Research Application Summary

Assessing the potential of camel milk as a livelihood option in the face of climatic and environmental changes in drylands of Kenya

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Abstract

In drylands of Kenya, the adverse effects of climate variability and change has directly weakened the pastoral production system and made it less effective as a livelihood option. This has med most pastoral household food insecure. However, there are many alternatives that exist to cushion pastoral households against the effect of climate variability and change. This study argues that proper assessment of camel milk sub-sector in dryland of Kenya is necessary to ascertain the potential and suitability of camel milk as one of the most suitable opportunities to ensure sustainable livelihood; enhancing pastoral resilience for climatic and environmental changes and shocks and thus achieve food security and alleviate poverty in dry pastoral areas of Kenya. The emphasis is therefore to consider camel milk for ensuring household food security as an alternative to cope and adapt to climate variability and change in the dryland of Kenya

Key words: Adaption, pastoral household, Camel milk, climate variability, dryland, Kenya

Résumé

Dans les zones arides du Kenya, les effets néfastes de la variabilité et du changement climatique ont directement affaibli le système de production pastorale et l'ont rendu moins efficace comme moyen de subsistance. Cela a rendu la plupart de familles des éleveurs dans une insécurité alimentaire. Cependant, il y a de nombreuses alternatives qui existent pour protéger les ménages des éleveurs contre l'effet de la variabilité et du changement du climat. Cette étude fait valoir que l'évaluation correcte du sous-secteur du lait de chamelle dans les zones arides du Kenya est nécessaire pour déterminer le potentiel et la pertinence du lait de chamelle comme l'un des débouchés les plus appropriés pour assurer la subsistance durable, renforcer la résilience pastorale pour les changements et les chocs climatiques et environnementaux et ainsi atteindre la sécurité alimentaire et atténuer la pauvreté dans les zones pastorales arides du Kenya. L'accent est donc de considérer le lait de chamelle pour assurer la sécurité alimentaire des

ménages comme une alternative pour faire face et s'adapter à la variabilité et au changement climatique dans les zones arides du Kenya

Mots clés: Adaptation, ménages pastoraux, lait de chamelle, variabilité du climat, terres arides, Kenya

Background

In recent years, pastoralists in the dryland have been recurrently devastated by the serious drought and disease mostly driven by adverse impact of climate variability and change (Konaka, 1997). In Kenya climate variability and change have caused severe damage to pastoral household livelihoods resulting in a rise of diseases among animals, as well as wasting and malnutrition, leading to a high mortality rate of livestock of between 40% and reaching up to 70% in some areas (Serna, 2011). It can be argued that climate variability and change will increase the vulnerability of the existing livestock systems and thus make it less effective as a sustainable livelihood option. Despite very high losses of cattle, sheep and goats associated with extreme environmental changes, there are few if any records of losses in camel (Yagil, 1982). Notwithstanding, camels have the ability to survive under harsh climatic conditions and have the potential to enhance pastoral household livelihoods under this distressful environment (Ahmed *et al*,. 2002). Camel production is yet to be explored to the limits. Clearly there is need to further explore camel and camel products in the face of climate change. The reason of this study is to ascertain camel potential as an alternative livelihood source for enhancing pastoral resilience for climatic and environmental changes and shocks. The information generated by this study will be used to guide climate change adaptation policies and specially adoption of camel raring in dryland Kenya.

Literature Summary

There is a lot of literature on the impacts of climate change and variability, especially the impact of drought in Africa (Owuor *et al.*, 2011; Eriksen and Lind, 2009; DDC, 2006; Ahmed *et al*., 2002). These studies have reported a significant negative impact of climate variability mostly on livestock and livestock related activities. However, in Kenya climate variability has caused severe damage to pastoral household livelihoods resulting in a rise of diseases among animals, as well as wasting and malnutrition, leading to a high mortality rate of livestock of between 40% and reaching up to 70% in some areas (Serna, 2011). It can be argued that climate variability and change will increase the vulnerability of the existing livestock systems and

thus make it less effective sustainable livelihood option (Johnson and Wambile, 2011). Studies on adaptation to climate variability in the dryland of Kenya recognises the important role which camel products play in ensuring food security and livelihood sustainability (Kuria *et al.*, 2011; Farah *et al*., 2004; Getahun and Belay, 2002). Camel thrives in the harshest environmental condition in the dryland and withstand the frequent droughts which decimate cattle, goats and sheep populations, and yet continuing to produce decent quantities of milk and meat (Farah *et al.*, 1990). Kenya is estimated to have the fifth largest camel herd in the world. In 2007 the camel population in Kenya was estimated to number 1.06 million of the dromedary (one humped) type, traditionally kept by the Somali, Rendille, Gabbra, and Turkana communities. However, there is a growing interest for the camel and its products across the dry areas of Kenya (Lore, 2005). This is due to various factors that include among others the fact that camel milk fetches higher prices than cow milk. Despite very high losses of cattle, sheep and goats associated with environmental changes, there are few if any records of losses in camel. For instance, in Niger there was 100% cattle mortality, 50% sheep and goat mortality and only 20% mortality in camel (Yagil, 1982). However, despite the ability to survive under harsh climatic conditions, camels have the potential to enhance pastoral household livelihoods under these conditions (Ahmed *et al*,. 2002).

Study Description

This study is being conducted in Isiolo county of Kenya. The county falls into three agro-climatic zones, semi-arid (occupying 5% of the area), arid (30%) and very arid (65%). Rainfall is low, bimodal, and erratic. The pattern of annual rainfall follows the monsoon and is therefore highly seasonal. Isiolo county is hot throughout the year with mean annual temperatures ranging from 24 - 30^{o}C. Under these conditions, rain-fed agriculture is unsustainable. Isiolo County has a prominent peri-urban camel population and a thriving camel milk business on one hand. On the other hand Isiolo County currently contributes to more than 90% of marketed camel milk reaching national urban markets. This among others makes Isiolo County suitable to carry out camel milk value chain study.A number of data collection techniques are being employed in this study. First, secondary data from 6 camel milk producing counties in Kenya with special focus on the production and climatic parameters among others will be used. Secondly, individual interviews have been conducted in 200 households to solicit demographic information, attitude and perception on camel adoption, factors affecting

camel milk production and marketing, challenges and opportunities to adopt camel production as an adaption strategy to climate change. More data will be obtained through observations, focus group discussions and interviews of key informants.

The Value Chain Analysis is being used to the camel products from the production stage to the final market. Various regression models will be used. First, the Cobb-Douglas Production Function will be used to estimate the effects of the factors of production (such as labour, capital, land and managerial skills) among the traditional camel keepers and non-traditional camel keepers. Simultaneous Equation Model (SEM) will be employed to determine factors that influence camel milk production and marketing (such as, camel milk production, household characteristics, distance to the market, labours). Thirdly, a semi-logarithmic (semi-log) function will be used to model and forecast milk supply, factors such as milk volume, labours, other costs, camel milk prices etc. Finally, the Distributed Lag Models will capture the effect of climate variability and change on camel and other livestock species (factors such as production, prices, rainfall and temperature will be included).

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