

Traditional Husbandry Practices and Major Challenge of Young Stock (Camel Calf) in Fafen Zone, Ethiopian Somali Regional State, Ethiopia

Awoke K* and Seid Mohamed Ali

Department of animal and range sciences, College of Dry land Agriculture, Jigjiga University, Ethiopia

Abstract

The study was conducted between July 2013 and January 2014. The objective of this study was to examine the existing challenges and opportunities of traditional camel calf management practices. The importance of camels as a source of livelihood for pastoralists in eastern Ethiopia cannot be overemphasized. A study was carried out in the districts of Jigjiga, Babile, and Gurusum in Fafen zone of Ethiopian Somali regional state, eastern Ethiopia to collect baseline data on camel calf colostrums feeding and management by the Jigjiga, Gurusum and Babile districts that inhabit the area and rearing of camel production. The primary and secondary data were collected to assess the impact of improved camel calf management and information whose dissemination was underway on the productivity of camel calves. During this study, between 30 and 60 households were purposively selected from three locations drawn from the three districts. A total of 130 respondents purposively selected from 60 households in Jigjiga district, 40 from Babile district and 40 household in Gurusum per location were interviewed using a semi-structured questionnaire. The questions targeted different aspects of camel calf management and colostrums feeding. Analysis of the data revealed malpractices in the areas of breeding management, colostrums feeding, milk allowance, feeding, and watering and health management, among others, across the studied districts. The feeding of with full suckling of colostrums across studied district Jigjiga (31.7%), Babile (27%) and Gurusum (46.4%). In the other hand, the percentage of case of death camel calves was disease (32.7%) and drought (27.8%) was the second across the studied area. The calves were herd with all-in one 71.7%, 69.1% and 56.1% for Jigjiga, Babile and Gurusum, respectively. The average culling of bull from herd of camels during the survey year was 16 ± 4 years across the studied districts. In the study areas, the results further indicated that the pastoralists were aware of the challenges facing their camel calves but did not have the knowledge to adequately deal with the constraints and colostrums feeding. This study concluded that the existing indigenous camel calf and information on camel calf management have great potential to improve camel calf performance if widely disseminated among the studied districts. Awareness creation among pastoralists and agro pastoral on the dangers of the current malpractices, vigorous dissemination of the technologies/information and follow-up to ensure utilization and/or application are strongly recommended.

Keywords: Data analysis; Calf performance; Camel technologies; Dissemination

Introduction

The one-humped camel (*Camelus dromedarius*) plays an important role as a primary source of subsistence production system in the lowlands of Ethiopia. It lives in arid and semi-arid areas which are not suitable for crop production and where other livestock species hardly thrive. Pastoralists in the eastern lowlands of Ethiopia rely mainly on camels for their livelihood. Ethiopia possesses over 1 million dromedary camels [1] and the majority of these camels are found in eastern part of the country. In spite of the large number of camels in Ethiopia, the productivity of camels is generally low and the camel has been given little research and development attention. Until recently, there is no development project in the country that neither features the camel nor is any attention given to this domestic species in connection with other livestock development programs.

The primary reasons for keeping dromedary camels and management of camels vary from country to country and from one place to the other. For instance, camels are kept mainly for riding in countries in the Arabian Peninsula [2], for transportation in Eritrea [3] and for milk production in Somalia [4]. Camel rearing in Somali region, Jigjiga zones of eastern Ethiopia represents a highly rational adaptation of human life to a severe and adverse environment. It is the only efficient way of exploiting the arid areas where cultivation and small stock rearing are impossible. The pastoralists clearly understand that the camel is, and for the coming decades will remain, their basic means of survival. The position of the camel in providing food for the

pastoralists in eastern Ethiopia will become even more important in the face of global warming and climate change [5].

The starting setting up of a camel herd is the calf. Calves form the replacement stock without which the herd cannot grow and neither would milk be available for the camel keepers. However, rearing of camel calves under traditional pastoral production systems is faced with several challenges that result in high death rates of the calves. Mortality rates of up to 60% have been reported in calves between birth and weaning [6-10]. This has to a large extent slowed down the growth of pastoral camel herds. In comparison with pastoral production systems, low camel calf mortality rates of 0 to 24.4% were reported in Kenyan commercial ranches [11]. Understanding the major role of camels and the traditional management practices used by camel owning societies would help to design appropriate intervention techniques that are applicable to local situations. To date, little information if any has been reported about the major contributions of pastorally managed

*Corresponding author: Awoke K, M.Sc. in animal production, College of Dry land Agriculture, Department of animal and range sciences, Jigjiga University, Ethiopia, Tel: +251910514564; E-mail: awoke2020@gmail.com

Received August 03, 2015; Accepted August 31, 2015; Published September 05, 2015

Citation: Awoke K, Ali SM (2015) Traditional Husbandry Practices and Major Challenge of Young Stock (Camel Calf) in Fafen Zone, Ethiopian Somali Regional State, Ethiopia. J Environ Anal Toxicol 5: 321. doi:10.4172/2161-0525.1000321

Copyright: © 2015 Awoke K, et al. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

dromedary camel's calf in Eastern Ethiopia and there is limited information on the traditional management practices used by camel owning pastoralists in this region. This study was, therefore, designed to assess the opportunity and challenges of dromedary camel calf production and indigenous colostrums feeding practices in targeted districts in fafen zones of Ethiopian Somali regional state, Eastern Ethiopia.

Objectives of the project

To identify available information on challenges and opportunities of traditional camel calf management practices in Jigjiga Zone, Somali Regional State, Ethiopia

Specific objectives of the study

- To assess constraints of pastoral indigenous calf production and management practices of camel calf managements in the area.
- To assess indigenous colostrums feeding practice in the study area.
- To generate base line data on traditional camel calf opportunity and to give information for extension programmers and workers.

Materials and Methods

Study design

The study design was cross-sectional descriptive concerning assessment of challenges and opportunities of traditional camel calf management practices in Jigjiga Zone, Somali Regional State, Ethiopia.

Description of the Study Area

The study will be conducted in Jigjiga town, eastern Ethiopia and the capital of the Somali region (Figure 1). It is located 650 Km from Addis Ababa and approximately 80 km (50 mi) east of Harar and 60 km (37 mi) west of the border with Somalia, this town has a latitude and longitude of 9°21'N 42°48'E with an elevation of 1,609 meters above sea level. Based on figures from the Central Statistical Agency in 2005, Jijiga has an estimated total population of 98,076 of whom 50,355 are men and 47,721 are women. The dominant ethnic group living in the town was Somali (99.0%), the next 3 largest groups were the Amhara (0.25%), the Oromo (0.44%), and the Gurage (0.30%); all other ethnic groups made up 0.08% of the population. Various forms of Christianity (Orthodox, Protestant and Catholic), Islam and other beliefs are commonly practiced in the town. Zone is administratively divided in to 6 districts and has its administrative capital in Jigjiga town. Jigjiga zone has a population of 1,034,823 people (80% rural).

Techniques of sampling procedure

The study was part of a larger benchmarking survey for Assessment on Challenges and Opportunities of Traditional Camel Calf Management Practices in Jigjiga Zone, Somali Regional State, Ethiopia it took the form of household surveys where between 40 and 60 randomly selected respondents each representing a household was interviewed per study location using a semi-structured questionnaire. The sampling was done in two stages where the first stage was random and meant to identify the households. The sampling frame was the total number of households in each of the study sites. The second stage of sampling to identify the household member to be interviewed was purposive, targeting members who were knowledgeable about camels. A total of 130 respondents were interviewed including 40 from the Babile, 30 from Gursum, and 60 from Jigjiga districts. The data collected related to the current camel calf management practices

among the different districts.

Methods of data collection

The primary Data were collected through interviewing of pastoral districts and to address the objectives of the study formal (diagnostic) survey by using semi-structured questionnaire used to collect data on Camel calf production and management system, challenges and opportunities for camel farming in the area, status of individuals and cooperatives involved in camel dairy farming, interest of the community and cooperatives toward keeping camel dairy, and camel calf replacement to herd in the area. In addition, secondary information from office of agriculture and other organizations relevant for this study were collected. Before the start of the real survey the questionnaire was pre-tested on two-three non-sampled households from each study district. In the formal survey stage of the study, all require data were collected for a specific period from individual house hold.

Methods of data analysis

All the responses were coded to facilitate data entry and management in such a way that the qualitative as well as quantitative variables were select and also coded for analysis. The data collect by using semi-structured questionnaire were entree in to Epi data and import to MS-excel and imported to SPSS (version 16) software. Descriptive statistics were used to describe quantitative factors. Standard errors of mean \pm (SE) were used to describe means while percentage is used for describing qualitative characteristics. The data were analyzed one way analysis of variance (one-ANOVA). The results were expressed in percentage and mean \pm SD of the results from the questionnaire. The analysis (means, standard errors, frequency summaries and tabulation of results) was done.

Results and Discussion

Major constraints to livestock production

In most part of the study area 80.0% of the respondents were stated that the importance of shortage of feed as a limiting factor for camel production followed by water shortage (61.7%) as shown below Table 1. However, the factors to be considered as a production constraint in the study area were include shortage of feed, shortage of water, shortage of grazing land, animal health problem and predator.

Breeding management

About 84% of respondents (n=130) selected breeding bulls from within the herd or immediate neighbors. Over 56.7% of the respondents in all the districts kept one breeding bull with the rest (43.3%) keeping more than one bull not for the purpose of controlling breeding but to ensure that there was a bull in the herd throughout in case one fell sick. Breeding bulls were culled from breeding at an average age of 16 ± 4

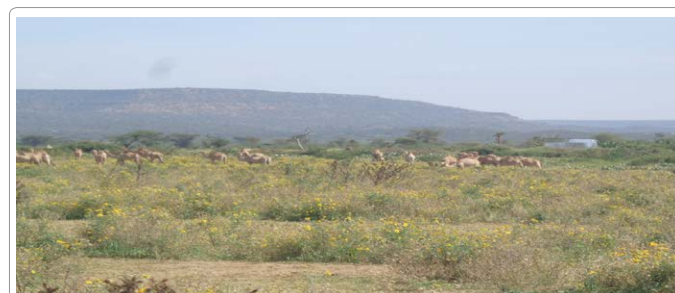


Figure 1: Herding practice of camel with calves in the study area.

Constraints	Frequency	Percent	Ranks
Shortage of feed	43	80.0	1
Shortage of water	35	61.7	2
Shortage of grazing land	26	45.0	3
Animal health problem	15	20.0	4
Predators	11	16.7	5

Table 1: Constraints of camel calf production. Source: survey result.

years in all the districts. The culling was done by way of selling the male, assigning it baggage duties and complete separation from the female herd or castration. The culling method used varied from districts to the other with the Jigjiga and babile doing the castration while Grusum sold out the males or converted them into baggage animals. Breeding females on the other hand were either not retired from breeding (30%, n=130 or were retired late (18 ± 3 years). 64 percent (Jigjiga district, n=60) and 80% (Babile, n=40) denied bull from mating its mother while 80% of the overall respondents (n=130) did not restrain the bull from serving its sisters and daughters. This practice pre-disposed the herd to the risks of inbreeding and weak or malformed calves at birth due to use of aged parents and the fact that the bull was mating with related females. This is in agreement with previous observations by Kuria. Simpkin (1996) and Kaufmann (1998) [8,10] had earlier recognized birth weight as an important factor in determining survival and growth rate of newborn camel calves.

Calf management

Young animals are managed in a traditional way. Nursing calves are kept separate from their dams, except when calves are used to stimulate milk letdown. Traditionally, calves are allowed to suckle two-quarters on the left side, while the other two-quarters are hand milked by women. This practice is believed to stimulate milk letdown. If the calf dies, the hide is stuffed with cereal straw or grass with four legs made of sticks. Salt is added to the hide of the stuffed calf and the dam is allowed to lick it in order to simulate the presence of the calf and stimulate milk letdown. Young children and females in general do most of the tending of small ruminants and calves near encampments. Management by female members of the family includes gathering cut-and-carry forages and hauling water for relatively immobile calves, which are kept in or near the family hut. Herders are well aware of colostrums feeding for the new born animals and understand the beneficial effect on health of the young.

The overall average weaning age of cattle and camel calves is 10.08 ± 0.23 and 12.0 ± 4.6 months, respectively (Table 2). However, weaning age is often determined by the season of birth of calves, the health status of the dam and the need for milk by the family. Complete weaning is practiced when the dam ceases to lactate or becomes pregnant. This result agrees with the report of Coppock who reported weaning age of 7-12 months for Boran calves. If the dam is weak or gets ill, the farmers practice forced weaning at an earlier age. Traditionally, the herders use different types of weaning methods. Weaning is performed by piercing the nose of the calf with thorns, twisting up the nose skin of the calves to prevent suckling (as this causes pain when the wounded nose touches the teat) and smearing of teats with animal dung.

According to this the survey result indicates that the camel Calves are provided with soil salt licks before they start feeding on forages. This is practiced because it is generally believed that direct exposure of calves to forage immediately after cessation of milk feeding causes diarrhea. On average around the first months (34 ± 5.02 for camel calves) of life, the calf diet consists of milk and a combination of cut-and-carry forage

and calves are allowed to graze around the encampment. The amount of milk that a calf receives varies with season and the human demand for the milk.

Colostrum's feeding

Data on colostrum's feeding of camel calves by the various districts are presented in Table 3. As shown in Table 3, a large percentage of agro pastoralists allowed full suckling of colostrums in 31.7% of Jigjiga, 46.4% in Gurusum but 38.3% restricted colostrums suckling by the calf in Babile. This practice by gurusum and Jigjiga use for calves the benefit of passive immunity usually associated with colostrums than Babile. Colostrums' enhances survival and also cleans the stomach by facilitating passing of the first faces (meconium). These findings are in agreement with an earlier report by Njanja (2007) [9] who indicated that 77% of Rendille pastoralists (n=13) ensured that newborn camel calves suckled immediately after birth while a small proportion of the herders (10%) milked down some little milk before allowing the camel calves to suckle. In the current study and that of Njanja (2007) [9], pastoralists who allowed unlimited amount of colostrums to the calf coincided that colostrums strengthened the calves and promoted growth of camel calf.

Milk allowance to the calf

Milk allowance to the calf is very critical, especially in the first three months of growth before the calf starts grazing. Wilson et al. (1981) [6] and Schwartz et al. (1982) [12] considered malnutrition resulting from competition of human beings and camel calves for milk a major cause of mortality. In the current study, between 10% and 21% of the respondents across the study sites recognized competition for milk between calves and humans as one of the causes of retarded growth before weaning. One way of controlling this competition is by allowing the calf to follow the mother during the day over this critical period of growth for it to get enough milk. The number of teats allowed to the calf in the first two months and after six months by different districts involved in the study is shown in Tables 4 and 5, respectively.

Data in Tables 4 and 5 show that most of the agro pastoralists in the three districts allowed the calves to suckle two teats for the better part of the period before weaning. The Jigjiga and Gurusum districts allowed calves the highest amount of milk during the two periods of growth. However, 25.5% (n=40) of the Babile agro pastoralists allowed the calf to suckle only one teat during the period below two months, suggesting competition for milk between humans and the calves. As earlier explained, this has a negative implication on calf growth and overall performance.

Calf grazing

Ages of introduction to grazing, watering and mineral supplementation are important factors in influencing calf growth. Early introduction of the calf to grazing facilitates development of the rumen which is important for feed digestion. This has a positive effect on the calf growth. The age at which different districts introduced

Districts	Weaning age (month)		
	Camel calves		
	No.	Mean \pm SE	P value
Jigjiga (n=60)	60	10.08 ± 0.23	0.00
Babile (n=40)	40	11.9 ± 0.65	
Gurusum (n=30)	30	12.0 ± 4.60	

Table 2: Weaning age of camel calves in Jigjiga, Babile and Grusum district. Source: Survey result. SE: Standard error of mean; No.: Sample respondents.

Districts	Allowed full suckling (%)	Restricted suckling (%)	Milked some for consumption (%)	Stripped teats before calf suckled (%)
Jigjiga (n=60)	31.7	38.3	11.7	18.3
Babile (n=40)	27.0	38.3	22.9	11.8
Gurum (n=30)	46.4	25.0	16.1	12.5

Table 3: Colostrum's feeding to camel calves in Jigjiga, Babile and Grusum district. Source: Survey result.

Community	Number of teats			
	One (%)	Two (%)	Three (%)	Four (%)
Jigjiga (n=60)	0.0	51.7	28.3	20.0
Babile (n=40)	7.3	32.8	47.3	12.7
Gurum (n=30)	3.6	23.2	46.4	26.8

Table 4: Number of teats allowed to the calf for suckling after two months of age in Jigjiga, Babile and Grusum district. Source: Survey result.

Districts	Number of teats after 6 months of age			
	One (%)	Two (%)	Three (%)	Four (%)
Jigjiga (n=60)	15	28.3	23.3	33.3
Babile (n=40)	25.5	40.0	32.7	1.8
Gurum (n=30)	12.5	54.9	11.1	21.5

Table 5: Number of teats allowed to the calf for suckling after 6 months of age in Jigjiga, Babile and Grusum district. Source: Survey result.

calves to grazing, mineral supplementation and watering is presented in Table 6 and Figure 2.

The Jigjiga and Babile camel calves started grazing earlier (less than 1.4 months) than those of the Gurum districts. In an earlier study by Njanja (2007) [9], pre-weaned Somali camel calves began grazing at the age of 3-4 months which this study supports. Jigjiga and Babile agro pastoralists also delayed commencement of watering of their camel calves which is in agreement with Njanja (2007) [9] who reported first watering at the age of 6-8 months. The Gurum districts started giving mineral supplements to their calves after 9 months of age. Delayed watering and mineral supplementation has a negative implication on the growth of the calf particularly during the dry season. Dehydration reduces feed intake while feed availability in terms of quantity and quality tend to decline during dry periods necessitating supplementation with minerals and other feed material. One way of ensuring that the calves start grazing early is by herding them together with the rest of the camels. Table 7 clearly shows that the Jigjiga, Babile and Gurum districts were not separating the calves from rest of the herd and this explains the early commencement of grazing among their calves. Separation of the calves from the main herd among the Jigjiga, Babile and Gurum (Table 7) explains why their calves started grazing late.

Distance to grazing and water resources

It is important that camel calves are not walked far for water or grazing to minimize stress which impact negatively on calf growth. Table 8 gives the distance traveled by calves to water and graze during different seasons of the year.

Data from this study show that while the Gurum and Babile camel calves walked far for water and grazing in the wet season, those of the Jigjiga district agro pastoral covered shorter distances to both resources (Table 8). This can be explained by the fact that the Jigjiga district agro pastorals separated calves from the rest of the herd retaining them near 'home' unlike the Gurum and Babile whose calves followed the main herd to water and grazing sources far from 'home'. However, across all the districts, camel calves had to walk far for water and grazing in dry season, thus suffering considerable degree of stress.

Health management

Health management is critical in controlling mortality and

enhancing growth in camel calves. In the current study, between 60% and 76% of the respondents across districts ranked diseases and parasites high as far as retarded growth in camel calves was concerned. Ecto-parasites especially ticks and, diarrhea were ranked high on the list of constraints to calf health in all the districts in agreement with earlier reports by Field and Rutagwenda. These authors, however, reported some other diseases such as gastrointestinal haemorrhagic conditions, camel pox; worms, mange, bloat, pneumonia and wounds as common clinical diseases and conditions in camel calves alongside ticks and diarrhea. Studies by Kaufmann (1998) and Njanja (2007) [8,9] also singled out diseases as a major cause of mortality among pre-weaned camel calves. Important diseases mentioned by these authors were largely similar to those mentioned earlier by Field and Rutagwenda including orf, mange, ringworms, wounds and pneumonia.

Mortality: As indicated in Table 9, the overall percentage of pre-weaning mortality for camels was 61.5 ± 11.40 . The differences in mortality rates between the post weaning and pre weaning was largely an indication of management techniques used by the herders and the ability to resist/tolerate diseases and stressful conditions increase after pre weaning. However, the percentage post-weaning mortality was lower than the pre-weaning mortality. The respective percentages of post-weaning mortality were 33.5 ± 0.96 camel's calves.

The lower post-weaning mortality could be due to improved management provided to young animals kept in and around the homestead for up to one year of age. During this period, calves rely exclusively on wet leaves or grasses that are provided mostly by the female members of the household. The current result is also in agreement with the reports of Gebre-egziabiher who indicated that with an increase in age, mortality decreased probably because of improved adaptation of animals to both climatic and nutritional factors. The overall mortality for the cattle herd was 43.7 ± 5.20 . Wagenaar reported that in Fulani cattle herds, pre-weaning calf mortality up to one year age was 43%, and decreased to 7.5% during the post weaning period. These high losses have invariably been attributed to poor young management practices and/or poor veterinary services.

As indicated in Table 9, mortality due to diseases was the major (32.6%) cause of loss in all the districts of animals followed by drought (28.7%), abortion (17.2%) and poisoning (16.4%). The least cause of

Districts	Grazing	Watering	Mineral supplementation	P value
Jigjiga (n=60)	1.8 ± 0.8	3.42 ± 0.072	2.08 ± 0.093	
Babile (n=40)	2.4 ± 1.0	5.4 ± 2.4	2.8 ± 1.0	0.05
Gurusm (n=30)	2.7 ± 1.6	3.5 ± 1.4	9.2 ± 1.5	

Table 6: Age (months) of introducing camel calves to grazing, watering and mineral supplementation in Jigjiga, Babile and Grusum District.



Figure 2: The sources of (a) water and (b) grazing of calf camel. Source: During survey taken from field.

Districts	Herding regimes of camel calves	
	Together with other camels (%)	Calves graze separately (%)
Jigjiga (n=60)	71.7	28.3
Babile (n=40)	69.1	27.3
Gurusm (n=30)	56.1	43.9

Table 7: Herding regimes of camel calves in Jigjiga, Babile and Grusum district.

animal death was predators (5.9%). The major camel killer diseases reported by herders in the study area were anthrax, camel pox, FMD, diarrhea, blackleg, pasteurillosis, respiratory tract infections and internal and external parasites.

Similarly, as a report from the Maasai pastoralist indicated, the major cause of death for young (76%) and adult (54%) camel was diseases followed by predator (11%) and physical injury (4%).

Control methods: In all the districts, common camel calf diseases were mainly controlled using indigenous technical knowledge including herbal concoctions and branding, necessitated by poor animal health delivery system. Other control methods included traditional mobility, quarantines, cleaning of night enclosures and avoidance of parasite infested areas. However, pastoralists near town

centers did use conventional veterinary drugs.

The Data from this study suggest that Jigjiga and Babile took treatment of diseases more seriously than the Gurusum district (Table 10).

Control of ecto-parasites: Six five percent Jigjiga (n=60) and 72.6% Babile (n=40) and 74.9 Gurusum (n=30), respectively, did routine control of ecto-parasites mostly did spot control. The statistics on camel calf disease treatment and parasite control presented in Table 11 suggests that Jigjiga, Babile were keener than the Gurusum districts in the management of camel calf health. All the agro pastoral and pastoralists paid particular attention to diarrhea, describing it as a serious killer of the very young camel calves. Worth noting also is the fact that agro pastoral and pastoralists from all the districts attempted to control diarrhea using different traditional and conventional methods, confirming the seriousness of the problem in camel calves. The traditional methods used to treat diarrhea included; giving the calf black tea and depriving it of milk, depriving the calf of colostrums for the very young ones, oral administration of sheep and goat fat, salted water. While the use of sheep and goat fat was practiced by all the districts (Jigjiga-13.7%, Babile-9.7%, Gurusum-5.9%), black tea and salted water respectively were commonly used by Jigjiga (7.3%) and Babile (6.6%, respectively).

Conclusion and Recommendations

Conclusion

The resulted of the survey, conclude that, this factor affect camels' management and husbandry practice such as shortage of feed, scarce of water seasonal variation, disease and low Management and husbandry practices such as colostrums feeding and allowances in fafen zone. Most of camel harder applied traditional Management and husbandry practice and there is no special breeding techniques applied by herders in fafen zone. Therefore,

- This study revealed malpractices in camel calf management among the studied districts including poor breeding management, restricted colostrums feeding, poor care for the calves in terms of milk allowance, grazing, watering and health management.
- While many agro pastoralists appeared to be aware of the challenges their camel calves were facing, they seemed not to have adequate knowledge to deal with the challenges.
- The existing technologies and information on camel calf management has great potential to improve camel calf performance if widely disseminated among the studied districts.

Recommendations

- From this survey result, the following recommendation is given. Therefore, there is call for to create awareness among agro pastoralists and pastoral on the dangers associated with the current calf management practices.
- Thorough training of agro pastoralists and pastoral on the existing camel calf management technologies is required as these technologies have potential to improve the current situation of colostrums feeding and salt supplementation.
- A follow up to ensure application of the technologies and knowledge by the agro pastoralists and pastoral is also required.
- Another survey should be conducted at the end of dissemination period and the data compared with the one from the current study to determine the impact camel calves production in the study area.

Districts	Watering in wet season	Grazing in wet season	Watering in dry season	Grazing in dry season	P value
Jigjiga (n=60)	1.42 ± 0.72	1.56 ± 0.56	2.08 ± 0.093	3.1 ± 0.64	
Babile (n=40)	2.4 ± 0.37	2.22 ± 0.12	3.0 ± 0.77	3.85 ± 0.12	0.001
Gursum (n=30)	2.8 ± 0.47	1.9 ± 0.63	4.07 ± 0.35	3.80 ± 0.07	

Table 8: Distance (km) covered by camel calves to grazing and water in different seasons among different districts.

Animal species	Average mortality				Overall mean
	Pre-weaning		Post-weaning		
	No.	Mean ± SE	No.	Mean ± SE	
Camel calf	70	61.5 ± 11.40	50	33.5 ± 0.96	35.63

Table 9: Pre-weaning and post-weaning mortality (%) of camel calf based on owner's response in studied area. Source: Survey result; SE: Standard error of mean; No: Sample households who encountered loss in camel due to diseases.

	Number and percentage of animals lost							
	Jigjiga		Babile		Gursum		Total	
	No.	%	No.	%	No.	%	No	%
Disease	22	36.7	15	27.3	26	46.4	63	32.57
Drought	15	25.0	14	25.5	10	17.9	39	27.8
Abortion	9	15	9	16.4	8	14.3	26	17.23
Poisonous herbs	13	21.7	7	12.7	7	12.5	27	16.43
Accidents/predators	1	1.7	4	7.3	5	8.9	10	5.97

Table 10: Major causes of death of camels in Jigjiga, Babile and Gursum district.

Practices	Jigjiga zone		
	Jigjiga(%) (n=60)	Babile(%) (n=40)	Gursum(%) (n=30)
Treatment (conventional/herbal/branding)	35.0	27.7	25.1
Ecto/endo- parasite control (washing and de-worming)	65.0	72.6	74.9

Table 11: Methods of controlling/treating camel calf diseases by different districts.

Acknowledgements

First of all, Thanks' to the Almighty God for giving us health, strength and support for the successful completion of our study. The authors would like to Acknowledgement Jigjiga University Research and Community Service Directorate for the research fund and Jigjiga, Babile and Gursum agricultural office livestock department workers for providing us importance comment and involvement for data collection during survey work.

References

1. FAO (2004) FAO STAT data, statistical databases on the internet. Address: <http://earthtrends.Wri.org/text/agriculture-food/variable334.html>. June 2012.
2. Wilson RT (1989) Reproductive Performance of the One-humped Camel: The Empirical Base. ILCA working document, Addis Ababa.
3. Schwartz HJ, Dioli M (1992) The one- humped camel in eastern Africa. Verlag Josef margrave
4. Ndikumana J, Stuth J, Kamidi R, Ossiya S, Marambi R, et al. (2000) Coping mechanisms and their efficacy in disaster prone pastoral systems of the greater horn of Africa. Effects of the 1995-1997 droughts and 1997-1998 El nino rains and the responses of pastoralists and livestock. International Livestock Research Institute, Project Report, Nairobi, Kenya. pp. 124.
5. Bremaud O (1969) Notes on camel production in northern districts of the Republic of Kenya. Report for Ministry of Agriculture Nairobi Kenya. Pastoral Development Network, Paper 27d, ODI, London.
6. Wilson AJ, Doran R, Olaho WM (1981) Important camel diseases in selected areas of Kenya. Integrated Project for Arid Lands Technical Report E 6 UNESCO Nairobi Kenya.
7. Simpkin SP (1985) The effects of diseases as constraints to camel production in northern Kenya. Integrated Project for Arid Lands (IPAL) Technical Report E 7 pp 77-160 UNESCO Nairobi Kenya.
8. Kaufmann B (1998) Analysis of pastoral camel husbandry in northern Kenya. Margraf Verlag Weikershereim, Germany. pp. 1-194.
9. Njanja JC (2007) Major factors associated with high morbidity, mortality and poor performance of camel calves, kids and lambs in the Rendille and Samburu pastoral herds in Marsabit District Kenya. PhD Thesis University of Nairobi Kenya. pp. 1-223.
10. Field CR (1979) Camel growth and milk production in Marsabit District of northern Kenya. Provisional Report, International Foundation for Science. pp. 215-240.
11. Simpkin SP (1996) The effect of breed and management on milk yields of camels in Kenya. PhD Thesis. University of Newcastle Upon-Tyne.
12. Schwartz HJ, Wilson AJ, Doran R, Evans JO, Fairhall J (1982) Productivities of camels (*Camelus dromedarius*) in selected areas of Kenya. 63: 964.