qocherie cattle types are found in North Gondar

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zone and these cattle type are used for dairy production. Even though, its contribution in terms of milk production to the community is high, comprehensive baseline information about farmers husbandry practices were not identified. Therefore, assessin 2 of husbandry practices of dairy cows in Alefa and Quara districts of North Goner Zone and documenting it for other researchers as well as policy makers was vital. Thus, the objective of the study was to describe farmer's husbandry practices of dairy cows at their production environment.

Materials and Methods

Description of the study areas

The study was conducted between December and April to assess the production and reproduction performance of indigenous cattle breeds in Quara and Alefa districts of North Gondar zone.

Detail descriptions are as follows:

Quara District: Quara district is located in North Gondar Zone. It is bordered from the south by Benishangul-Gumuz Region, from the west by Sudan, from the north by Metemma, from the East by Takusa and Alefa District and from the southeast by Agew Awi Zone. The administrative center of this District is Gelegu with other settlements include Tewodros Ketema. The district is 360 Km far from Bahir Dar, which is the capital city of Amahara National Regional State, and 284km from Gonder town. It lies between 11°47′ and 12°41′ N latitude and 35°16′ and 36°30′E longitude coordinates and at an altitude that ranges from 530 to 1900 meter above sea level, while the temperature ranges from 26°C - 42°C with annual average rainfall 800 mm with Quara District Agricultural office, 2016. The rainy season begins in early May and ends in early October. It has 19 kebeles with area coverage of 858588 hectares. From this; 262104.18 hectare is used for cultivated land, 97870.04 hectares is grazing land, 33756.55 hectares are covered by river and valley, and 157399.24 hectares are accounted by forest. One third (266570 hectare) is covered by Altash national park, 7795.96 hectares is villages and 33091.41 hectares for others. It has 134640 people living in two agro ecologies. About 70% of the district is covered by low land with vertisoil and the rest 30% is covered by mild altitude (nitosol dominant). Mixed crop-livestock is one of the most common practices for the community way of life, which sesame, sorghum, maize, and teff are the most common crop types. Its livestock composition includes 46427 oxen, 59333 cows, 37465 heifers 117672 goats 10981 donkeys 151 mules, 571 camels, 179174 poultry and 12788 bee colonies [8].

Alefa District: Alefa district is bordered from the southwest by the Agew Awi Zone, from the west by Quara, from the north by Takusa, from the east by Lake Tana and from the southeast by the West Gojjam Zone. The administrative center of Alefa is Shawra. It is 80 km far from Bahir Dar, which is the capital city of Amhara region, and 144 Km from North Gonder zone. It lies between 11°45′ and 12°30′ N latitude, and 37°10′ and 36°30′E longitudes coordinate, respectively, and at an altitude that ranges from 750 to 2250 meter above sea level. Its temperature ranges from 25-38°C and annual rainfall of 950mm-1500mm, its rain begins in early May and extended up to early November. Its heavy rainy seasons are June, July and August. Its cattle populations are accounts 244405. Of the total cattle population 44782 accounts dairy cows and its covers area of 531285ha with 25 Kebeles. The district is dominated by vertisoil and nitosol type. The district is known by its transhumant livestock production system with its common crop cultivation of Teff, Sorghum, Maize, Bea and pea [9] (Figure 1).

Sampling procedure

Multistage purposive sampling technique was used based on the potential of dairy cattle production in the zone. To locate the

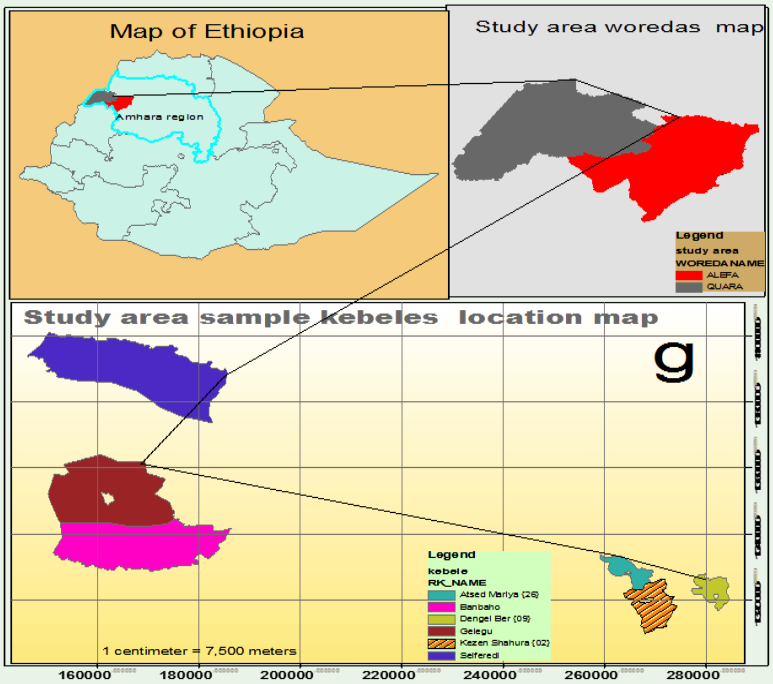

Figure 1: Changes in Mean Facial (± S.E.) Width-to-Height Ratios of Major League Baseball Players Active 1870-1989.

Table 1: Summary of sampling procedure.

Districts	Kebeles	Representative Sample size	Number of groups Discussion held
Quara	Gelegu	69	1
	Banbaho	70	1
	Selferedi	69	1
Alefa	Kezenshahura	56	1
	Astedemarim	56	1
	Dengelber	56	1
Total	**6**	**376**	**1**

distribution of dairy cattle production, rapid preliminary survey was done prior to the actual survey was done. Discussion was held with zonal, district agricultural experts and development agents about the distribution of dairy production potential. Based on this information two districts (Quara and Alefa) were selected. Then three Kebeles from each district, a total of six Kebeles were selected through purposive sampling procedure using similar fashion. Finally, farmers who had at least one lactating cow were selected for interview through systematic random sampling method.

The total household heads included in the study were determined by the formula given by Yamane [10] with 95% confidence level.

$$n= N/1+ N(e)^2$$

Where n= Sample size

N= population size

e = the desired level of precision

Accordingly, from a total of 6750 population size having lactating dairy cows of six representative Kebeles, 376 households (208 households from Quara district with a population size of 3750) and (168 households from Alefa district with a population size of 3000) were selected.

Data collection procedure

Questionnaires was designed, translated to local language, pretested and administered to address the description of socio-economic condition of the community, family size, and major sources of income, type of livestock reared by the community in the study area, including their composition and number, housing system, feeding, watering, health care management, major livestock production constraints and milk marketing practice were assessed using questionnaires.

Focus group discussion was held in two districts with the recommended group size of 8-10 households that were encompassed from different social segments. As shown in table 1, the participant segments consisted of district experts, Developmental Agents (DA's), model farmers, and village leaders, elderly female and male members of the society who are known to have better knowledge on the present and past social and economic status of the area to strength the reliability of a survey.

Statistical data analysis

The collected data were entered in Microsoft Excel (2007) computer software program and analyzed using statistical package for social science (SPSS Version 20) and was described by using descriptive statistics for various parameters. Analysis of variance (ANOVA) was used for family size and herd number per households.

Results and Discussion

Socio- economic characteristics of the respondents

As illustrated in table 2, about 205 (98.6%) and 3 (1.4%) of respondents in Quara district were male and female headed, while in Alefa district it accounts about 161 (95.8%) and 7 (4.2%), respectively. This indicates that, participation in socio-economic aspect were the responsibilities of males. This result is in line with the findings of [11] in Sidama Zone and [12] in Hossana Town.

Education is the way to improve life of rural communities. Hence to increase farmer's knowledge, they shall have learned either regular or irregular way and should send their children to school. About 86.0 and 83.3 % of respondents in Quara and Alefa districts were illiterate, respectively. This result revealed that, most respondents for both districts were illiterate; therefore, farmers might be resistant to adopt modern livestock production system and new technologies.

Source of income

Majority 194 (93.3%) and 156 (92.5%) of respondents in Quara and Alefa district were generating their income from mixed crop-livestock production, respectively (Table 3). Therefore, the current result is revealed that, the common ways of income for the respondent farmers were from livestock and crop production system. The rest 7 (3.4), 3 (1.4) and 4 (1.9%) of respondents for Quara district and 8 (4.8), 3 (1.8) and 1 (0.6%) of respondents for Alefa district were earned their

Table 2: Socio- economic characteristics of the respondents by district (N = 376).

Districts						
House Hold Characteristics	**Quara**		**Alefa**		**Overall**	
Sex of Respondents	N	Percent	N	Percent	N	Percent
Male	205	98.6	161	95.8	366	97.3
Female	3	1.4	7	4.2	10	2.7
Marital status						
Married	203	97.6	163	97.0	366	97.4
Unmarried	2	1.0	3	1.8	5	1.3
Divorced	3	1.4	2	1.2	5	1.3

N = Number of respondents

Table 3: Socio- economic characteristics of the respondents by district (N = 376).

House Hold Characteristics	Quara		Alefa		Overall	
Educational status	**N**	**Percent**	**N**	**Percent**	**N**	**Percent**
Illiterate	179	86.0	140	83.3	319	84.8
Read and write	21	10.1	23	13.7	44	11.7
Primary	6	2.9	3	1.8	9	2.4
Secondary	2	1.0	2	1.2	4	1.1
Source of income						
Livestock and crop production	194	93.3	156	92.5	350	93.1
Livestock and Trading	7	3.4	8	4.8	15	4.0
Crop production and Trading	3	1.4	3	1.8	6	1.6
Livestock, crop production and Trading	4	1.9	1	0.6	5	1.3

N = Number of respondents

income from livestock production and trade, crop production and trade, from livestock and crop production with trade, respectively. This study is different from in Mekele city as 53.3 and 40% of farmers were generate income from selling of milk and milk products [13].

Families size and land holding pattern

Family sizes in the two districts were significantly different ($p<0.001$). The average family size in Quara district was 6.02±0.13 which is nearly similar with 6.65 households in Sekota district Waghimra zone (zinash, 2015), 6.7+0.11 and 6.0+0.15 for Chencha and Kucha District (Minale and Yilkal, 2015); 6.22 for Bure, 6.1 for Shashemene, 6.62 for Mieso [14]. However, average family size of Alefa district (7.36±0.15) was higher than the above values. As result is presented in table 4, there was a highly significant difference between the two districts on land holding pattern ($p<0.001$). Total land, cultivated land and grazing land for Quara district were 10.83±1.86, 9.27±1.80 and 1.56±0.19 ha, respectively. On the other hand, the average landholding pattern of households in Alefa district were 1.65±0.07, 1.43±0.63, and 0.22±0.14 ha for total land, cultivated and grazing land, respectively.

As respondents were mentioned during focus group discussion, the increasing of family size needs extra land for crop cultivation, this causes reduction of private and communal grazing lands from time to time and it adversely affects livestock production. Similarly, studies in Fogera, Bure, Metema, Mieso, Shashemene, Dilla, Hawassa and Dale districts were reported, 1.51–3.0, 1.3, 8.5, 1.97, 3.08, 0.87, 0.59, and 1.12 ha, respectively [14]. The current result, particularly in Alefa district was lower than Bainesagn, (2016), as 2.3 and 1.2 ha for crop and grazing land in West Shewa Zone of Oromia Regional State, 1.89±0.97 ha for West Gojjam Zone [15].

Livestock composition

As result is illustrated in table 5 except poultry and mule, livestock numbers in both districts were significantly different ($p <0.001$). There was higher herd number in the lowland (Quara) than mid land (Alefa) district. Availability of open grazing lands, productive performance of the herd, selling or culling strategies and experience of livestock keeping as the main source of income in Quara district than Alefa district might be the probable reason for herd number differences. The average number of cattle in Quara district was 4.69±0.39, 4.32±0.31, 9.77±0.83, 7.36±0.57, 8.71±0.99 and 5.84±0.42 for Oxen, Bulls, Cows, and Lactating cows, Calves and Heifers, respectively. The current result for number of cows, oxen and heifers in Quara district was higher than 2.55±0.27, 1.48±0.15 and 1.58±0.21 for cows, oxen and heifers in Bahirdar zuria district respectively [16]. In addition to this, the average livestock number in Alefa district was 2.33±0.078, 1.58±0.08, 2.14±0.10, 1.51±0.06, 1.85±0.90 and 1.70±0.11 for Oxen, Bulls, Cows, and Lactating cows, Calves and Heifers, respectively. The average cattle population in Alefa (1.85±0.24) was lower than 5.08±0.35 and 4.7±0.34 for urban and peri-urban regions of the mid rift valley, Ethiopia, however the average cattle population (6.78±0.59) in Quara district was higher than this value.

Table 4: Number of families and land holding pattern per households.

Descriptives	Quara	Alefa	Overall	
Number of families	**Mean ±SE (N=208)**	**Mean ±SE (N=168)**	**Mean ±SE (N=376)**	**P-value**
Male	3.10±0.09	3.63±0.11	3.33±0.07	0.000***
Female	2.97±0.01	3.71±0.11	3.30±0.76	0.000***
Total	6.02±0.13	7.36±0.15	6.62±0.10	0.000***
Landholding (ha)				
Total land	10.83±1.86	1.65±0.07	6.24±0.97	0.000***
Cultivated land	9.27±1.80	1.43±0.63	5.35±1.22	0.000***
Private Grazing land	1.56±0.19	0.22±0.14	0.89±0.13	0.000***

N = Number of respondents, SE = Standard Error, *** = shows significant difference ($p <0.001$)

Table 5: Livestock composition per household's level.

Livestock Composition (Mean ±SE)	Quara (N=208)	Alefa(N=168)	Overall N=376	P-value
Oxen	4.69±0.39	2.33±0.08	3.64±0.22	0.000***
Bull	4.32±0.31	1.58±0.08	3.10±0.19	0.000***
Cows	9.77±0.83	2.14±0.10	3.36±0.501	0.000***
Lactating cows	7.36±0.57	1.51±0.06	4.74±0.348	0.000***
Calves	8.71±0.99	1.85±0.99	5.64±0.575	0.000***
Heifers	5.84±0.42	1.70±0.11	3.98±0.261	0.000***
Average cattle population	**6.78±0.59**	**1.85±0.24**	**4.32±0.42**	**0.000*** **
Goats	9.69±0.92	2.90±0.38	6.66±0.56	0.000***
Sheep	7.37±0.86	3.38±0.36	5.59±0.51	0.000***
Average shoat population	**8.53±0.89**	**3.14±0.37**	**5.84±0.63**	**0.000*** **
Donkey	1.77±0.12	0.65±0.09	1.01±0.08	0.000***
Camel	0.08±0.01	0	0.03±0.002	0.000***
Mule	0.10±0.02	0.14±0.03	0.11±0.02	0.23 NS
Poultry	8.38±0.49	7.63±0.57	8.04±0.37	0.321NS
Heaves	0.26±0.49	0.76±0.18	0.48±0.09	0.004**

N=Number of Respondent, SE= Standard Error, **= shows significant difference (p <0.01), ***= shows significant difference (p <0.001), NS= Not significant

Feeds and feeding management

Main source of feeds: The availability of feed resources varied depends on season and agro ecologies. The main source of feed in Alefa district were, crop residue for dry season, communal and private grazing land for wet season (41.1%), private grazing land plus crop residue (36.7%) and communal grazing land (13%), respectively (Figure 2). However, few (4.2%) of respondents were supplemented industrial by products. On the contrary industrial by products were not used in Quara district. As respondents were noted, the absence of infrastructure and high loading cost were limiting factors to use industrial by products. The majority (49.8%) of respondents in Quara district were used communal grazing land. The rest 39.6, 3.9 and 6.7% were used communal grazing land with crop residue, crop residue with private grazing land and only private grazing land, respectively. The other study revealed that, agro-industrial by-products such as, flour milling, sugar factory (molasses), oil processing refusals, abattoir waste products and brewery residuals are used in some urban and peri urban areas. But these feed sources are less accessed by small holder farmers due to availability and increasing of price [17]. Similarly Andualem [18] reported that natural pasture, crop residues, improved pastures, forage crops and agro-industrial by products are commonly used.

Feeding System: About 88 (52.4%), 46 (27.4%) and 34 (20.2%) of respondents in Alefa district were feed their dairy cows as, free grazing with cut and carry system, cut and carry, and only free grazing system, respectively. On the other hand, respondents in Quara district were managed differently. About 9 (4.3%) and 37 (17.8%) of respondents feed their dairy cows as, only cut and carry, both free grazing and cut and carry system, respectively. While majority (77.9%) of respondents were used free grazing system. Hence most farmers in Quara district were managed their dairy cows extensively, while most farmers in Alefa district were feed intensively and semi intensively. Therefore, this revealed that farmers feeding management practice in Alefa district were better than Quara district; this might be educational level, experience of livestock keeping, herd number, extension service and availability of communal grazing land in lowland area (Quara district) causes to allocate their herds extensively. The other finding stated that, feeding practice in low land and high land areas mainly depend on extensive system, but in urban dairy production system of Shashemene–Dilla milk shed intensive (cut and carry) feeding practice were the major one [14]. Similarly Belay and Geertpoul [19] in Jimma town Ethiopia was reported that, zero-grazing (79.6 %), zero- and partial-grazing (7.4 %) and full time grazing (11.1 %) were the main types of dairy feeding system.

Feeding trough: Majority (57.7%) of respondents in Alefa district were not used feeding trough for their animals. But the remaining (42.3%) of respondents were used feeding trough which it was prepared from local materials and in Quara district almost all (98.1%) of respondents were not used feeding trough for their animals, but very few (1.9%) of respondents were used feeding trough. So, this result is revealed that feeding management practice in Quara district were less common practice than Alefa district. As we were observed in the study areas, feed was mixed with feces and urine causes animals to refuse feeding on it. Feeding system were different in two districts based on availability of feed source, land, and herd number. The current result was not consistent with Zinash [20] reported that, about 92% of respondents in peri urban area of Sekota district were used feeding trough (Table 6).

Feed storage system: Storage system and length of storing time affects feed quality. If storage system is not properly managed it will exposed to air, sunlight, heat and moisture and it induce loss of nutrients to various degrees. Storage conditions allowing for molding and heating can substantially reduce plant nutrient contents and animal acceptability [21]. About 18 (10.7%), 42 (25%) and 108 (64.3%) of respondents in Alefa and 197 (94.7%), 5 (2.4%) and 6 (2.9%) of respondents in Quara district were stored the feedstuffs such as Stover, straw, and hay on perch or tree, only bar land, and Plastic or woody flooring land, respectively. This revealed that, there was wastage of feed stuffs in the study areas. Similar study in East Shoa Zone, Ethiopia was reported that, feed stuffs were wasted by improper storage system and failure to collect feeds at the right time and it causes mold formation followed by termite attack [22]. Seid and Berhan [23] in Segen zuria zone, SNNPRS, noted that, farmers

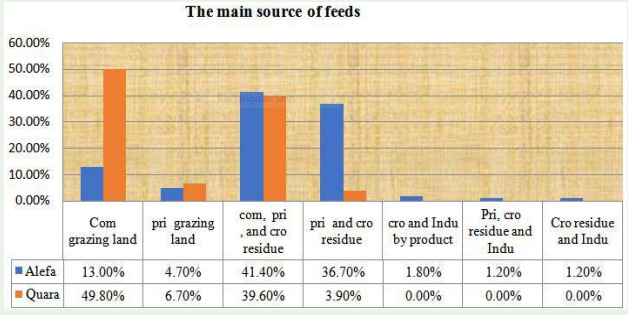

Figure 2: The main source of feed for livestock production in the study areas.
Com = Communal Grazing Land, Pri = Private Grazing Land, Cro = Crop Residue, Indu = Industrial by Products.

Table 6: Feed storage system, feeding trough and feeding system.

Feeding Management	Quara		Alefa		Over all	
	N	Percent	N	Percent	N	Percent
Feeding System						
Only grazing	162	77.9	34	20.2	196	52.1
Cut and carry	9	4.3	46	27.4	55	14.6
Both	37	17.8	88	52.4	125	33.3
Feeding Trough						
Yes	4	1.9	71	42.3	75	20
No	204	98.1	97	57.7	301	80
Feed Storage System						
on perch or tree	197	94.7	18	10.7	215	57.2
bar land	5	2.4	42	25	47	12.5
Plastic/woody flooring	6	2.9	108	64.3	114	30.3
Grazing Management						
Zero grazing	-	-	12	7.1	12	3.2
Continuous Grazing	199	95.7	41	24.4	240	63.8
Rotational grazing	9	4.3	19	11.3	28	7.5
Fencing system	-	-	96	57.1	96	25.5
Hay Harvesting Stage						
Early flowering stage	-	-	27	16.1	27	7.2
Middle (moderate stage	28	13.5	91	54.2	119	31.6
At extend (lignin) stage	180	86.5	50	29.8	230	61.2

N = number of respondents

were stored the feed in cottage house. The other study suggested that, storing of hay in a proper way would increase quality of feedstuffs. Most of the feed stuffs needs to be stored in the barn to protect it from the weather and minimize the chances of a fire. Other options include storing the hay in a shed or atop pallets on higher ground with a tarp for covering. If feedstuffs stored outdoors, the bales need to be off the ground or on top of crushed rock. These methods keep bottom bales from contact with ground moisture and deterioration by termites [24].

Grazing management: Rotational grazing is better than continues grazing to improve grazing pasture in terms of quality and quantity. However, zero grazing practice will increase productivity relative to rotational grazing [25]. Majority (54.2%) of respondents in Alefa district were grazed their pasture by using fencing system. Farmers were fenced the pastures until it reaches the maturity stage, while the remaining 7.1, 24.4 and 11.3% of farmers were grazed their pasture land as, cut and carry (zero grazing), continuous and rotational grazing system respectively. On the contrary farmers in Quara district was not used Zero and fence grazing system, but almost all (95.7%) of farmers were used continuous grazing system with minimum (4.3%) of rotational grazing system, because most respondents were used communal grazing land and they were not managing the grazing land properly.

Hay harvesting stage: Forage quality and quantity is affected by stage of maturity. As maturity stage of the forage is increased, it is changed to lignin and fiber results in a dilution of energy, protein and other nutrient contents with decreasing of nutrient digestibility [21]. About 91 (54.2%), 27 (16.1%) and 50 (29.8%) of respondents in Alefa district were harvested the hay at stage of early, middle (moderate) stage and at extended (lignin) stage, respectively. On the other hand, most (86.5%) of farmers in Quara district were harvest at extended (lignin) stage. Hence quality hay production in Alefa district was slightly better than Quara district. If hay is not harvesting at the right time, important nutrient contents might be lost, due to shattering of leaves or leached by rain and it may be difficult for digestion system for the animals. Therefore, training for both farmers and extension workers to enhance hay quality and quantity either harvesting in proper time or using of urea treatment and silage preparation should be practiced. The other study report that, harvesting at the appropriate stage of growth will help to increase forage quality and quantity, that leguminous fodder crops should be harvested at their flowering stage, while grasses should be harvested at their pre-flowering or flower initiation stage [26]. Similarly, Adugna [27] noted that, late cutting of hay can cause a loss of about 20% in digestibility of the forage and shattering of leaves may cause a loss of about 20% of the nutritive value of the forage.

Watering management

Source of water: Water is the most important nutrient for dairy cattle. It accounts about 50 to 80 percent of animal's body and it involved in every physiological process. Therefore, dairy Cattle must get free access of quality water [28]. In the current study majority (70.8%) of respondents in Alefa district was used river water for their animals both in dry and wet season. The rest 15.5, 4.8, 3.8, and 2.8% of respondents were used lake, ground water and river, river and pipe water, and stream water, respectively (Figure 3). Similarly, about 83.3% of respondents in Quara district were mentioned that the main sources of water for dairy cows were river water. However, no respondents were used lake and pipe for their dairy cows. Using of both river and ground water (4.8%) in Alefa district were lower than Quara district (6.3%), but it was higher than by stream water. This finding is not consistent with Tilahun and Gebregiorgis [1] in Mekelle City Tigray noted that, during dry season in high land areas,

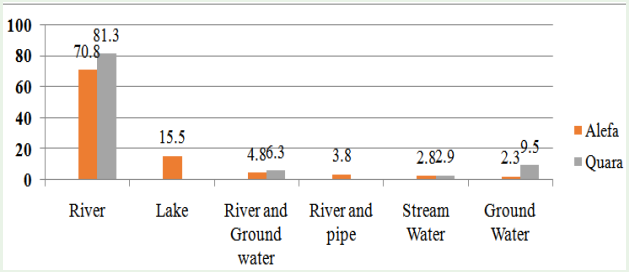

Figure 3: Percent of respondents with source of water for their animals.

stream water was first and river were second as a source of water for livestock.

However, the current research finding was agreement with Seid and Berhan [23] reported that, river was the main source of water for livestock production. However, it wasn't similar with Zinash as reported in Waghimra Zone Sekota District that, bore hole water was the main source of water followed by spring water, and she said river water were not main source of water in dry season. In addition to the above information, our research result is in line with the finding of Ketema [29], in Kersa Malima district noted that, the source of water for respondents were river water. Likewise, our research result was similar with Azage et al., [14] whom reported that river was the main source of water in Metema. On the other hand, majority of respondents in Fogera district were used ground wells (49%) and rivers (47.2%) for their animals. According to Bainesagn [30], in West Shewa Zone of Oromia Regional State showed that, about 12.26, 2.58, 23.29, and 61.9 % of respondents were watered their cows at ground well, steam, pipe and river water, respectively. Therefore, it revealed that, the most water source for animals were river, which in line with our research result (Figure 3).

Watering trough and frequency of watering: Majority 102 (60.7%) of respondents in Alefa district were not used watering trough, but the rest 66 (39.3%) of respondents use watering trough which were made from wood and plastic materials. In Quara district 167 (80.3%) of respondents were not used watering trough, but some (19.7%) of respondents were used.

The frequency of watering for dairy cows depends on availability of water sources, the age structure of the herd, and physiological stage of animals and season of the year. Watering for dairy cows without limitation is very important to increase milk production, thus dairy cows which have accessed freely to drink water will increased up to 18 percent and provides more milk than when watered only once a day [14]. Similar study revealed that, watering of dairy cows one times/ day or one time/ two days decrease production of milk by 10 and 31 %, respectively compared with ad libtum drinking [31]. In our research finding watering frequency was different in two agro ecologies, that in Alefa district 40 (23.8%), 112 (66.7%) and 16 (9.5%) of respondents were watered their animals once, twice, and three times/ day, respectively. Therefore, the current result is revealed that, watering management was poorly managed, since 40 (23.8%) of respondents were watered one times per day. Hence, dairy cows were not lactated based on their production performance. Because water is the main vital component of nutrients to increase milk secretion and physiological process. On the other hand, about 79 (38%), 124 (59.6%) and 5 (2.4%) of respondents in Quara district were watered their animals once, twice, and three times/ day, respectively. The other study in **Mekelle City noted that,** 65.6% of respondents were watered their animals once a day and 15.6% of respondents were provides water two times per day and the rest (18.8%) of respondents were watered three times per day [1].

Season of water shortage: Water availability and quality can become a major issue during a drought season for animal production [28]. Accessibility of different water sources and use by livestock had different among types of agro ecology and seasons of the year [31]. There was variation between districts that, shortage of water in Quara district was more challenging than Alefa district. As respondents were mentioned, there was serious shortage of water in season of March-May. This is because of rivers; streams and other water source were dried out in those seasons. From the total respondents 53 (31.5%) of farmers in Alefa district were reported that, there was no shortage of water, but about 2 (1.2%), 5 (3.0%) and 108 (64.3%) of respondents

Table 7: Watering trough, watering frequency and season of water shortage.

Districts						
Descriptive	**Quara**		**Alefa**		**Over all**	
Watering Trough	**N**	**Percent**	**N**	**Percent**	**N**	**Percent**
Yes	41	19.7	66	39.3	107	28.5
No	167	80.3	102	60.7	269	71.5
Watering Frequencies						
One times/day	79	38	40	23.8	119	31.6
Two times/day	124	59.6	112	66.7	236	62.8
three times	5	2.4	16	9.5	21	5.60
Season of Water Shortage						
No shortage of water	3	1.4	53	31.5	56	15.9
Sep- May	3	1.4	2	1.2	5	1.3
Mar-May	109	52.4	108	64.3	217	57.7
Dec –May	93	44.7	5	3.0	98	26.1

SEP- MAY =September-May, MAR-MAY=March -May, DEC-MAY=December-May, N= number of respondents

Table 8: Distance of water sources.

Districts						
Descriptive	**Quara**		**Alefa**		**Over all**	
Distance of Water Sources	**N**	**Percent**	**N**	**Percent**	**N**	**Percent**
<1km	55	26.4	117	69.6	172	45.7
1-2km	97	46.6	50	29.8	147	39.1
2-3km	23	11.1	-	-	23	6.1
3-4km	27	13.0	1	0.6	28	7.5
>5km	6	2.9	-	-	6	1.6

Km = kilo meter, N = Number of respondents

in Alefa district were reported that, problem of water was occurred in season of September-May, December-May and March-May, respectively. This revealed that, season of March-May was serious problem of water shortage for dairy animals. In addition to this, only 3 (1.4%) of respondents in Quara district were reported that, no problem of water shortage. On the contrary about 3 (1.4%), 93 (44.7%) and 109 (52.4%) of respondents were noted that, shortage of water was occurred in season of September-May, December-May and March-May, respectively (Table 7). As majority 93 (44.7%) and 109 (52.4%) of respondents were confirmed, shortage of water was challenging in season of December-May and March-May, respectively. Generally, this study revealed that, demand of water in low land (Quara) district was higher than mid high land (Alefa) district. The finding of Belay et al., [31] at Ginchi Watershed, Ethiopia were disagreed with our research finding whom they reported that, 99% of respondents in Ginchi Watershed were informed as no shortage of water for livestock production. However, Azage [14] reported that, shortage of water in Metema and Mieso districts was severed in the season of summer, since well and rivers were dry out. Similarly, Kebede et al., [32] noted that, during the wet season there was no water shortage in Siraro districts of Oromia Regional State. But there was water shortage in the dry season and farmers were shifting towards dugouts as the main source of water for their livestock.

Distance of water sources: According to respondents in Alefa district, distance of water source was not greater than 2km. From the total respondents, majority (69.6%) were trekking their animals to water point with less than 1km. The rest (29.8%) of respondents were trekking to water point 1-2km distance. However, nearly 1% of respondents were trekking distance of 4-5km and no respondents were trekking their cows 3-4km distance. On the other hand, 46.6, 26.4, 13.0, 11.1 and 2.9% of respondents in Quara district were trekking their animals 1-2km, less than 1km, 4-5km, 3-4km and greater than 5km, respectively. Therefore, this study revealed that, trekking of long distance to search of water point in Quara district were more challenging than Alefa district. To alleviate this problem collaboration of farmers with any concerned bodies to search advanced water sources is essential, such as by conserving rain water for dry season, underground water and stream water conservation with river are the most important solutions. The current result for both districts were lower than the maximum distance 14 km reported in a study of Semi-Arid Tropics of Zimbabwe in dry season, 10 km in Simbe, Zimbabwe [33,34] (Table 8).

Housing management

Housing system: The house is important to protect animals from predators, theft and from adverse weather conditions. Dairy cattle housing system commonly depends on the knowledge of the farmers and their farming activities. Farmers were not constructed separate housing system in both districts.

However, almost all 164 (97.6%) of respondents in Alefa district were used simple shed housing system which was contracted permanently with adjacent to farmers house. The rest 4 (2.4%) of respondents were used barn system. Hence it was not consistent with finding of Bainesagn [30], in West Shewa Zone of Oromia Regional State, as he reported that; open barn was the main housing system for dairy cows. However, it was nearly similar with finding of Desalegn et al., [35] at Bishoftu and Akaki noted that, 88.5 and 87% of respondents were use permanent enclosure house in Bishoftu and Akaki, respectively. Respondents were not considering for protection of animals from extreme weather condition such as, rain, wind, and

Table 9: Housing and flooring system for dairy cows in two districts.

	Alefa		Quara		Overall	
	N	**Percent**	**N**	**Percent**	**N**	**Percent**
Housing system for dairy cows						
Simple shed (adjacent to the main house)	164	97.6	10	4.8	174	46.3
separated housing	-	-	-	-	-	-
Barn	4	2.4	198	95.2	202	53.7
What is your Flooring Type						
Bare floor	89	53.0	198	95.2	287	76.3
cemented floor	4	2.4	0	0	4	1.1
slated stones	75	44.6	10	4.8	85	22.6

N= Number of respondents

heat stress. This indicates that, dairy management and extension service were not well adapted. On the contrary, about 198(95.2%) and 10(4.8%) of respondents in Quara district were used barn and simple shed housing system, respectively. It was in line with Seid and Berhan [23] reported that, 85% of small holders in lowland areas of Buraju district, Segen zuria zone were used barn for their herds.

Flooring types: About 53.0% of respondents in Alefa district were used bare land flooring system and the rest 44.6 and 2.4% of respondents were used slated stones and cement flooring system, hence it was not consistent with Wangdi et al., [36] noted that, farmers in Bhutan, Eastern Himalayas were u permanent dairy shed using cement and Corrugated galvanized iron sheet. Majority (97.6%) of respondents in Alefa district were confined all herds in the same house, which was similar with research conducted by Tilahun and Gebregiorgis [1], in Mekelle City, Tigray Ethiopia reported that, housing system were not separate for animals in different age groups and they used one house. Emebet and Zeleke [37] also noted that, lactating and dry cows in Dire Dawa administrative region were housed together, however breeding bulls were kept in separate place in the corners of the same barn (Table 9).

Health care management

Common livestock disease: About 23 (13.8%) of respondents in Alefa district were indicated that, their herds were free from any disease. Nevertheless, 51 (30.5%), 35 (21.0%), 34 (20.4%), 16 (9.6%), 7 (4.2%) and 1 (0.6%) of respondents were reported that Blackleg, Lumpy Skin Disease, Trips, Mastitis, Babesiosis and FMD were the most challenging disease, respectively. On the other hand, in Quara district, Trypanosomiasis, Lumpy Skin Disease, Babesiosis, and FMD were mostly occurred with its respective percentage of 122 (58.7%), 39 (18.8%), 18 (8.7%). Trypanomiasis were more common in Quara district than other diseases, because infestation of tsetse fly was widely spread in this area. The other study in Mieso district revealed that, mastitis and anthrax were the major disease, while in Metema district babesiosis and FMD were the most challenging diseases [14]. Thus, it is different with spread of disease in Alefa district, however it was similar with Quara district as Trypanosomiasis (58.7%), LSD (18.8%), Babesiosis (8.7%), and FMD (1.0%) were major disease, respectively. The consistency of spread of disease in Quara with Metema district might be the similarity of agro ecology and husbandry practice. In addition to this, the occurrence of disease in Quara district was consistent with finding of Seid and Berhan (2012) noted that, Trypanosomiasis, Blackleg, Foot and mouth disease, Fasholasis, and Lumpy skin disease was the major diseases of livestock in Buraju district, Segen zuria zone. In Alefa district black leg (30.5%) was ranked as the first disease problems and it was not consistent with finding of Minale and Yilkal [5], in Chencha district, that anthrax was the major disease problem and blockage was not a serious problem.

However, it is similar to Quara district as black leg was not a serious problem. The most killer disease in Sidama Zone was mastitis (38.5%), foot and mouth Disease (33.3%) and anthrax (28.1%) [11] therefore, it was disagreed with our research finding in Alefa district that, Blackleg (30.5%), Lumpy Skin Disease (21.0%), Trypanomiasis (20.4%), Mastitis (9.6%), Babesiosis (4.2%), and Foot and Mouth Disease (0.6%) where the most common disease.

Table 10: Common livestock disease, season of disease occurrence and bloating frequency.

Districts						
Descriptives	**Quara**		**Alefa**		**Overall**	
Common livestock diseases	**N**	**Percent**	**N**	**Percent**	**N**	**Percent**
Never sick	24	11.5	23	13.8	47	12.5
Blackleg	1	0.5	51	30.5	52	13.8
Babesiosis	18	8.7	7	4.2	25	6.6
Mastitis	2	1.0	16	9.6	18	4.8
Lumpy Skin Disease	39	18.8	35	21.0	74	19.7
Trypanosomiasis	122	58.7	34	20.4	156	41.5
Foot and Mouth Disease	2	1.0	2	1.2	4	1.1
Internal parasite						
Faciolosis	10	4.8	126	75	136	68.7
Ascariosis	15	7.2	20	12	35	17.7
Dyctocaulosis	5	2.4	22	13.0	27	13.6
External parasite						
Thick infestation	79	38.0	36	21.6	115	30.6
Mangemit	6	2.9	17	10.0	23	6.1
Both	123	59.1	115	68.4	238	63.3
Bloating						
Yes	43	20.7	110	65.5	153	40.7
NO	165	79.3	58	34.5	223	59.3

N = Number of Respondents

Table 11: Parasite Prevention Methods and Disease Treatment Center.

Descriptives	Quara		Alefa		Overall	
Season of Disease Occurrence	**N**	**Percent**	**N**	**Percent**	**N**	**Percent**
June-August	92	44.2	40	23.8	132	35.1
September-November	79	38.0	14	8.3	93	24.7
December-January	8	3.8	36	21.4	44	11.7
March-May	29	14.0	78	46.4	107	28.5
Parasite prevention						
Regular hand control	7	3.4	4	2.4	11	3.0
Spraying	193	92.8	132	78.6	325	86.4
Both	8	3.8	32	19.0	40	10.6
Treatment place						
Government clinic center	147	70.7	72	42.9	219	58.2
Government and Private clinic center	38	18.3	84	50.0	122	32.4
Government, private clinic center and traditional methods	23	11.0	12	7.1	35	9.3

N = Number of Respondents

As result is presented in table 10, about 126 (75%), 22 (13.0%) and 20 (12%) of respondents in Alefa district were ranked, Faciolosis, Dyctocaulosis and Ascariosis as first, second and third problems of internal parasitic diseases, respectively. The probable reason that Faciolosis was occurring more frequently than other parasitic disease is that, there is a swampy area which was more comfortable for snail population that is a known vector for Faciolosis expansion. On the other hand, in Quara district about 178 (85.5%) of respondents reported that the occurrence of internal parasitic disease was not a serious problem. The other challenging problem for livestock production was an external parasite infestation. About 36 (21.6%), 17 (10.0%) 115 (68.4%), and 79 (38.0%), 6 (2.9%) and 123 (59.1%), of respondent were reported for occurrence of thick, mange mite, both management and the thick infestation for Alefa and Quara districts, respectively. Consequently, the infestation of ecto-parasite in the study area was the most limiting factor for dairy animal production. The other study noted that, Ticks cause considerable losses in dairy production, in terms of diseases, by decreasing of productivity, fertility and frequently death [38]. Furthermore, Kaufman et al., [39] reported that, external parasites are reducing body weight gains, milk yield and it reduces immunity system for secondary invasion of pathogenic organisms.

According to 65.5% of respondents in Alefa district, bloating was the most important factors for livestock production, the rest 34.5% of respondents were indicated that bloating problem was not existed. On the other hand, majority (79.3%) of respondents in Quara district were reported that, there was no problem of bloating. However, miner (20.7%) of respondents was reported that, there was the problem of bloating. The cause of this minor problem of bloating was due to parasites and feeding of succulent leguminous fodders.

Season of disease Occurrence: About 78 (46.4%), 40 (23.8%), 36 (21.4%) and 14 (8.3%) of respondents in Alefa district were confirmed that the disease was spread from March-May, June-August, December-January and September-November, respectively (Table 11). As respondents were noted, occurrence of disease in March-May and June-August was higher than the other seasons.

Since in June-August flooding was high, as the result causative agent will transport easily and animals might be consumed with grazing grass. On the other hand, disease infestation was higher from March-May. The probable reason might be shortage of feed, water access and high heat stress will decrease immunity system of animals in the dry season. The current result was consistent with finding of Moenga [40] illustrated that, in pastoral area of Kenya spread of disease during the rainy season and dry season was advanced, because, microorganisms might be spread via flood from place to place, heat stress in dry season and shortage of feed will decrease resistance of disease. About 92 (44.2%), 79 (38.0%), 29 (14.0 %) and 8 (3.8%) of respondents in Quara District were ranked disease occurrence as September-November first, June-August second, March-May third and December-January fourth. In September-November Trypanosomasis is more frequently occurred, because tsetse fly is known vector for Trypanosomasis transmission was highly spread in this season, in addition to these seasons, tsetse fly was serious problem June-August, so disease occurrence in two districts was different as high disease occurrence was observed in dry season for Alefa, since availability of feed was decrease causes decreasing of immunity system.

Parasite prevention methods and disease treatment center: About 132 (78.5%), 32 (19.0%) and 4 (2.4%) of respondents in Alefa district were used, spraying, both methods and regular hand control methods, respectively. While in Quara district about 193 (92.8%), 8 (3.8%) and 7 (3.4%) of respondents were ranked as spraying, both methods and regular hand control method, respectively. This revealed that parasitic prevention in two districts were the same. Most dairy cows were damaged their teats by mismanagement of chemicals during spraying. Farmers were treated their animals whenever it became sick. About 147 (70.7%), 38 (18.3%) and 23 (11.0%) of respondents in Quara district were used at the Governmental veterinary clinic center, in both Government and Private clinic center, and from the Government, private clinic center and traditional methods, respectively.

On the other hand, about 72 (42.9%), 84 (50%) and 12 (7.1%) of respondents in Alefa district were treated at the Governmental veterinary clinic center, in both Government and Private clinic center, and from the Government, private clinic center with traditional methods respectively. The majority of respondents in Quara district

Table 12: Selling experience of milk and milk products.

Descriptors	Quara		Alefa		Overall	
Experience of selling milk	**N**	**Percent**	**N**	**Percent**	**N**	**Percent**
Yes	27	13.0	35	20.0	62	16.5
No	181	87.0	133	76.0	314	83.5
Reasons fail to selling milk						
Cultural taboo	146	80.7	44	33.1	190	60.5
It is not sufficient	22	12.2	82	61.7	104	33.1
No market access	13	7.1	7	5.2	20	6.4
what are your customers						
Local communities	22	81.5	32	91.4	54	87.1
Cooperatives	-	-	-	-	-	-
Hotels	5	18.5	3	8.6	8	12.9

N =Number of respondents

were used Governmental veterinary clinic center, but farmers in Alefa district were used in both Government and Private veterinary clinic center to treat their animals. The existence of this difference might be the availability of private clinic center, costs to incur for medication, and proximity of clinics to farmers place.

Marketing of milk and milk products: Majority (76.0%) of respondents in Alefa district had no experience of selling milk and milk products. However, some (20.0%) of respondents had experience of selling milk and milk products for local communities (91.4%) and hotels (8.6%) (Table 12). Cultural taboo (34%), absence of sufficient milk and milk products (62%) and absence of market access (4%) were factors which were hindered selling practice of milk and milk products in Alefa district. On the other hand, about (87.0%) of respondents in Quara district had no experience of selling milk and milk products.

The reason was, cultural taboo (80.7%), insufficient milk production (12.2%) and absence of market access (7.1%) were factors limiting marketing practice. Similarly, Abebe et al., [41] in Gurage Zone reported that, inefficient milk production, cultural restrictions (taboos) and lack of market access were the major constraints to sell milk and milk products. In the current result, some (13.0%) of respondents had experience of selling milk and milk products for local communities (81.5%) and hotels (18.5). The other study noted that, marketing practice in Mieso rural agro pastoral system was illegal [14].

Major livestock production constraints: The major livestock production constraint in Quara district were feed and disease with the same indices value of 0.32, Water 0.20, Marketing and extension service with similar indices value of (0.06) were observed. Similarly, feed followed by disease was the major constraint in Alefa district with index value of 0.5 and 0.2, respectively. The other constraints were water, marketing, infrastructure and extension service with indices value of 0.19, 0.08, 0.03, and 0.007 respectively (Table 13). The current result is in line with finding of Tsegay et al., [11] in Selected Districts of Sidama Zone reported that, the major constraints for dairy cattle production was shortage of feed, health problem, water and labor scarcity. Similarly, Minale and Yilkal [5] in Chencha and Kucha Districts reported that, shortage of feed for dairy cows was the main problem. On the other hand, shortage of feed, followed water and diseases were the major livestock production constraints in Lume districts of Oromia Regional State, while in Siraro district water shortage was the most important limiting factor for livestock productivity than feed shortage. Komwihangilo et al., [42] in agropastoral systems of Central Tanzania also reported that, the quantities and qualities of pasture is a big challenge for cattle production. Similarly, Brigitte et al., [43] reported that, animal diseases (78%) and lack of feed (60%), followed by lack of money (28%), animal theft (21%), and animal housing/space (13%) were the most challenging problems in Congo.

Summary and Conclusions

Dairy cows husbandry practice in both districts were traditional. Almost all (95.2%) of respondents in Quara district were used barn

Table 13: Major livestock production constraints in the study areas.

Constraints	Quara				Alefa				Overall
	1st	2nd	3rd	Index	1st	2nd	3rd	Index	
Feed	120	-	11	0.32	163	-	-	0.5	0.41
Water	20	66	87	0.20	-	75	44	0.19	0.20
Disease	33	107	68	0.32	5	61	75	0.2	0.26
Marketing	-	35	0	0.06	-	32	14	0.08	0.07
Infrastructure	35	-	-	0.06	-	-	28	0.03	0.05
Extension service	-	-	42	0.04	-	-	7	0.007	0.02
Total	**208**	**208**	**208**	**1.00**	**168**	**168**	**168**	**1.00**	**1.00**

Index = Σ of [3 for rank 1 + 2 for rank 2 + 1 for rank 3] given for particular qualitative variables divided by Σ of [3 for rank 1 + 2 for rank 2 + 1 for rank 3] for all qualitative variable considered, R1, R2 and R3= Rank1, Rank 2.

system and it was severing during rainy and extended dry season. However, nearly all (97.6%) of respondents in Alefa district were used simple shied house without concrete to confine all herds together. Almost all (95.7%) of farmers in Quara district were used continuous grazing system with minimum (4.3%) of rotational grazing system and most (86.5%) of farmers were harvest their hay at extended (lignin) stage. About 108 (64.3%) of respondents in Alefa district reported that, problem of water was serious in season of March-May, while about 93 (44.7%) and 109 (52.4%) of respondents in Quara district were noted that, shortage of water was challenging in season of December-May and March-May, respectively. Most farmers in Quara district (46.6%) were trekking their animals 1-2km to the water point, the rest 26.4, 13.0, 11.1 and 2.9% of respondents were trekking their animals less than 1km, 4-5km, 3-4km and greater than 5km, respectively

Blackleg (30.5%), Lumpy Skin Disease (21.0%), Trypanomiasis (20.4%), Mastitis (9.6%), and Babesiosis (4.2%) were the most challenging diseases in Alefa district, while 58.7, 18.8, and 8.7% of respondents in Quara district reported that, Trypanosomiasis, Lumpy Skin Disease and Babesiosis were most occurring diseases, respectively. The other problem for livestock production was an external parasite infestation. About 21.6, 10.0 and 68.4% of respondents in Alefa and 38.0, 2.9 and 59.1% of respondent in Quara district reported that, infestation of thick, mange mite, both management and thick was critical problems, respectively.

March-May (46.4%) and June-August (23.8%) were common seasons for disease spread in Alefa district, whereas September-November (44.2%) and June-August (38.0%) were the highest diseases spread seasons in Quara district. Cultural taboo (34.0%), insufficient milk production (62.0%) and absence of market access (4.0%) were factors limiting marketing practice of milk and milk products in Alefa district. Similarly, about 80.7, 12.2 and 7.1% of respondents in Quara district reported that, cultural restriction (taboo); insufficient milk production and absence of market access were challenging milk and milk products marketing practices. The major livestock production constraints in Quara district were feed and disease with the same indices value of (0.32) and water (0.20). Similarly, feed followed by disease were the major constraints in Alefa district with index value of 0.5 and 0.2, respectively.

Recommendations

- To alleviate feed scarcity for livestock due to land shortage particularly in Alefa district needs attention to formulate clear and workable policy to rehabilitate degraded land, planting of perennial forage tress and improved forage plants in road sides and around back yards. Moreover, to improve nutritional value of roughages urea treatment and silage making is paramount important.
- To solve shortage of water, particularly in dry season when rain water is not there, developing alternative water sources such as ground water and rain water harvesting shall be in place.
- To solve problem of disease infestation, periodic vaccination program and good husbandry practices shall be practiced. More specifically, to avoid thick infestation, farmers shall treat their dairy cows regularly either by using hand control or spraying methods.
- To enhance marketing practice of milk and milk products, establishing and strengthening of milk cooperatives (particularly in Quara district) and providing training for farmers to reverse the cultural taboo and encouraging farmers to sell milk on market can increase the amount of income from dairy production.

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