



News from the Field

Managing climate risks through small ruminants in Kenyan climate-smart villages

Small ruminants in Kenya

Small ruminants (goats and sheep) play an important role in rural livelihoods. About one third of the total red meat consumed in Kenya comes from small ruminants (GoK, 2015a). Small ruminants are easier to de-stock and re-stock due to their small body size, higher birth rate, and shorter generation intervals compared to large stock. *Kenya Vision 2030* is the country's development programme from 2008 to 2030, and has agriculture as a key economic pillar. Within agriculture, small ruminants have been identified as a priority sector in contributing to food security in a changing and variable climate.

Climate-related risks in Nyando, western Kenya

The Nyando basin in western Kenya is one of the most highly populated areas in East Africa, with a population density of more than 400 persons per square kilometre. About 40 percent of the Nyando basin landscape is highly eroded with deep gullies (Macooloo *et al*, 2011). Agriculture is the main source of livelihood, where local zebu cattle and local East African sheep and goats are kept alongside local poultry. The onset of the seasonal rainfall has become more variable and long dry periods can be expected whenever the rains start earlier than predicted. Dry periods reduce the length of the main growing season, and thus farmers rely more on livestock to address the risk. However, some of the local breeds have low productivity and are more susceptible to drought and disease. In 2011, about 81 percent of the families experienced 1-2 hunger months in a year, while 17 percent of the families experienced 3-4 hunger months – a period when they are unable to produce food from their own farm (Mango *et al*, 2011).

Improved small ruminants in Nyando

Through participatory action research, the International Livestock Research Institute (ILRI) and local community-based organisations (CBOs) have, from 2013, upgraded the local breeds of small ruminants through crossing with resilient breeds of *Galla* goats and *Red Maasai* sheep, and coupled this with better livestock management practices. The improved small ruminants are able to better cope with the disease burden, better withstand heat stress, better utilise low quality herbage, recover from drought due to faster compensatory growth, and mature to market weight in shorter periods

(Ojango *et al*, 2015). *Galla* goats are adapted to drylands, with a longer productive life, good milking ability, a high level of twinning, high growth rate, and an earlier maturing age – up to six months compared to the local small East African goat. The *Red Maasai* sheep is reared for meat, and is renowned for withstanding drought and heat stress, resistance to internal parasites, and faster growth as compared to the small East African sheep. More than half of the households (57 percent) across the Nyando climate-smart villages (CSVs) currently own either pure- or cross-bred *Galla* goat and *Red Maasai* sheep (Ojango *et al*, 2016).

Farmers were trained on basic sheep and goat husbandry, housing, and fodder development, conservation and utilisation, prior to receiving the improved goats and sheep. Farmers trained to be breeders received pure-bred *Galla* does and bucks, and *Red Maasai* ewes and rams, which formed breeding units for the community crossbreeding. In 2013, 100 breeding units of *Galla* goats and *Red Maasai* sheep were established, and after one year, a total of 1,506 crosses were registered, representing one third of the total 4,336 sheep and goats in seven test villages (Kinyangi *et al*, 2015). It is anticipated that it may take 10 years to replace the current population of 38,725 sheep and goats in Nyando villages with the new *Galla* and *Red Maasai* crosses, and hence bring the benefits of resilience.

The impacts of the initiative are at both individual and community level. Individual farmers are able to own the assets (sheep and goats), and obtain goat milk for home consumption, resulting in improved household nutrition. Small ruminants are popular with women, as they have more control over the small ruminants as well as over the income generated from them as compared to large ruminants. The small ruminants are less labour intensive and take less time to raise compared to cattle. The meat and milk gains of small ruminants far exceed cattle because of the shorter reproductive cycles.

As the uptake of the *Galla* goats and *Red Maasai* sheep crossbreeds increases, farmers are coming up with innovative ways of marketing their livestock. An annual goat auction is emerging, linked to the Christmas festive season, when livestock is in high demand. Other benefits include income through sale of milk and live animals, and using the manure for crop production. The average price of the improved breeds of small ruminants in local markets is at least US\$ 120 per head, which is about three times the price of the local breeds. At the group level, the communities are able to work together and collectively access better services for their farming enterprises, jobs are created through the breed associations, and market access is fostered for the sheep and goats.

Linkages to policy and strategies

Within agriculture, the livestock sector has a huge potential for mitigation of climate change and reducing carbon emissions (GoK, 2015b). Kenya's Intended Nationally Determined Contributions (INDCs) includes both mitigation and adaptation components, and aims to achieve a low carbon, climate-resilient development pathway. At the same time, the country is continuing to implement the National Climate Change Action Plan (GoK, 2012) for the period 2013-2017 and this includes promotion and implementation of Climate-Smart Agriculture (CSA). The methane greenhouse gas (GHG) emissions from enteric fermentation in domestic livestock in Kenya is 14,540 Gg CO₂e per year, and methane emission from manure management is 541 Gg CO₂e per year (GoK, 2015b). Improved small ruminants have great promise in reducing the emissions through improving animal and herd efficiency. Improved *Galla* goat and *Red Maasai* sheep breeding and animal health interventions allow rearing of fewer animals that are more highly productive, hence reducing GHG emission intensity. Improved manure management ensures recovery and recycling of nutrients and energy – potentially playing a useful role in reducing GHG emissions.

Emerging lessons and conclusions

Working with CBOs guarantees greater success in the adoption of improved small ruminant interventions due to the organisational structure that facilitates farmer investments in improved breeds, sharing of information, and scaling-up of interventions to many villages. The intervention has also brought new opportunities for farmers to participate in new markets such as the goat auction.

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