Climate Smart Research and Innovation for Livestock Development in Kenya with Focus on Dairying project

Summary

The Climate Smart Research and Innovation for Livestock Development in Kenya with Focus on Dairying project (CSRILD) is a 30 months, €1 million project financed by Irish Aid with duration from October 2019 to March 2022. The project aims to link international research knowledge with local knowledge by building relationships between institutions in Africa and Europe with a view of increasing science in development and thereby achieving a profound transformation of the livestock sector in Kenya.

Forage-based animal genetics and application coupled with the use of climate smart forage feeding systems on-farm that the project introduces will lead to better farm-level profitability, providing farmers at all stages of development an economic incentive to adopt and continue to use more economically, environmentally efficient farming practices. The project explores whether forage-based production systems in Kenya deliver better gross margins for farmers and potential benefit in resilience and adaptation.

The innovation model pursued through this project will establish whether the traditional linear model of technology transfer can be replaced with the farmer becoming a key player in the development and application of new Climate Smart Agriculture (CSA) technologies on-farm. The CSRILD project brings along an array of partners with varied technical skills and experiences for synergies in research and technology development, capacity building in agriculture, project management, governance, milk aggregation, trading and processing.

One hundred and twenty dairy cattle from Friesian, Friesian-Sahiwal Cross, Jersey and Sahiwal breeds have been selected and acclimatized at KALRO DRI Naivasha for breed comparison trials. A demonstration farm that represent a farming systems perspective has been established at the centre to serve as a training unit. It has basal and supplementary forages and four dairy cattle from each breed type.

Linkages with farmers and County governments in Nakuru and Nyandarua has been established and training materials developed for extension staff and lead farmers. Towards establishment of an innovation support unit for the Kenyan dairy sector, linkages has been established with five external nodes. These are Development Pamoja in Rongai Nakuru County, Baraka Agricultural College, Kuresoi North of Nakuru County, Keringet Community Socio-Economic and Environmental Development (KCSEED) and Olenguruone Dairy Farmers Cooperative Society in Kuresoi South Sub-County, Nakuru County and Tulaga Dairy Farmers Cooperative Society in Kinangop Sub-county, Nyandarua County. Other actors targeted are the County Governments of Nakuru and Nyandarua, Milk processors, breeder organizations, financial institutions and international agricultural research organizations with activities in dairy sector.

Within the five nodes 4 demonstration farms have been established with basal and supplementary forages and are being monitored. Trial plots have similarly been established in three sites. Through linkages with County and dairy cooperatives extension staff, 1602 farmers (660F, 942 M) have been recruited into the programme.

Eleven (11) extension manuals and 10 farmer information brochures have been developed for use by extension officers and lead farmers in the external nodes. The manuals cover prioritized basal and supplementary forage production, conservation, and utilization; feed formulation, breeding and young stock management; animal health and housing and milk hygiene.
Introduction/Background

Kenya is experiencing a growing demand for milk and dairy products driven by expanding urbanization, increasing population and a growing middle class. As a result, the country will need to significantly increase milk supply, especially to urban consumers. An additional 3.5bn litres per annum will be required by 2022 (versus 2012 output) and a target output of 12.5bn litres p.a. by 2030. To come near achieving these targets, productivity will need to double.

A key challenge to improved productivity in the dairy sector is climate change. The country’s agriculture is predominantly rain-fed and, therefore, vulnerable to climate change, particularly changes in temperature regimes, precipitation patterns and extreme weather events. Agriculture is the largest source of GHG emissions; it was estimated to be responsible for one-third of Kenya’s total emissions in 2010.

The Climate Smart Research and Innovation for Livestock Development in Kenya with Focus on Dairying’ project (CSRILD) will help build a dairy production systems initiative aimed at transforming the livestock sector and help build progress towards Sustainable Development Goals targets on poverty, hunger/food security, climate change and ecosystem development. A particular focus will be on the introduction of research-led innovations at the production level and along the value chain, which will allow the industry to grow in a climate-smart, sustainable way.

This project will focus on dairy production at farm level and will build on existing initiatives underway in Kenya. It will also link with ongoing CGIAR livestock research (ILRI and ICRAF) in other parts of East Africa, specifically in Tanzania, Ethiopia and Eritrea. The project aims to link international research knowledge with local knowledge by building relationships between institutions in Africa and Europe with a view to increasing science in development and thereby achieving a profound transformation of the livestock sector in Kenya.

The project’s Theory of Change is that improved dairy farm systems - forage-based animal genetics and application and the use of climate smart forage feeding systems on-farm - will lead to better farm-level profitability, giving farmers at all stages of development an economic incentive to adopt and continue to use more economically and environmentally efficient farming practices. Improved income on dairy farms greatly helps the local rural economy (important for villages and small towns) as farms tend to spend their income locally.

Justification for the project

Currently, the dairy sector depends on the importation of animals/genetics which are bred for high milk yields based on the feeding of high-quality concentrates. Given the quality of the feed resource in the Kenyan system, these imported animals perform poorly in terms of milk productivity; produce high levels of enteric methane production (due to a large number of low productivity animals); and provide low gross margin and poor farm profitability. There is clear evidence that forage-based production systems in Kenya deliver better gross margins for farmers. There is also significant capacity for improved production, conservation and utilisation of forages in Kenya, as well as a potential benefit in resilience and adaptation.

Project design including partners and collaborators

Experience from national livestock development programmes in the EU suggests that the implementation of transformative, climate-smart innovations requires the input of user-driven research-based evidence. The traditional linear model of technology transfer needs to be replaced by an innovation model in which the farmer is a key player in the development and application of new CSA technologies on-farm. When successful, key innovations can lead to improved sustainability for producers, including women and men smallholder farmers and trigger enhanced economic activity along the agri-food value chain.

Project implementation partners are:
- **KALRO** – Kenya Agriculture and Livestock Research Organisation – KALRO will be at the centre of the applied research activities and support the outreach and private sector participation.

- **Teagasc** will provide and oversee the application of technical expertise at all stages of the project. Teagasc is actively involved in research and development projects (within country and EU funded projects) on sustainable cattle production systems with a particular focus on livestock farming techniques, macro and micro-economics, farm system modelling and bioinformatics, GHG emissions and other environmental issues (ammonia, water quality, biodiversity).

- **Sustainable Food systems Ireland (SFSI)**, the international consultancy division of Ireland’s Ministry of Agriculture, Food and the Marine, will participate in a project management support role.

- **Greenfield International (GI)** – provides expertise in forage-based systems of production and their application on-farm, combined with substantial experience of capability-building in African agriculture.

- **Self Help Africa** – on the ground project management and operations, project administration and backstopping, and support of the outreach activities.

Among other partners will be engaged through project activities are:

- Kenyan private sector – **Milk processors** will participate in and contribute to the research and extension elements of the project, as well as collaborating with KALRO on its dairy processing roadmap.

- **County Government (s)** – The pilot phase brings along extension staff from Nakuru and Nyandarua Counties.

- **International Centres** - **International Livestock Research Institute (ILRI)** and **World Agroforestry (ICRAF)** bring animal genetics and agronomy expertise.

- **Co-operative, Producer Groups and Service Providers** – Baraka College in Molo, Development Pamoja in Rongai, Olenguruone dairy farmers, Keringet Community and Tulaga dairy Farmers, will improve the project’s relevance to farmers through their established outreach and pilot fodder activities.

- Irish private sector – companies like **Dovea Genetics** and **Nutribio** who have been active or interested in the Kenyan market will be included in opportunities to interact with project activities and build new relationships in the market.

**Status of Implementation**

The project now has 30 animals for each of the Friesian-Sahiwal cross, Sahiwal, Friesian and Jersey cattle for comparison of different breeds/strains of dairy cattle managed under a forage-based system and development of breeding index.

A forage demonstration unit of 0.85 Ha has been established at KALRO DRI Naivasha with Sorghum (0.17 Ha), Napier Desmodium (0.34 Ha), Lucerne (0.21 Ha), and sweet potato vines (0.13 Ha). It is small enough to represent a farming systems perspective which farmers and extension agents can identify with. One cow from each of the four breeds are kept under stall feeding at the unit. Records kept within the demo unit include feed records, milk records, input and labour records and body weight of the animals.

Thirty five (35%) lead farmers from the 5 nodes have been selected, for establishment of various forages within their farms which will be used as demonstration plots or learning centres. Fourteen demo farms have been supplied with inputs and established with basal and supplementary forages. To determine soil nutrient content, composition and other soil characteristics, sampling and analysis has been conducted in two nodes, and recommendations provided. Demonstration training on haylage and silage making has also been carried out.

Towards establishment of an innovation support unit for the Kenyan dairy sector, linkages has been established with five external nodes. These are Development Pamoja in Rongai Nakuru County, Baraka Agricultural College, Kuresoi North of Nakuru County, Keringet Community Socio-Economic and
Environmental Development (KCSEED) and Olenguruone Dairy Farmers Cooperative Society in Kuresoi South Sub-County, Nakuru County and Tulaga Dairy Farmers Cooperative Society in Kinangop Sub-county, Nyandarua County. Through linkages with County and dairy cooperatives extension staff, 1602 farmers (660F, 942 M) have been recruited into the programme. A coordination office at KALRO DRI has been refurbished and connected with high speed internet.

Eleven (11) manuals and 10 farmer information brochures have been developed for use by extension officers and lead farmers in the external nodes. The manuals cover prioritized basal and supplementary forage production, conservation, and utilization; feed formulation, breeding and young stock management; animal health and housing and milk hygiene.

Protocols on breeding, forage evaluation and conservation, demonstration of management of forage-based smallholder dairy production system and innovation support unit have been developed, shared with partners and being implemented.
Four breeds of dairy cattle at KALRO DRI Naivasha for breed comparison study

Farmer training on top dressing of Lucerne crop in Rongai, Nakuru County
Training of lead farmers on management, harvesting and utilization of sweet potato vines at KALRO DRI demo farm
Training on use of manure slurry in forage grasses
Training of lead farmers in silage making at KALRO DRI