

## Developing community-based breeding programs to improve productivity of sheep and goats in Turkana, Isiolo and Marsabit counties of Kenya

### Background

In 2019, the Government of Kenya through the Ministry of Agriculture, Livestock and Fisheries and Irrigation (MALFI) contracted the International Livestock Research Institute (ILRI) to contribute to the World Bank-aided Regional Pastoral Livelihoods Resilience Project (RPLRP) in Kenya. The collaborative intervention aims to enhance the livelihoods and resilience of pastoral and agro-pastoral communities in cross-border drought-prone arid to semi-arid areas of the northern Kenyan counties of Turkana, Isiolo and Marsabit through:

- Building capacity within the pastoral communities to maintain genetic diversity of their indigenous livestock while improving productivity.
- Promoting behaviour change towards more commercial livestock production



### General characteristics of the counties

#### Turkana County

Turkana County has an area of 70,586 km<sup>2</sup>. The county is hot and dry with annual rainfall ranging from 52 mm to 480 mm (mean 200 mm). The mean annual temperature is 30.5°C. The county experiences cyclical prolonged dry periods followed by short

periods of very intense rainfall, which result in loss of livestock assets and livelihoods. Turkana County has 6 sub-counties, 30 wards, 56 locations and 156 sub-locations, with an estimated human population of 926,967<sup>1</sup>.

Figure 1: Map of Kenya indicating the location of the counties involved in the project.



<sup>1</sup> KNBS (Kenya National Bureau of Statistics). 2019. 2019 Kenya housing and population survey volume 1: Population by county and sub-county. (Available from <https://www.knbs.or.ke/?wpdmpo=2019-kenya-population-and-housing-census-volume-i-population-by-county-and-sub-county>).

## Isiolo County

Isiolo County covers an area of 25,382 km. The county is hot and dry with an annual rainfall of 300–670mm (mean 580 mm). The mean annual temperature is 29°C. The County has 3 sub-counties, 10 wards, 22 locations and 43 sub-locations, with an estimated human population of 268,002.

## Marsabit County

Marsabit County covers an area of 76,031<sup>2</sup> km<sup>2</sup>. Marsabit is one of the driest counties of Kenya, with temperatures ranging between 10.1°C and 30.2°C. Annual rainfall ranges from 200mm to 1,000mm (mean 254mm). The county comprises four sub-counties and 20 wards. Marsabit County has an estimated population of 459,785<sup>3</sup>.



*Animals in Marsabit County.*

In these three counties, land is generally communally owned by nomadic pastoralists. Key economic activities revolve around the rearing of cattle, goats, sheep, camels and donkeys. Some areas alongside the main rivers are used for crop and livestock production. The livestock are more valued as a social asset rather than as a source of income for households.

<sup>2</sup> KNBS. 2020. *Statistical abstracts 2020*. (Available from <https://www.knbs.or.ke/?wpdmpo=statistical-abstract-2020>).

<sup>3</sup> KNBS. 2019. *2019 Kenya population and housing census volume 1: Population by county and sub-county*. (Available from: <http://housingfinanceafrica.org/app/uploads/VOLUME-I-KPHC-2019.pdf>).

Turkana is estimated to hold 5,994,881 goats and 3,517,148 sheep<sup>4</sup>. Marsabit is estimated to hold 1,800,000 goats and 1,600,600<sup>5</sup> sheep. Numbers of sheep and goats in Isiolo are not reported in the national county statistics database.

## Site selection

Following consultations with stakeholders, including county government leaders, the national government, and county departments of livestock and non-governmental organizations (NGOs) implementing projects in the three counties, sites were selected for implementation of interventions for improving productivity of sheep and goats using the following key criteria:

- Aligned to county priorities on livestock development
- Communities of sizable population density with access to main market points
- Accessibility of the communities and their openness to external communication
- Security for long-term interventions

In Turkana County, two sites, Napeikar and Kapua sub-locations in Turkwel and Kalokol wards, respectively, were selected. In Isiolo County, the Nakuprat-Gotu Conservancy in Ngaremara Ward was selected, while in Marsabit County, the Songa Conservancy in Karare Ward was selected.

In each site, meetings were held with community members, adopting an approach that involved both men and women livestock keepers.

Livestock development needs recognized by community members

- To adjust community activities in response to the changing environmental conditions
- To learn and adopt new ways of managing livestock in order to enhance their productivity
- To harness the rapidly eroding indigenous knowledge and practices in livestock enterprises
- To learn new ways of thinking for sustaining livelihoods in the fragile ecosystems
- The importance of organized groups within communities in enabling development of different enterprises

<sup>4</sup> KNBS. 2015. *County statistical abstract 2015: Turkana*. (Available from [https://www.knbs.or.ke/?page\\_id=3156](https://www.knbs.or.ke/?page_id=3156)).

<sup>5</sup> KNBS. 2015. *County statistical abstract 2015: Marsabit*. (Available from [https://www.knbs.or.ke/?page\\_id=3156](https://www.knbs.or.ke/?page_id=3156)).

Each community nominated 30 participants representing different households, ensuring that both men and women were represented, to learn and adopt best practices within their flocks. The members selected formed a core innovation group (CIG). A digital tool was developed and used for training and interacting with community members in order to identify core innovation groups members and outline their expected roles.

A total of 130 households from the five sites were



selected.

*Community group discussion in Turkana County.*

To determine the nature of sheep and goats in the CIG, and the nature of the production environment, a targeted survey was carried out and information on breeding and management and community perspective on sheep and goats, which produced the baseline report.

## Breeding management practices

In Turkana, Marsabit and Isiolo the livestock keepers actively select male animals, for both sheep and goats, for use in breeding. In Turkana and Isiolo counties, the livestock keepers almost exclusively use male animals raised in their own flocks for breeding (Turkana: 94% sheep, 100% goats; Isiolo: 94% sheep, 89% goats), while 40% of the livestock keepers in Marsabit County use rams and bucks that were loaned from other livestock keepers. These

rams would be transferred for the mating season and left to mate randomly within the flock after which they would be returned to the original owner. Mature male animals not selected for breeding would be castrated using traditional methods. None of the livestock keepers maintained written records on their animals but could recall the mating history of their flocks from memory. The months of April, October and November were associated with kidding and lambing in the three counties. The decision by the livestock keepers in Turkana and Isiolo to use animals from their own flocks in

uncontrolled and random mating had a negative impact on their animals productivity due to the progressive increase in inbreeding within the flocks. In Marsabit, the exchange of male animals could lower the inbreeding rate, however, the random mating practiced still allows for some levels of inbreeding.

Animals for breeding and restocking are selected by the livestock keepers based on appraising their physical appearance without taking into cognizance their history or any measurements. This means there is

no consistent criteria for selecting breeding animals in these counties. Indeed, the choice of breeding animals varied depending on those available within each mating season. All these factors directly impact the productivity of the animals in the flocks.

Community perspectives on livestock resources  
Key traits of importance for sheep and goats identified in all three counties were the age of animals, breed-type, body conformation (size), body condition and sex of the animals. When the livestock keepers in the different counties were asked to rank the traits in order of importance, differences emerged. In Turkana County, body conformation (size) was the most important trait, closely followed by body condition with weighted scores of 149 and 140, respectively. In Isiolo County the sex of the animal ranked highest with a weighted score of 72, followed by breed (weighted score 51) and body conformation (weighted score 50). In Marsabit the most important trait was the age of the animal (weighted score 101) followed by the sex of the animal (weighted score 72). On observation of

animals within the counties, it was noted that the animals found in Turkana County were smaller in size than those in the other counties. The animal markets were also more easily accessible in Isiolo and Marsabit Counties and younger male animals with good body condition were said to be easily sold in them. The availability of younger male animals could be a main determinant in ranking traits by the communities.

## Animal health management practices

In all the three counties, the livestock keepers associated optimal animal health with high production. The livestock keepers were able to identify the different diseases affecting their animals. In Marsabit County, enterotoxaemia in sheep was noted to be the greatest challenge. In Turkana the greatest challenge with sheep was mange while in Isiolo it was helminths. Among flocks of goats, contagious caprine pleuropneumonia (CCPP) presented the greatest challenge in all three counties.

The treatment remedies adopted in all three counties were based on the purchase of acaricides to control ticks, antibiotics and anthelmintics. The livestock keepers, however, noted various challenges when trying to access animal health services. The greatest factor limiting their access was the high cost of drugs to treat the livestock, poor road infrastructure and scarcity of animal health providers (selected by 24%, 18% and 17% of all the respondents, respectively). The livestock keepers indicated that they often manage the various disease challenges using traditional remedies and would have variable results.

**Management of animals during the droughts**  
One common challenge experienced across the three counties is an increased frequency and duration of droughts. The livestock keepers noted that the worst and most recent drought was experienced in 2018, which resulted in great losses. Livestock mortality rates were very high, with more than 50% of the mature sheep and goats dying. The livestock species that was least affected by the drought were camels reared in Turkana and Isiolo counties. In Marsabit County, sheep were the most affected while in Turkana, both sheep and

goats were adversely affected. With the history of previous droughts experienced, the livestock keepers strived to sell off a larger proportion of their flocks as the drought set in with the anticipation that they would restock and build their flocks at the end of the drought. Prices for animals in markets were, however, highly variable and in many cases the pastoralists indicated that they opted to try and manage the flocks through the drought rather than sell them at the very low prices offered. This resulted in the very high mortality rates reported.

## Recommendations

- Actors seeking to improve livelihoods of pastoralists need to understand the decisions the livestock keepers make in relation to their animals. These include decisions regarding animals they select for breeding, the traits they select in animals during restocking, how they manage diseases, and the decisions they make during the different drought cycles they experience.
- Pastoralist communities need to be better informed on the consequences of inbreeding in their flocks, and on management practices that can prevent high rates of inbreeding.
- Training is required within communities on the following:
  - Selection criteria and management of animals for improving productivity.
  - Mating strategies to ensure desired traits are propagated within the flocks.
  - Technologies for conducting more humane castration of male animals, and the optimal age for castration in order to reduce trauma for the animals.
- Practical community-based training should include the women and youth who tend to spend the most time with the animals when feeding conditions are more favourable.
- To mitigate the adverse effects of the drought the decisions of livestock keepers to destock by selling their animals should be supported by enabling fair pricing of animals in key markets.
- Innovative ways of managing livestock health and controlling diseases in the communities needs to be considered.
- Organizing the farmers into support groups and information sharing networks would add value and provide direct and positive impact on small ruminant production in general.



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