

## Challenges of camel production in Samburu District, Kenya

Joshua Orungo Onono<sup>1\*</sup>, William Okelo Ogara<sup>1</sup>, Samuel Oyieke Okuthe<sup>2</sup>,  
Johnson Gitahi Nduhiu<sup>1</sup>, Alfred Omwando Mainga<sup>1</sup>, Dorcus Nduati<sup>1</sup>

<sup>1</sup>College of Agriculture and Veterinary sciences, Department of Public Health, Pharmacology and Toxicology, University of Nairobi, P.O. Box 29053- 00625, Nairobi, Kenya;

<sup>2</sup>Food and Agriculture Organisation of the United Nations- RAHC- ECTAD, Museum Hill, Westland Rd. Nairobi, Kenya.

### Abstract

The objective of the study was to identify the challenges to camel production in Kenya's Samburu district. The data was collected through administration of structured and semi-structured questionnaire to a representative sample of the pastoralist household heads. The major causes of camel loss in the district were identified as predation (50.9%), drought (28.7%) and camel diseases (20.4%). Severe drought was reported to have occurred in the years; 1984 (12.4%), 1995 (9%), 2005 (42.1%), and 2006 (37.6%), and the livestock species most affected by the drought were cattle (98.1%), sheep (63.9%), donkeys (57.5%), goats (50.8%) and camels (31.2%). Water was reported to be inadequate in the district by 54.6% and 62.1% of the respondents respectively for livestock and human use. Herdsmen reported watering their camels from; rivers (24.6%), dry river beds (40%) and spring (7.7%). The livestock grazing area was reported to be getting smaller (45.7%), overgrazed (21.7%), and destroyed (13%), while only 13% believed that the grazing area had increased. Amongst the pastoralist who responded to the question on their source of income, 78.8% had no alternative source of income apart from livestock keeping. Conclusion: More resources should be allocated by the governments for improvement of camel production and the carrying capacity in pastoral production systems needs to be re-evaluated to ensure optimal productivity.

Keywords: Camel, predation, drought, diseases, production.

---

\* Corresponding author: Email: [joshua.orungo@uonbi.ac.ke](mailto:joshua.orungo@uonbi.ac.ke)

### 1. Introduction

Camels are used as multifunctional animals in pastoral production systems of east Africa with the general aim of producing; milk, meat, blood, hides and skins, provision of transport, barter trade (sale and exchange) and social and cultural functions (Kaufman and Binder, 2002).

Camels have an outstanding milk production in harsh environmental conditions in which they are kept. The camels produce more milk when compared with cattle and small stocks under the same harsh environmental conditions and its lactation persists well into the dry seasons and rarely ceases even during extended dry spells. Camel's milk is preferred to milk of other livestock species because of its taste, nutritious value, health reasons and it is

perceived that camel milk prevents thirst even when walking for a long distances (Kaufman and Binder, 2002). Depending on the accessibility of the market, surplus camel milk is also sold for cash income by members of the communities (Kaufman and Binder, 2002).

Meat production from camels is less important in the east African region due to low reproductive performance as compared to cattle and small stocks (Kaufman and Binder, 2002). Small stocks are the main source of meat to the pastoral communities, but camels are slaughtered for meat on some occasions. Pastoralists emphasize that camels have a better meat quality because of the nutritive value and taste. Most camels are slaughtered at home for domestic consumption and the excess meat sold

through a butcher. Camels are also regarded as a source of hides and skins, which are valuable raw materials for building huts and manufacturing utensils (Kaufman and Binder, 2002). Additionally camels are a source of blood that is mixed with milk to form a diet component for the young warriors who are also herders. Camels also have social and cultural functions including social transactions like gifts, loans to relatives and friends and food supply at the occasion of ceremonies (Kaufman and Binder, 2002). Sale and exchange of camels only occurs during droughts or when pastoralists are in need of high amounts of cash, such as for paying hospital fees or school fees (Kaufman and Binder, 2002). These unique and strategic uses of camel and related products explain the importance of the camel in the Samburu community.

Despite all the benefits associated with camel production in the pastoral areas of east Africa, camels still faces challenges in their natural environment including camel diseases (Njiru *et al.*, 2001; Dolan *et al.*, 1983), drought and predation which expose the pastoralist to risks of losing their source of livelihood. Similarly, according to Kenya's development blue print, vision 2030 livestock sub-sector's potential for substantial contribution to the country's GDP and food security have not been exploited (ACPK, 2007). This paper addresses the current challenges to sustainable camel production in Samburu district, Kenya.

## 2. Material and Methods

The study was carried out in Samburu district, Kenya. Data was collected using structured and semi structured questionnaires administered to pastoralist's household heads. The data collected included causes of camel losses

in the district, sources of water, water adequacy for household and livestock use and camel management. The camel losses were disaggregated according to age, and causes of loss disaggregated by predators, diseases and drought.

### 2.1. Data analysis

The data was entered into Microsoft access database package and selected queries exported into Instat® statistical package version 3.036 for analysis (Instat®, 2005). Descriptive statistics was done and the proportions obtained from the group tabulation function in instat® statistical package.

## 3. Results

### 3.1. Causes of camel loss

The major causes of camel loss in the district were identified to be predation (50.9%), drought (28.7%) and diseases (20.4%). The lion killed most of the camels (74.7%) while the elephant killed fewer camels (1.2%) (Table 1). However, analysis based on the number of camels killed per herd showed that the hyena had a higher average kill of camels per herd (11), followed by leopard (8), lion (6) and elephant (4). Most of the camels were killed in the grazing field (88.4%), while fewer were killed at watering point (8.1%), in manyatta (2.4%) and near homesteads (1.2%). More adult camels (68.7%) were killed as compared to the younger camels (31.3%), but the average number of younger camels (7) killed by predators per herd was similar to that of adult camels (6). The average number of younger camels killed by the hyena (12) per herd was higher as compared to the adult camels (2), while the average number of adult (6) and young (5) camels killed by the lion were similar.

**Table 1.** Number of camel predation by age

Predators	Camel predated on by age category			
	Adult prey	Young prey	Total	% of Total kill
Elephant	2	5	7	1.2
Hyena	2	82	84	14.1
Leopard	27	33	60	10
Lion	378	68	446	74.7
Total	409	188	597	100

### 3.2. Camel survival and water availability

Water was generally not adequate for livestock and human use in the district. About 54.6% respondents reported that water was not adequate for livestock use while 62.1% reported that water was inadequate for human use. The households reported watering their camels from; rivers (24.6%), dry river beds (40%) and spring (7.7%). Of the households using river water, fifty percent (50%) used seasonal rivers while other 68.4% of the household were harvesting water from dry river beds. Majority the respondents reported that grazing land in the district was getting smaller (41.2%), overgrazed (19.6%), and destroyed (17.6%), while only 11.8%

believed that the grazing area was increasing in size (Table 2). The drought cycle in the district was reported to occur after every four years, with the respondents identifying the following years as having had severe drought: 1984 (12.4%), 1995 (9%), 2005 (42.1%), and 2006 (37.6%). The breeds most affected by the drought were cattle (98.1%), sheep (63.9%), donkeys (57.5%), goats (50.8%) and camels (31.2%). Human beings were also reported to have died during the drought (3%).

Amongst the pastoralist who indicated their alternative sources of income, 78.8% depends fully on their livestock but get income through employment in wildlife conservancy, formal civil employment and small scale businesses.

**Table 2.** Grazing land and sources of household income

<b>Grazing land and its management</b>		
Status of grazing areas	No. of respondent(Yes)	% (Yes)
Pasture diminishing	42	41.2
Pasture increasing	12	11.8
Pasture destroyed	18	17.6
Pasture overgrazed	20	19.6
encroachment into wildlife areas	4	4.0
Grazing areas are well managed	6	5.8
<b>Household income</b>		
Sources of income	No. of respondent (Yes)	% (Yes)
Business	4	7.7
Formal employment	3	5.8
Livestock only	41	78.8
Wildlife Conservancy	4	7.7

#### 4. Discussion

The major causes of camel loss identified including death from diseases and drought had been reported by Kaufman and Binder, (2002). But losses due to predation have never been reported. These could be linked to wildlife livestock conflict in the district (Abdi, 1997). The pastoralists are known to encroach into wildlife protected areas to graze their livestock during the dry periods, and it's supported by the 11.8% of the respondents who reported that the grazing land was increasingly becoming available, although only 4% indicated that they encroach into wildlife areas to graze their livestock.

Drought that has persisted in district is also a major challenge to camel production in the district, and was reported to be a major cause of camel loss. This can be attributed to loss of pasture and drying up of water sources during dry periods. The loss of pasture and scarcity of water may result in the camels suffering from dehydration and starvation and eventually they would die. The scarcity of water and pasture are also part of the reasons that lead to encroachment of wildlife protected areas leading to increased camel predation especially at the grazing fields and watering points.

There was evidence of environmental degradation as the grazing land was reported to be diminishing in size, overgrazed, destroyed, with encroachment into the wildlife areas. These factors affect camel production in the district because they lead to loss of pasture and browsers and eventual increase in predation when livestock encroaches into wildlife areas. Since land in the pastoral areas are communally owned, they are frequently overgrazed because emphasis is laid on increasing herd sizes with minimal or no strategies to manage the pastures.

Most of the camels killed by the hyena were young, but the lion and the leopard killed both adults and the young. The young camels were probably more affected by the drought and therefore could not escape when the herd was attacked by predators, as is shown by the percentage of young camels that were attached by the hyena (Table 1). The camels that were killed by the elephants were probably coincidental, and could have occurred when the herders encroached into the wildlife protected areas. This is supported further by the small number of camels reported to have been killed by the elephant.

Livestock diseases were also identified as major challenges because the district has limited access to veterinary services (Wambua *et al.*, 2009). The private sector providers of veterinary services are largely uninterested in the district as demand for their services are low and the supporting infrastructure poor, while the government department is faced with various logistical challenges (Wambua *et al.*, 2009). Most of the diseases affecting camels are tick-borne and vector-borne diseases including trypanosomiasis transmitted by tsetse fly (Njiru *et al.*, 2001; Dolan *et al.*, 1983). These diseases have been identified by use of participatory approaches based on the experiences and knowledge of the community member (Mochabo *et al.*, 2005).

#### 4.1. Recommendation

- 1 Support to livelihoods through camel production may be enhanced by improved husbandry practices that will reduce human, livestock and wildlife conflicts as well as disease prevalence's and their impacts. This study underpins the unique and strategic role of camel under frequent and intense drought and recommends

that more resources be allocated towards disease control strategies and mitigation against other identified threats to camel productivity.

- 2 Because of the persistent drought in the pastoral areas in the country and in most parts of east Africa, the carrying capacity of pastoral production systems needs to be re-evaluated to ensure improvement in productivity of livestock kept in these areas.
- 3 Successful mitigation measures for improved and sustained camel husbandry requires contribution and clear roles of a number of stakeholders; the communities, the department of veterinary services, ministry of finance and Kenya wildlife service.

## 5. Acknowledgement

The authors acknowledge the Earthwatch Institute for providing funds for this research work and the Samburu pastoral community for their participation by providing information.

## References

Kaufman B.A. and Binder C. 2002. Production aims and functions of camels in Kenyan pastoral systems; in proceedings of collaborative research project on camel breed differentiation and pastoral camel breeding strategies within the KARI/EU Agriculture/livestock research support programme for Kenya (ARSPII; Project NO. 6ACP KE0161-KE 6003/001)

- Njiru, Z. K., Ole-Mapeny, I. M., Ouma, J. O., Ndung'u, J. M. and Olaho-Mukani W. M. 2001. Surra in camel calves in Laikipia district of Kenya; *J. Protozool. Res.* 11, 19-25 (2001)
- Dolan Rosemary, A. J., Wilson H. J., Schwartz, R. M., Newson and Field, C. R. 1983. Camel production in Kenya and its constraints- Tick infestation; *Tropical Animal Health and Production* (1983) 15, 179-185
- Instat ® for windows version 3.036, 2005. Statistical services centre, the University of Reading, UK <http://www.rdg.ac.uk/ssc>
- Wambua, F., Ngige, G., Mogaka, D., Cheboi, D., and others, 2009. Long Rains Assessment Report; Samburu district, 23rd-31st July, 2009
- Mochabo, M.O., Kitale, P.M., Gathura, P.B., Ogara, W.O., Catley, A.I., Eregae, E.M., and Kaitho, T.D. 2005. Participatory estimation of the incidences and mortality of camel trypanosomiasis in Lapur division of Turkana district, Kenya. *Tropical Animal Health and Production*, 37: 187 – 204.
- The Government of the Republic of Kenya, 2007. A globally competitive and prosperous Kenya; Kenya Vision 2030; Ministry of Planning and National Development and the National Economic and Social Council (NESC), Office of the President.
- Abdi Umar, 1997. Resource utilisation, conflict and insecurity in pastoral areas of Kenya. A paper for the USAID organised seminar on conflict resolution in the horn of Africa, held at the Methodist Guest House, Nairobi, 27-29 March 1997. Kenya Pastoral Forum