

# Study on Major Constraints of Camel Production, Management and Their Impacts in and Around Yabello District, Oromia Regional State, Southern Ethiopia



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## Abstract

A cross sectional surveys were conducted on 120 camel keeping households as well as 30 experts who were selected using purposive sampling technique; from November 2014 to April 2015 in selected camel herds of the Yabello district. A pre-tested semi-structured questionnaire and interview were employed for collecting data. The major camel health constraints identified from households responses were parasites (50.00%), fungal (31.67%) and bacteria (18.33%) while expert responded as parasites (33.33%) bacteria (26.67%) and fungal (20%). The disease impact (68.33%) mainly related to general loss of productivity (decrease body condition, decrease meat or milk yield and growth retardation). There was 100% feed and water shortage in study area and their impact was reports as death of calf (43.33%), reduced milk production (28.33%) and reduced body weight (20%). Regarding market constraints the major findings identified from households responses were presence of camel diseases (30.83%), lack or insufficient overall improvement support (27.50%) and lack of market information (24.17%) while expert responded presence of camel diseases (33.33%), poor overall knowledge of producer (23.33%) and lack or insufficient market infrastructure (20%). With respect to reproductive constraints the household respondents showed late maturity (29.17%), long calving interval (24.17%) and birth of stunted calf (20.83%) while expert responded as late maturity (33.33%), low conception rate (26.67%) and long calving interval (23.33%) and their implications were poor productivity (52.50%) and death of camels (45.83%). Therefore, concerned bodies need to focus on parasitic control; relieve feed and water shortage, improve market facilities in study area.

**Keywords:** Camel; Constraints; Impacts; Production; Yabello

## Introduction

World Camel population is estimated to be around 25.89 million spread across 47 countries [1]. From African countries, Somalia has the highest population of 7.00 million followed by Sudan 4.25 million and Ethiopia 2.4 million camels [2]. Camels are extremely important livestock species in the arid and semiarid zones in Asia and Africa [3]. Camels play an important socio-economic role within the pastoral and agricultural system in dry and semi dry zones of Asia and Africa [4]. Camels contribute significantly to the livelihood of the pastoralists and agro-pastoralists living in the fragile environments [1]. Many pastoral groups and communities in diverse eco-zones throughout the world are depending on camels for their livelihood. Camel population is numerous in the arid areas of Africa, particularly in the arid lowlands of Eastern Africa namely, Somalia, Sudan, Ethiopia, Kenya and Djibouti, and the number

increased during the past two decades [5]. The increasing human population pressure and declining per capital production of food in Africa precipitated an urgent need to develop previously marginal resources, such as the semi-arid and arid rangelands, and to optimize their utilization through appropriate livestock production systems among which camel production is certainly the most suitable [6]. Despite the camel's considerable contribution to food security in semi dry and dry zones, and its being a major component of the agro-pastoral systems in vast pastoral areas in Africa and Asia, little is known about its production potential and production systems compared to other domestic animals [1].

In Ethiopia, camels represent a subset of major livestock resources with a population estimated at more than 2.4 million [7]. The Ethiopian most dromedaries are found in south eastern

and north eastern arid as well as semiarid regions, such as Somali, Afar, and Borena [3]. The major ethnic groups owning camels in Ethiopia are the Afar, Somali, and Oromo [8]. Even though camels are found in different agro-ecological zone in Ethiopia, few studies were undertaken with regard to distribution and characteristic features of different camel populations [6]. Camel-based livestock system will generate employment and help to improve income of the local rural population [9]. Together with the socio-economic importance of camel, lies on serving as a cheap source of power for drawing water from wells, ploughing, leveling of land, working mini mills for oil extraction, grinding grains, crushing sugarcane and pulling carts to transport goods as well as people. Camels are also engaged in the transport of salt, fuel wood, agricultural products and household goods. Moreover, a baggage camel comfortably carries loads up to 300Kg to distant places at a speed rate of 30Km/day. These facts tend to suggest that the camel can be of immense help to improve the livelihoods of those involved in its raising, provided they supplement their traditional management systems with modern husbandry practices and health care of their animals. Camels also provide milk and meat, not only in very arid regions but also in several urban areas in many countries [10].

With regard to underutilization of Borana livestock potentials suffer from a number of constraints, which include high prevalence of diseases and inadequate health care facilities, feed shortage, overstocking and rangeland degradation [11]. Scarcity of pasture and water is a prominent feature of this area rangeland

due to degradation, recurrent droughts and population pressure [12]. Pastoralism is always associated with risk, because the life of pastoralists is based on unreliable climatic conditions, border and marginal lands, and conflicts [13].

Researchers and funding agencies have been very reluctant to act on camel research for improvement of their production [1]. These indicate the presence of not specific supporting gaps that cannot boost camel production using modern husbandry and health care activities due to widely spread diseases, poor overall management and lower attention to camel research where these constraints and their impacts are not identified based on their order of importance to the specific study area. Also little is known about camels as compared to other domestic animals.

Therefore the objectives of the study was:

- a. To assess and identify major constraints of camel management and production according their order of importance.

## Materials and Methods

### Study area

The study was conducted from November 2014 to April 2015 in selected camel herds of the Yabello district in Borena zone, southern Ethiopia. Yabello is town and seat of administrative bodies of Borena zone (Figure 1). It is geographically found at 50 23'49 N 390 31'52 E, and located at distance of 575km Southern of Addis Ababa.

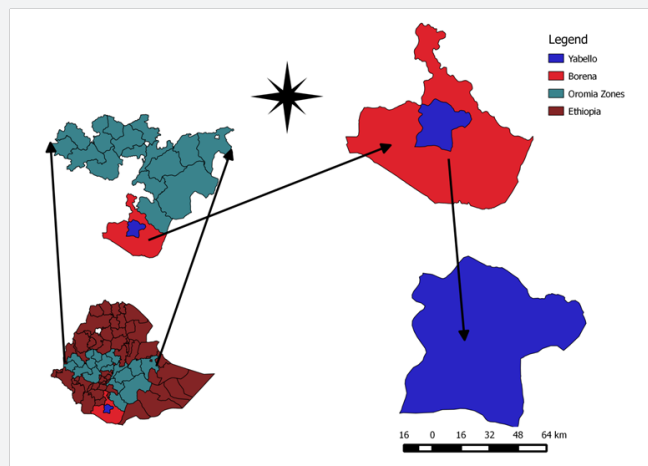


Figure 1: Map of Study Area.

### Source: (GIS)

The settlement of households in the pastoral villages of Borena and elsewhere is characterized by the clustering of households with close proximity in a village. Villages are traditionally managed by chiefs' "Abba Olla" who are important contact person for any cooperation of village members. The zone holds 1,496,652 cattle, 452,177 goats, 193,021 sheep, 106,366 camels, 355,700 chickens, 13,945 mules, 61,699 donkeys [14]. The farming system comprises of mainly pastoral area and

seldom Agro-pastoral areas. The region has predominantly a semi-arid climate. The annual temperature varies between 21 °C and 38 °C and the rainfall ranges from 350mm to 900mm, with considerable spatial and temporal variability in quantities and distribution [15]. The study region is characterized by bimodal rainfall with 60% occurring in the long rainy season (Gena) extending from mid-March to May and erratic short rain season (Haggaya) from mid-September through mid-November. The other seasons are the cool dry season (Adolessa) extending from

June to August and the major dry season (Bonna) from December to February [16]. Physiographically, the area is dominated by savannah vegetation with mixtures of perennial herbaceous and woody mainly of acacia species and thorny shrubs. Animal husbandry in the area is characterized by extensive livestock productions system and seasonal mobility [15].

### Study population

The study population contains households having dromedary camels and kept under extensive and traditional production management system located in villages of Darito, Surupa, Didahara, Harobake, Arbora and Elwaye villages, where large population were found. These animals depend on seasonal movement in search for browsing and water sources.

### Study design and sample size

A cross sectional surveys was conducted on purposely selected 120 households, who owned camels and who are familiar with camel husbandry. These sample size was determined using central limit theorem. These households were picked from the purposely selected 6 villages out of 23 villages found in the zone. The criteria used to select the villages were accessibility and willingness of the camel owners to be part of the study. Additionally 30 purposely selected experts on field of livestock were included. In all these the study tool used was filling semi

### Major constraints of camel production and its management

**Table 1:** Household responses on major camel diseases and their impacts.

Diseases	Number of Respondents (%)	Impacts of Diseases	Number of Respondents (%)
Parasites	60(50.00%)	Decrease body condition	15(12.50%)
Fungal	38(31.67%)	Decrease meat or milk yield	20(16.67%)
Bacteria	22(18.33%)	Growth retardation	3(2.50%)
Viruses	1(0.83%)	More than one effect	82(68.33%)

**Constraints on camel health and its impacts:** Occurrence of diseases was one of the major concerns to camel health in the study area. Parasitic 50.00% disease was reported as the major problem by respondents followed by fungal (31.67%) and bacterial (18.33%). Viral disease was reported only by 0.83% of the respondents. The impact of disease on qualitative production

structured questionnaires supported with interview. To increase reliability of the prepared questionnaire pre-testing on 15 households and 5 experts were done which were not considered in the final questionnaire appliance.

### Data analysis

All data collected were entered, cleaned and managed using Microsoft Excel computer, 2007. The data were analyzed using descriptive statistics of SPSS version 15.

### Results

#### Household characteristics and responses

Most of the respondents in the study areas were illiterate (79.6%) and the remaining (20.4%) got only primary and high school education. The average age of respondents ranges 50-70 years old. Respondents in the study area were predominantly males 100 (83.33%) than females 20 (16.67%). Majority of respondents (90.80%) kept camel overnight in the barn which was made up of wood. Most of the owners 110 (91.67%) use harness for their camels while others 10 (8.33%) did not use harnesses during loading. All camels were fed only in range lands and migration was common during dry season. The 75.00% source of water for their camel was form ponds and 80.83% of the respondents supply water once per week.

parameters were also responded by respondents. Main impact reported was decrease meat or milk yield was responded by 16.67% of respondents followed by decreased body condition (12.50%) and growth (2.50%). Majority of respondents (68.33%) reported more than one impact on qualitative production parameters due to disease (Table 1).

**Table 2:** Percentage of causes of feed and water shortage and their impacts.

Problems of Feed Purchasing	Number of Respondents (%)	Impacts of Feed Shortage on Camels	Number of Respondents (%)
Unavailable	50(40.67%)	Death of calf	52(43.33%)
High cost	47(39.17%)	Reduced milk production	34(28.33%)
Lack of capital	23(19.16%)	Reduced body weight	24(20.00%)
		Long reproduction cycle	6(5.00%)
		Abortion	4(3.33%)

**Shortage of feed and water and its impacts:** Shortage of feed and water especially during dry period was responded by all respondents (100.00%) in the study area. Difficulty to purchase the feed was also reported by the respondents. Unavailability of feed especially during dry season was reported by majority of

respondents (40.67%) followed by high cost of feed (39.17%) and lack of capital to purchase expensive feed (19.16%). Impact of feed shortage on camels was also provided by the respondents. Death of calf was reported to be the major impact by 43.33% respondents followed by reduced milk production (28.33%),

reduced the body weight (20.00%), long reproduction cycle (5.00%) and abortion (3.33%) (Table 2).

**Market Constraints**

Respondent of the study area mentioned numerous constraints on the camels and its products market which were shown in Table 3. Presence of the camel disease was the major constraints responded by 30.83% of the respondents followed by the lack or insufficient overall support (27.50%), lack of market information (24.17%), lack or Insufficient market infrastructure (12.50%) and poor overall knowledge of producer (5.00%) (Table 3).

**Table 3:** Household response on marketing constraints.

Measurements	Number of Respondents (%)
Presence of camel disease	37(30.83%)

Lack or insufficient overall support	33(27.50%)
Lack of market information	29(24.17%)
Lack or insufficient market infrastructure	15(12.50%)

**Reproductive Constraints**

Reproductive problems were also reported by the respondents in the study area. Five major reproductive constraints were enlisted in Table 4. Late maturity responded by 29.17% respondents as primary reproduction problem followed by long calving interval (24.17%), birth of stunted calf (20.83%), low conception rate (18.33%) and presence of reproductive disease (7.50%). Poor productivity was reported to be the major impact by 63(52.50%) respondents followed by death of camels 55(45.83%) and deformity 2(1.67%) (Table 4).

**Table 4:** Household response on major reproductive constraints and their impacts.

Reproductive Problems	Number of Respondents (%)	Impacts of Reproductive Problems	Number of Respondents (%)
Late maturity	35(29.17%)	Poor productivity	63(52.50%)
Long calving interval	29(24.17%)	Death of camel	55(45.83%)
Birth of stunted calf	25(20.83%)	Deformity	2(1.67%)
Low conception rate	22(18.33%)		
Presence of reproductive diseases	9(7.50%)		

**Expert responses**

Characteristics of Experts and their Responses: Professionals and experts respondents in the study area were predominantly males 24 (80.00%) than females 6 (20.00%). Based on type of profession community animal health worker were 11 (36.67%) and animal health assistant 9 (30.00%), DVM 5(16.67%), laboratory technician 3 (10.00%) and animal health technician 2(6.67%) Major Constraints Identification.

**Table 5:** Expert response on major camel diseases and their impacts.

Diseases	Number of Respondents (%)	Age	Number of Respondents (%)
Parasitic	10(33.33%)	Adult	4(13.33%)
Bacterial	8(26.67%)	Young	26(86.67%)
Fungal	6(20.00%)		
Viral	3(10.00%)		
Nutritional deficiency	2(6.67%)		
Reproductive disorder	1(3.33%)		

**Constraints on camel health and its impacts**

Response from professionals and experts were also recorded separately. Parasitic disease was responded as the major problem by professionals (33.33%) followed by bacterial (26.67%), fungal (20.00%), viral (10.00%), nutritional deficiencies (6.67%) and reproductive disorders (3.33%). Young camels were more affected (86.67%) than adult (13.33%) due to disease reported by the professionals and experts (Table 5).

**Constraints on markets of camels and its products**

Professionals and experts respondent of the study area mentioned numerous constraints on camels and its products market shown in Table 6. Among the market constraints the majority responded presence of camel disease (33.33%) as

major constraints followed by poor overall knowledge of the producer (23.33%), lack or insufficient market infrastructure (20.00%), lack of market information (16.67%) and lack or insufficient overall support (6.67%).

**Table 6:** Expert response on marketing constraints.

Measurements	Number of Respondents (%)
Presence of camel disease	10(33.33%)
Poor overall knowledge of producer	7(23.33%)
Lack or insufficient market infrastructure	6(20.00%)
Lack of market information	5(16.67%)
Lack or insufficient overall support	2(6.67%)

### Reproductive Constraints

Reproductive problems were also reported by the professionals and experts in the study area. Five major reproductive constraints were enlisted in Table 7. Late maturity responded as primary reproduction problem by 33.33% respondents followed by low conception rate (26.67%), long calving interval (23.33%), birth of stunted calf (10.00%) and presence of reproductive disease (6.67%).

**Table 7:** Expert response on major reproductive problems.

Reproductive Problems	Percentage
Late maturity	10(33.33%)
Low conception rate	8(26.67%)
Long calving interval	7(23.33%)
Birth of stunted calf	3(10.00%)
Presence of reproductive disorder	2(6.67%)

### Discussion

The result of the present study disclosed the existence of major camels health problems in Yabello district with an overall diagnosed based on questioner survey. Most of the diseases of camel existed in the study area were parasites (50%), fungal (31.67%) and followed by bacteria (18.33%) as respondent responses. Although the study areas were different this findings were similar with other workers [17,18] who have reported these diseases as the major problem of the camels in the Pakistan and also which agree with the result of [19]. The major impact of these diseases on camels were decrease body condition (12.50%), decrease meat/milk yield (16.67%) and growth retardation (2.50%) and as general (decrease body condition, decrease meat/milk yield and growth retardation) 68.33% which was higher than the others. This was in agreement with the study of [3,20] in Afar region.

The other major constraints that hinder camel production in the study areas were feed and water shortage as respondent responses. This result agree with the result of the study by [21] and [22] in Rashaidi camel who has described the Sudanese camel having a similar morphological feature and being able to survive under a precarious feed and water supply condition in Gezera state of the Sudan where feed and water supply is considered as most serious constraints. The major impacts caused by shortage of

feed and water as respondent responses (100%) on camels were being highest death of calf (43.33%), reduced milk production (28.33%), reduced body weight (20.0%), long reproduction cycle (5%) and abortion (3.33%). This can be explained as the provided feed and water is mainly useful for the maintenance requirement of camels. The respondents informed also the reasons for shortage of feed were lack of supply (40.67%) and higher price (39.17%) which again these are the major causes and followed by lack of capital (19.16%).

Regarding market constraints of camel and its products the highest response rates were for camel diseases 37 (30.83%) and insufficient government attention 33 (27.50%) followed by lack of market information 29 (24.17%), lack/insufficient of market infrastructure 15 (12.50%) and lastly poor overall knowledge of producers 6 (5.00%). These constraints look to have impact on income generation from production of camels of the study area. Majority of these results were similar with [23] findings which ranges from 21 to 100%.

The reproduction constraints identified were late maturity 35(29.17%), long calving interval 29(24.17%) which were the highest succeeded by birth of stunted calf 25(20.83%), low conception rate 22(18.33%) and the lowest presence of reproductive diseases 9(7.50%).

These results were analogous with a previous reported by [3,24-27]. The major impacts of reproductive constraints indicated in the survey were reduced productivity 63(52.50%), death of camels 55(45.83%) where both contributed the higher share and deformity 2(1.67%). In comparison the deaths were higher than result reported by [28,29] shown as about 10.7% of calves died before reaching weaning age despite being specific. Generally the findings of this study indicate the economic loss produced by reproductive problems.

Together with households questionnaire survey the opinion of experts were also assessed. Accordingly the major diseases affecting camels were the highest parasitic diseases 10(33.3%) and bacterial causing 8(26.6%) succeeded by viral 3(10.00%) and others which were lower nutritional deficiency 2(6.67%) and reproductive disorder 1(3.33%). Even though these results were lower than household responses for parasitic diseases (50%), for fungal diseases (31.6%) except higher for bacterial diseases (26.67%) the overall ranking of results had similarity. The percentage difference on bacterial and fungal diseases could be due to more diagnostic capacity was higher on educated experts than producers. The influence of diseases based on age differences was also higher on young camel 26(86.67%) and lower on adults 4 (13.33 %) which indicated the impact on stock replacement [30].

In relation to market constraint identification the experts responded the presence of diseases as 10(33.3%), poor overall knowledge of producers 7(23.33%), lack or insufficient market

infrastructure 6(20.00%), lack of market information 5(16.67%) and insufficient government support 2(6.67%). Having the differences on level of percentage the highest constraint by both types of respondents for camel diseases was similar. Whereas the insufficient government support 33(27.5%), lack of market information 29(24.17%) were higher than the experts. The reason for such differences can be because of having clear understanding was higher on households than experts with regard to the problems. Conversely the insufficient market infrastructure 15(12.5%) and overall knowledge of the producer 6(5%) were higher on experts for differences of their knowledge from households [31,32].

Experts had also prioritized the reproductive constraints on camel production. Thus based on their response rate with the highest problem was late maturity 10(33.3%), followed by low conception rate 8(26.67%), long calving interval 7(23.33%), birth of stunted calf 3(10.00%) and presence of reproductive disorder 2(6.67%). Considering knowledge differences of households and experts of this survey the problems of late maturity which was 35(29.17%), long calving interval 29(24.17%) and presence of reproductive diseases 9(7.50%) had more or less looks like percentages. There was also higher results on experts compared to low conception rate 22(18.33%) of households due to differences in knowledge and perception respectively. The differences shown on calf stunted birth which was higher 25(20.83%) on households and lower on experts response can be also differences to judge the constraint.

### Conclusion and Recommendations

The present study revealed that the major constraints to camel health in study area were wide spreads of diseases which mainly include parasites, fungal and followed by bacteria. The major identified impact due to camel diseases were generally lied on decrease body condition, decrease meat/milk yield and growth retardation. The other constraint that hindered camel production was feed and water shortage. Their major impacts were death of calf, reduced milk production & reduced body weight. The constraints identified on market issues were listed as lack or insufficient market infrastructure and lack of overall support. In relation to constraints of reproductive parameters the late maturity and long calving interval contribute to low productivity and death of the camels. Based on the above conclusion the following recommendations are forwarded:

- a. As parasitic diseases are major constraints; control strategy should be developed and applied.
- b. Shortage of feed and water require attention by responsible government bodies and stakeholders.
- c. Market related development of infrastructure and provision of information should be addressed.
- d. Implement capacity building strategies related to camel on all aspects of management at household and expert level.

- e. The government should pay due attentions to camels compared with other livestock potentials.

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