

# Socioeconomic Characteristics of the Community and Importance of Camel and other Livestock Species in Tahitay-Adiyabo District, Tigray Region in the Northern Periphery of Ethiopia

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## Abstract

The study was undertaken in the northern periphery of the country, Tigray region, north-west Tigray zone, Tahitay Adiyabo district from February to March, 2017. For this study, four Kebeles were selected purposively based on the presence of two major community groups (Tigrayans and Kunama) and presence of camel species and other livestock species. Seventy-two (72) households per district, of which 38 households from two kebeles for Kunama community and 34 households from two kebeles for Tigrayan community groups were selected randomly. A software package of SAS (2008) was employed to generate descriptive statistics for qualitative and quantitative data. As the study revealed, three-fifth and two-fifth of the respondents in the study area were illiterate and attended primary education respectively. The two community groups were significantly ( $P < 0.05$ ) different on educational status and Tigrayans respondents were more educated than the other counterpart. More than 2/3 children (7 - 17 years of age) of the respondents in the study area were attended school. Exceptionally, more than 75% of the children for Tigrayan community group in the district were attended school whereas 3/5<sup>th</sup> of Kunama community children were attended school education. Average family size per household in the study area was  $6.22 \pm 0.45$  and significant ( $P < 0.05$ ) difference was observed in the two community groups which was higher in Tigrayan community (7.23). Livestock husbandry practices (breeding objectives, herding, milking and marketing) were decided entirely by husband or both and the decision by wife alone was reported to be non-existent in the study area. From all respondents of Kunama community, more than a quarter of them produce household income majorly from their

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livestock and secondarily from crop. Livelihood diversification (off-farm activities) was almost non-existent in the study area. The study shows that majority of the respondents own ruminant animals and camel. Surprisingly, in the current study, all of the respondents own camel species but camel milk marketing was the main problem of Kunama community. From the Kunama community group, quarter of the respondents own camel and goat only. This study suggested that attention should be given for child education in Kunama community and absence of camel milk marketing may affect the utilization of the species and as a consequence, it would extinct. Hence, in order to conserve this species, camel milk market problem should be solved. Besides, in the study area, camel is the important species for all the communities and attention should be given to improve camel productivity.

### Keywords

Camel, Livestock Species, Socioeconomic Profile, Source of Household Income

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## 1. Introduction

In Ethiopia, the lowland areas are relatively poorly served in terms of infrastructure and public services such as roads and veterinary services, which may exacerbate livestock morbidity and mortality [1]. In addition, livestock diseases are more prevalent in the moisture-stressed areas of the lowland compared to highland and midland areas. It is generally believed that the traditional cattle economy in mixed farming system is directed mainly towards supplying draught oxen Astatke and Mohammed [2] despite a wide variety of animals that small-holder farmers keep to cater different needs. One of the basic means of livelihoods for pastorals and mixed farming systems in semi-arid areas is livestock keeping with different species.

Both men and women have vital roles in the continuation and adaptation of pastoral and mixed farming systems. Women play pivotal role as livestock herders, natural resource managers, income generators, and service providers, but all of these tasks by themselves are influenced by gendered norms, values, and relations [3].

The study area, north-western Tigray is known with vulnerability to drought, high food insecurity, livestock feed constraints and poor animal health services [4]. With this kind of semi-arid environment, farmers can benefit through diversification by cropping in different plots (spatial diversification) and combining farming (crop and livestock) with off-farm or non-farm activities [5]. Other study [1] suggested that shortage of family labor, high price of fodder and limited farm income are perceived as the most important risks that impact on farmers' livelihood in Tigray region.

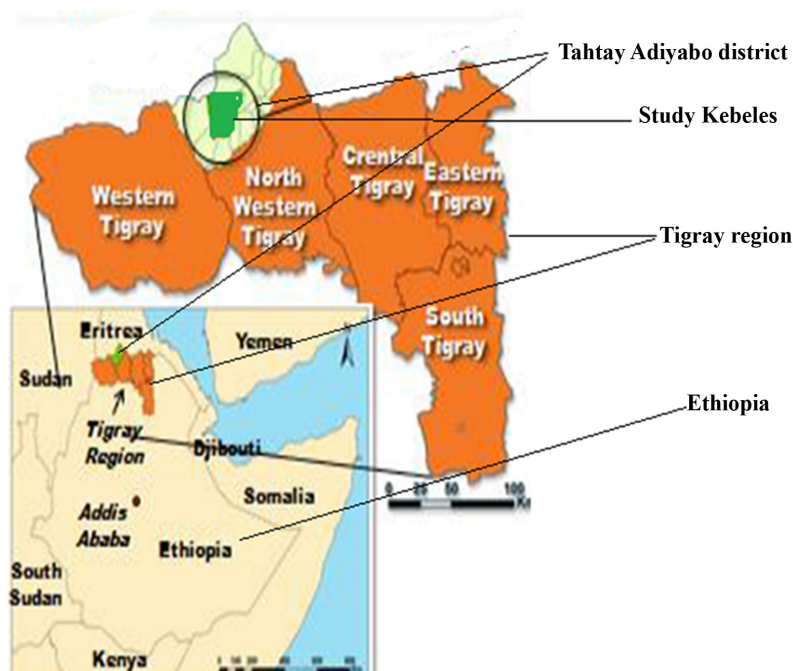
In this regard, a wide range of studies [6] [7] [8] about risk management, constraints to access and stocking, livestock marketing and socioeconomic characters were undertaken in various parts of pastoral communities in Ethiopia.

However, study about socioeconomic profile and livestock portfolio composition of mixed farming system in semi-arid area is scanty. Besides, due to harsh environmental characteristics of north-western Tigray Tahitay Adiyabo district which is bordered with Eritrea and unfriendly relationship with neighboring country (Eritrea), study on socioeconomic feature of the community and importance of livestock and camel are scarce. Therefore, this study was undertaken to assess socioeconomic characteristics and importance of camel and other livestock for household of the communities in Tahtay Adiyabo district at the periphery of north-western Tigray, Ethiopia.

## 2. Materials and Methods

### 2.1. Study Area

The study was undertaken in 2017 (February-March) in the northern periphery of the country, Tigray region, north-west Tigray zone, Tahitay Adiyabo district (**Figure 1**). Geographically, it is located between  $37^{\circ}21'13''\text{E}$  to  $38^{\circ}10'33''\text{E}$  longitude and  $14^{\circ}31'34''\text{N}$  to  $14^{\circ}51'42''\text{N}$  latitude. The boundary of the district is Laelay Adyabo to the east, Kafta Humera and Eritrea to the west and, Asgede Tsimbla to the south and Eritrea to the north. The administrative town of the district (Shiraro) is located about 1117 km north of Addis Ababa and 402 km north-west of Mekelle, the capital of the Regional State. The district has an altitude range from 900 to 1040 m above sea level. The mean temperature of the district ranges from  $28^{\circ}\text{C}$  to  $40.5^{\circ}\text{C}$  [9]. The climate is generally characterized as tropical semiarid area with an extended dry period of nine to ten months. The area has uni-modal rainfall pattern (late July-September) with a mean annual



**Figure 1.** Map of the study area.

precipitation of about 600 mm [10]. The district has a total surface area of 384,000 ha with a population of 98,934, among these, 1056 are Kunama [9]. The study area was once covered with natural forest, but because of various human activities like cultivation, grazing, and wood cutting now days the natural vegetation have been reduced to a few scattered clumps of *Acacia-Balanites-Zyzzus-Combretum* trees/bushes [11].

## 2.2. Methods of Data Collection

For this study the two major community groups (Tigrayans and Kunama) in the district were participated. The study district was purposively selected based on the presence of camel species (camel is found in few district in the northern part of Ethiopia) and different community groups. From a total of eight (8) kebeles (the lower administrative unit in the country) in the countryside of the district in which both communities live together, four (4) kebeles (two from each community) were purposively selected. The sample size for the questionnaire based survey was calculated using the statistical formula,  $n = N/1 + N[e]^2$  where,  $n$  = number of study subjects (household heads) enrolled in the study,  $N$ =total population of the study districts,  $e$  = acceptable error for questionnaire based survey (5%) [12]. Then seventy-two (72) households per district (38 and 34 households for Kunama and Tigrayan community groups respectively) were selected randomly. The distribution of households were 20, and 18 from Shembelina and Lemlem kebele respectively for Kunama community group and 15 and 19 from Awet and Kokob kebeles respectively for Tigrayan community group. These four kebeles are found on average 10 km distant from Shiraro town (administrative town of the district).

Data collections were conducted using semi-structured questionnaire by trained enumerators speaking the local languages. One group discussion per site/kebele was held with the group discussants that consist of elders, development agents and community leaders. Data on camel and livestock management practices in relation to men and women participation, household and children school attendance, decision by men and women on work share in different livestock activities, camel herd composition per household and importance of camel and other livestock species for the household were collected.

## 2.3. Data Analysis

Software packages of [13] were employed to generate descriptive statistics for qualitative and quantitative data. When variables were shown significant difference between groups, mean comparison was applied between independent variables using Tukey-Test.

## 3. Results and Discussion

Head of the households participated in this study is shown in **Table 1**. As the result indicated majority of respondents participated in this study were husbands. This implies that camels and ruminant animals were handled and managed by male household head in the community.

**Table 1.** Head of the household participated in the survey in the study area.

District	Variable	N	%
	Household head participated	72	
TA	Husband	50	69.44
	Wife	22	30.56
Ethnic groups in the district		N	%
	Variable		
Kunama	Household head participated	38	
	Husband	26	68.42
	Wife	12	31.58
Tigrai	Household head participated	34	
	Husband	24	70.59
	Wife	10	29.41

### 3.1. Education

Educational background of the respondents in the study area and the community groups are shown in **Table 2**. Three fifth (3/5) and two-fifth (2/5) of the respondents in the study area were illiterate and attend primary education respectively. The two community groups were significantly ( $P < 0.05$ ) different on educational status and Tigriyans respondents were more educated than the other counterpart. This study result shows that even though the study area is very far from the capital city of the country, the literate respondents of Tigriyans respondents were relatively higher in comparison to other community distantly found from the capital city of the country. The higher literate in the study area may be due to the effective activity of educational office in the region and zone.

Considering the communities, Tigriyan community group exhibited three-fifth (3/5) of the respondents as literate which was higher than the Kunama community. The possible reasons for the higher percentage of literate respondents in Tigriyan community may be due to their understanding about the importance of education. However, the relatively higher level of illiteracy in the Kunama community can pose serious problem in the delivery of modern technologies to improve livestock production as well as it impair record keeping through writing. Besides, the high illiteracy in Kunama community may affect their competency with the contemporary community group in modern animal husbandry practices. In this regard, study [14] in the Eriterea side reported that the illiteracy level of the Kunama respondents was 49 percentages with an age interval from 18 - 59. Another study [15] on Kunama community group reported 48.3% of illiterate respondents in the same Tahitay-Adiyabo district.

The result of the current study on average illiteracy (58%) was higher than the study [16] reported 42% of illiterate respondents in Shebele zone, Somali region in the eastern periphery of Ethiopia. However the current study result was consistent with the study [17] who reported 56.89% of illiteracy level in East Harargae

**Table 2.** Educational background of the respondents in the study area.

Region and Zone	District	Variable	N	%
		Educational status of head of the household	72	
	Tahtay Adiyabo	Illiterate	42	58.33
		Primary education	30	41.67
	Ethnic groups in the district			
		Variable	N	%
		Educational status of head of the household	38	
Tigray, North west	Kunama	Illiterate	28	73.68
		Primary education	10	26.32
		Variable	N	%
		Educational status of head of the household	34	
	Tigrai	Illiterate	14	41.18
		Primary education	20	58.82

zone. In community groups, the illiteracy level of Tigray group was similar with the study [16] and lower than [17] whereas the illiteracy level of Kunama community was higher than the above mentioned studies in different part of the country. This study result was supported by previous study [15] who described that Kunama community are minor and less privileged groups which may results to poor socioeconomic characteristics, poor health service delivery and lower literacy. Hence, attention should be given by relevant stakeholders to improve the literacy level of Kunama community.

More than 2/3 children of the respondents whose age between seven and fifteen in the study areas were attended school (this data is for those children whose age was within the age described school age in Ethiopia) (Table 3). Exceptionally, more than 75% of children for Tigray community group in the district were attended school/education whereas only 3/5<sup>th</sup> of Kunama community children were attended school/ education. The lower percentage of children those attended their education in this study area for Kunama community may be related with the presence of higher percentage of illiterate respondents (parents). Study [18] explained that improved parental education is related to improved child cognition and education. Other study [15] described that 58.3% of respondents in Kunama community group of Tahitay Adiyabo district have got on average less than 600 birr of monthly income and low income levels of households could limits the kinds and the amounts of food available for consumption and as a result their children became stunted and underweight which have child cognitive effect and consequently dropout.

Hence, the higher percentage of children not attending school in the current study may be related with the above mentioned factors. The result of this study for school attendance of Tigrayans children was higher than most areas of the country which are far from the capital of the country.

**Table 3.** Children school attendance in the study area.

District	Variable	N	%
	Children school attendance	72	
Tahtay Adiyabo	All attended	48	66.67
	Not attended	14	19.44
	Some attended	10	13.89
Ethnic groups in the district			
	Variable	N	%
Kunama	Children school attendance	38	
	All attended	22	57.90
	Not attended	9	23.68
	Some attended	7	18.42
Tigrai	Children school attendance	34	
	All attended	26	76.47
	Not attended	4	11.76
	Some attended	4	11.76

### 3.2. Age and Family Size

As indicated in **Table 4**, majority of the participant in the study area was found at the age of active work force with average household size higher than the national average of 4.2 [19]. This shows the presence of more number of children per household which may be useful to get work force for various livestock husbandry practices, but the higher family size per household would influence the living standard of the community. In relation to this finding study [1] explained that respondents with larger household size perceived labor risks to be less important compared to those with smaller families and this is due to the fact that larger household size typically have more labor that can be engaged in livestock activities such as herding, feeding and cleaning shelters.

From the two communities, Kunama community was lower in average family size per household and significantly ( $P < 0.05$ ) different from Tigrai community in the same district. The result of this study on the family size of Kunama community was consistent with the study [20] reported that average family size of five (5) on the same Tahitay Adiyabo district. Regardless of the number of children per household, as explained in focal group discussions, almost 4/5<sup>th</sup> of the respondents replied that the current number of children were enough. The loss of interest to increase their children may be related with absence/shortage of resources (land, livestock) to handle more children in the family. In addition, reduction in crop and livestock productivity due to recurrent drought and climate change in the study area could be other factors for the respondents to loss interest. This study result suggested the importance of undertaking family planning by the relevant stakeholders to lower the current family size per household

**Table 4.** Summary results of average age of the respondents and family size per household in the study area.

District	N	Variables	Mean $\pm$ SE	Minimum	Maximum	CV
Tahitay Adiyabo	72	Age	45.80 $\pm$ 1.97	25.00	78.00	25.85
		Family size	6.22 $\pm$ 0.45	1.00	10.00	43.99
Community groups in the district						
Community groups in the district	N	Variables	Mean $\pm$ SE	Minimum	Maximum	CV
Kunama	38	Family size	5.31 <sup>a</sup> $\pm$ 0.59	1.00	9.00	48.99
Tigrai	34	Family size	7.23 <sup>b</sup> $\pm$ 0.62	3.00	10.00	35.75
Kunama	38	Age	44.84 $\pm$ 2.75	30.00	78.00	26.73
Tigrai	34	Age	46.88 $\pm$ 2.89	25.00	60.00	25.48

\*Means with different superscript are significantly different. P value at 95%.

at least to the national level in the study area. The current study result was contrary with the study [8] reported that in Somali and Afar regional state more than 90% and 75% of the households, respectively have an interest to have more children in the future. The result of average family size in the current study area was lower than the studies [8] [21] who reported the average family size of 7 and 9.8 per household in pastoral area of Afar and Somali region and Guji zone, Odo Shakiso and Adola districts respectively. The larger family size in most pastoral areas of the country could be related with the practice of polygamy. The family size of Kunama community group in the current study was lower than the study [16] [22] reported average family size of 6 and 6.9 per household in Bale zone (Mada Walabu, Rayitu and Sawena districts) and Shebele zone respectively.

### 3.3. Gender Participation in Decision Making in Livestock Management

Decision about marketed live animal, livestock by-products and camel, breeding objective and scale of operation varies between community groups in the same district (Table 5). Accordingly, most of the live animal sale, livestock husbandry practices (scale of operation, sales and purchase, intensity of production, market targeted livestock-by product and breeding objective) were decided entirely by husband or both and the decision by wife alone was reported to be non-existent in the study area. In this regard, from the two community groups, the decision of men on the above mentioned husbandry practices were profoundly higher in Kunama community whereas majority of the decision in Tigriyan community was undertaken by discussion of both wife and husband. This result may show the participation of women in decision making of livestock husbandry practices in Tigriyan community. This study result was in different from the studies [23] [24] explained that absence of participation of women in decision making in camel husbandry in the study areas of Afar communities was due to the participation of male household owner or husband in the discussion and decision making on issues of concern in the community.



**Table 5.** Decision in the family on various livestock husbandry practices in the study area.

District	Variable	N	%
Thatay Adiyabo	Decision	72	
	Women	2	2.78
	Men	36	50.00
	Both	34	47.22
Community groups in the district			
Kunama	Variable	N	%
	Decision	38	
	Women	2	5.27
	Men	22	57.89
	Both	14	36.84
Tigrai	Decision	34	
	Men	14	41.18
	<b>Both</b>	<b>20</b>	<b>58.82</b>

Even though the participation of female alone in the decision making of livestock activities were not existed in this study area, the decision together with her husband may be related with sedenterization of the communities which brought livestock as individual properties. In the contrary in pastoral areas the impact of elders on the community to rule and define the implementation on communal resources, especially in livestock are immense, which hinder the participation of female. In this regard, the study [25] indicated that roles of females in pastoral communities were spelt out by males and forbid females owning property or livestock in that matter. Other study [8] also explained that absence of participation of women in decision making in the scale of operation in camel husbandry in Afar communities was due to the participation of male household owner or husband in the discussion and decision making on issues of concern in the community.

### 3.4. Gender Participation on Work Sharing in Livestock Management Practices

Majority of the work share in the respondents household of the study area on livestock husbandry practices was undertaken by husband and in a quarter of respondents wife also participated (Table 6). In this study area, children in Tigriyan community were not involved in any work share of livestock management practices and all activities were shared by husband and wife. This may be related with the involvement of children in education and the attention given by

**Table 6.** Work share in the family on various livestock husbandry practices in TA district.

District	Variable	N	%
<b>Work Share in the household for livestock husbandry practices</b>		72	
Thatay Adiyabo	Women	2	2.78
	Men	47	65.28
	Both husband and wife	18	25.00
	Male < 15 years of age	5	6.94
Community groups in the district			
	Variable		%
Kunama	<b>Work Share in the household for livestock husbandry practices</b>	38	
	Women	3	7.90
	Men	29	76.32
	Both husband and wife	2	5.26
	Male < 15 years of age	4	10.52
Tigrai	<b>Work Share in the household for livestock husbandry practices</b>	34	
	Men	14	50.00
	Both husband and wife	14	50.00

the parents for their children. Whereas, in Kunama community group more than 3/4<sup>th</sup> of husband were undertaken every activities of livestock management practices. The result of this study on Kunama community group was consistent with the study of [26] in Berhale district of Afar region who reported that women were only involved in calf rearing activity, and apart from this women have no role in milking, herding and marketing of live camels. In contrast, the study of [27] in Jordan pastoral communities described about female in that the gender division of labor in agriculture places a heavy burden on females.

### 3.5. Source of Income for the Respondents

As the study shows the source of household income for majority of the respondents were from crop production followed by livestock (Table 7). This indicates that even though, there was migration of some family from the household with their selected livestock species in search of feed and water during dry season, all the respondents were sedentary and construct permanent houses. This study indicates that one-seventh of the respondents were brought their immediate household income majorly from livestock followed by crop and trade but majority brought from crop production. From all respondents of Kunama community group more than a quarter of them produces household income majorly from their livestock including camels and secondarily from crop. This also shows livestock were more useful for the Kunama community group for immediate household income. The major household source of income from livestock species for the Kunama community group was milk from cattle and goat and male

**Table 7.** Source of income for the respondents in the study area.

District	Variable	N	%
<b>Source of income for the households</b>		72	
TA	Crop as first and livestock secondary source of income	62	86.11
	Livestock as first and crop secondary source of income	8	11.11
	Livestock as first and Trade secondary source of income	2	2.78
Community groups in the district			
	Variable		%
Kunama	<b>Source of income for the households</b>	38	
	Crop as first and livestock secondary source of income	28	73.68
	Livestock as first and crop secondary source of income	8	21.05
	Livestock as first and Trade secondary source of income	2	5.27
Tigrai	<b>Source of income for the households</b>	34	
	Crop	34	100

camel as live animal. Few of the respondents (4-6) produced immediate household income from non-farm activity (trade) as a third option. However, for the three-fourth of the respondents in Kunama community group, crop was the major source of income. The contribution of livestock as an immediate source of income for these respondents was 40% on average per household.

The Tigriyans community group produces their household income totally from crop. The major crop used by the households for their immediate household income was sesame. The income from livestock was produced to buy cloth annually for the family, buy agricultural inputs (fertilizer and others) and fulfill the requirement used for different religious and cultural ceremonies.

Even though the study area was characterized as semi-arid environment, there was few respondents produced non-farm income for their households, which was not a common practice with this kind of unsuitable environment for agriculture. In support of this, studies [28] [29] described that to reduce the impact of a range of risks, farmers use various risk management strategies such as diversification of their livelihood activities. Study [30] on respondents in Meiso districts, Oromia region pointed out that although rearing of livestock remains the backbone of the livelihood, pastoral and agro-pastoral societies were looking for diverse opportunities to increase and stabilize their means of livelihood.

In general, livelihood diversification in rural area is an important strategy to survive and accumulate asset. However, there are several constraints that determine the pastoral and agro-pastoral society to engage in successful livelihood diversification. The major constraints to livelihood diversification in various areas includes poor asset base, lack of financial facilities, lack of awareness, lack of rural infrastructure, and lack of opportunities in different activities [30]. Other study [1] suggested that increase in walking time to the main road could discourages farmers' participation in diversification activities since it results in

higher communication, transport and other transaction costs.

Hence, absence of non-farm income in the current study area may be related with high percentage of illiterate, lack of awareness, lack of rural infrastructure and lack of opportunities in different activities. Earlier study [31] states that educated people have better opportunity than non-educated family members to exploit the existing resources in the area. Better educated individuals have more chance to engage in various employment opportunities in other areas.

### 3.6. Livestock Species Composition of the Respondents

The study shows that majority of the respondents own ruminant animals and camel (Table 8). The Kunama camels were large in size (with average height at wither of 1.95 m and 2.04 m for female and male respectively) and majority of them were white in color. The livestock species composition in the current study was similar with the studies [16] [22] who reported that the major livestock species in Shebele zone, Somali region and Bale zone (Rayitu, Sawena and Mada-Walabu) of pastoral and agro-pastoral communities respectively were cattle, goat, sheep, camel and donkey. Surprisingly in the current study all of the respondents own camel species. This may indicate the importance and multipurpose use of camel in the study area. In the study area camel is used for milk, transportation (equipment and salt transportation), oil extraction and others.

**Table 8.** Livestock species composition of the respondents in the study area.

District	Variable	N	%
	Livestock species composition per household	72	
TA	Camel and cattle	12	16.67
	Camel, cattle, sheep and goat	40	55.56
	Camel, cattle, sheep, goat and others	10	13.89
	Camel only	6	8.33
	Camel and goat	4	5.56
	Community groups in the district		
	Variable	N	%
Kunama	Livestock species composition per household	38	
	Camel and cattle	6	15.79
	Camel, cattle, sheep and goat	16	42.11
	Camel, cattle, sheep, goat and others	6	15.79
	Camel only	6	15.79
	Camel and goat	4	10.53
Tigrai	Livestock species composition per household	34	
	Camel and cattle	6	17.65
	Camel, cattle, sheep and goat	24	70.59
	Camel, cattle, sheep, goat and others	4	11.76

Besides, the other reasons to own camel by all of the respondents may be due to adaptive character of camel for the harsh environment of the study area. From the Kunama community group quarter of the respondents own camel and goat only.

### 3.7. Camel Herd Composition

The study revealed that female camel with calves and matured male with matured female camels constitute the major camel herd composition in the study area (Table 9). The main reason for the presence of this camel composition was related with the purpose of keeping male for transportation of salt from Afar area, other equipments, ploughing and oil extraction and adult female camels kept in higher number in the herd for milk production. Hence, male camels were kept in the herd to give transport and oil milling activities for the communities whereas matured female or together with calve were kept to fetch milk (specially in Kunama community) and to get male calve for future transport activities. From the two community groups, Kunama kept matured female camel to fetch milk whereas the Tigriyans kept matured female to get male calve (future male camel) for transportation, breeding and oil milling.

Oil milling with male camel was the common practices in the study area which are not practiced in the Somali and Afar pastoral communities. This study result was similar with the study [32] stated that the Kunamas keep camels for

**Table 9.** Camel herd composition of the respondents.

District	Variable	N	%
TA	Camel herd composition	72	
	Matured pregnant female camel	12	16.67
	Male and female camel	18	25.00
	All group of camel	20	27.78
	Female camel with calve	22	30.56
Ethnic groups in the district			
	Variable	N	%
Kunama	Camel herd composition	38	
	Matured pregnant female camels	10	26.32
	Breeding male and female camels	4	10.53
	All group of camels	10	26.31
	Female camel with calve	14	36.84
Tigriyans	Camel herd composition	34	
	Matured female camel	2	5.88
	Breeding male and female camel	14	41.18
	All group of camel	10	29.41
	Female camel with calve	8	23.53

ride and use as work animals in mills and for ploughing. Based on the group discussion with Kunama community group, on average a Barka camel (camel owned by Kunama community group) produced 6 litters at the beginning and mid lactation and 3 - 4 liters at the end of lactation. But their main problem was milk marketing in the district. As the key informants explained, due to the culture and religion of majority of the community in the district (Tigriyans), drinking camel milk was forbidden by the Tigriyans community group and this create market problem for camel milk. With regard to market problem, study [1] indicated that households in lowland areas perceived market risk as higher compared to those in highland areas due to absence of better infrastructure in terms of roads and transport facilities that make market constraints as a major problem compared to highland locations.

#### **4. Conclusion**

Higher illiteracy was the major feature of the respondents and their children in Kunama community which hinder adoption of technology in livestock husbandry practices. The average family size per-household was higher in both communities in comparison to the national average and this may be useful to get labor in livestock husbandry practices, but the large family size may have a negative consequence on the living standard of the respondents. All decisions on livestock management practices were done by husband or both (husband and wife) and this may be due to the dominancy and livestock ownership of the husband. For quarter of the respondents in Kunama community, livestock was the major source of household income. Diversifications of household income like off-farm activities were almost nonexistent in the study area which could support the household income in this semi-arid environment. All of the respondents in the study area own camel species but camel milk marketing was their major problem. Hence, this study suggested that illiteracy of the respondents should be improved and attention should be given for family size per household and child education in Kunama community. Besides, livestock species could not be conserved without utilization. Transportation and oil extraction using camel could be substituted by modern technology and this may be a treat for the survival of the species in the community. Therefore, camel milk marketing problem should be solved either by transporting to larger cities in the country and improvement of camel productivity by selection and conservation of Kunama camel should be undertaken.

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## Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

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