

## DOC NO. 4

### TERMS OF REFERENCE

#### INNOVATIVE AND CLIMATE-SMART LIVESTOCK DEVELOPMENT IN UGANDA

##### 1. Introduction

Embassy Kampala wishes to develop a proposal and multi-year plan for a partnership and knowledge exchange project between Irish and Ugandan partners with the objective of creating sustainable improvements in production, productivity, management and health of dairy and beef cattle; to strengthen the complete dairy and beef value chains; and to bolster institutional knowledge support for the sectors. Consistent with DFAT's *A Better World* and *Africa Strategy*, the initiative will draw upon Irish expertise in agriculture and food to support capability building, undertake collaborative research and innovation management activities and build institutional links between Uganda and Ireland.

An engagement between Irish and Ugandan national and regional partners, supported through project initiatives, over a four to five-year period, can directly impact on: a range of livestock production features, including productivity, quality, animal health; on the strength of Ugandan applied research, innovation, extension, farmer education and disease control institutions; on the provision of inclusive farmer training and demonstration of improved farm systems appropriate to the Ugandan context and with specific attention on the role of women; on the development of stronger milk and meat value chains; and on the creation of benefits for smallholder farmers through improved household income and food security. Through the creation of long-term institutional relationships between Irish and Ugandan partners, the benefits of project activities can be sustained after the funded period of project actions has ended.

##### **Background – Cattle Livestock in Uganda**

Cattle keeping in Uganda is conducted at a wide range of scales and socioeconomic levels. Cattle ownership is linked to status, wealth and security and cattle are often kept for more than economic reasons. Extensive nomadic cattle production is practiced by both the political elite in Uganda and by the most marginalised communities in the country. Extensive cattle production is usually practiced in the drylands, in areas unsuitable for other agricultural enterprises. There have been many, and continuing, attempts to “modernise”, nomadic pastoralism (i.e. sedentisation and ranching), but the current consensus is that nomadic pastoralism is still the most effective way to utilise sparse and heterogeneous resources and that improving security, resilience to climate shocks and integrating pastoralists into markets will provide the greatest improvement to pastoralist livelihoods.

Large and medium scale dairy farms exist but the majority of milk production is by households stall-feeding one of two cows and stall-fed dairying has proved to be an effective route out of poverty. Outside the commercial dairy farms the dairy sector is dominated by women, who in many Ugandan cultures control the production, processing and sale of milk and critically, the use of milk within the household. Much of Uganda has traditionally relied on oxen for animal traction for crop production, particularly in the East and North, and at one stage Uganda was a leader in the production of animal traction equipment. Leather is an important industry for both exports and local production, though one dominated by a limited number of buyers, and there have been several initiatives to improve and maintain the quality of hides produced by the smallholder sector.

Over the past decade the cattle population in Uganda has shown modest growth in the period 2008 to 2018 (Figure 1) increasing from 11.4m to 14.6m<sup>1</sup>. Most cattle, 93% (13.6 million), are native breeds or crosses from native breeds<sup>1,2</sup>. 1.4 million households have at least one cow with the majority of cattle located in a diagonal belt extending from South-Western to North Eastern Uganda, in an area commonly known as the cattle corridor<sup>3</sup>.

Most cattle in Uganda are dual purpose cows, providing milk which is primarily consumed at home with cows and offspring eventually sold to traders or butchers for beef<sup>4</sup>. This dual aspect is highlighted by the seemingly conflicting estimates of the dairy and beef national herds, with the national dairy herd estimated as 13.8 million<sup>5</sup> while the national beef herd has been estimated at 11.9 million<sup>1</sup>.

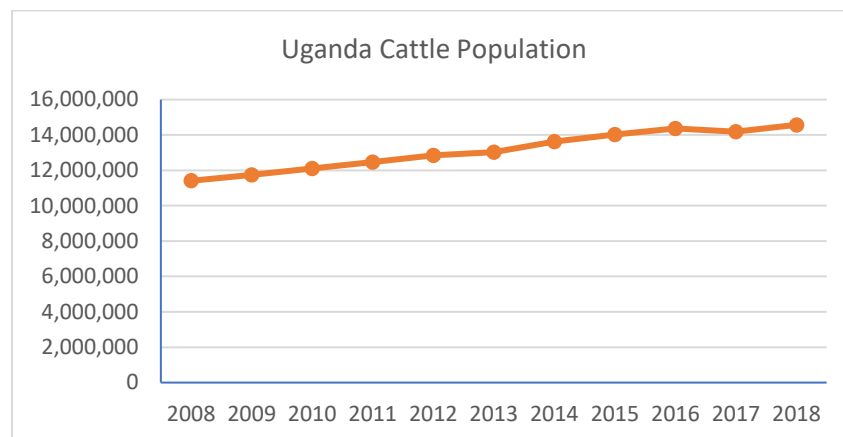


Figure 1: Uganda Cattle Population 2008 to 2018 (Source: Uganda Bureau of Statistics)

Like other parts of East Africa, livestock agriculture in Uganda is unable to realise its optimum contribution to the food system in terms of food security, nutrition, resilience, economic empowerment, inclusion of women and young people, and innovation, due to the following:

- lack of well-functioning and integrated value chains which would link consumer and nutrition needs to domestic primary production, leading to a dependence on imported food such as dairy powders
- low productivity of livestock commonly attributed to weaknesses in:
  - availability of water and good quality feed and digestible forages, especially on smallholder farms, with a dependence on bought-in feed and lack of access to sufficient fodder in dry seasons
  - genetics and animal breeding
  - animal management and husbandry

<sup>1</sup> Uganda Bureau of Statistics, Statistical Abstract 2019, <https://www.ubos.org/statistical-abstract-2019/>

<sup>2</sup> F. Kabi, V. Muwanika and C. Masembe (2016). Indigenous cattle breeds and factors enhancing their variation, potential challenges of intensification and threats to genetic diversity in Uganda, *Animal Genetic Resources*, Volume 58, June 2016, pp. 1-12, <https://doi.org/10.1017/S2078633615000326>

<sup>3</sup> Uganda Investment Authority, Agriculture (Beef) 2016 <https://www.ugandainvest.go.ug/wp-content/uploads/2016/02/AGRICULTURE-Beef.pdf>

<sup>4</sup> Africa Sustainable Livestock 2050, Livestock Production Systems Spotlight, Uganda, Beef and Chicken Meat, 2018 <http://www.fao.org/3/i8713en/i8713EN.pdf>

<sup>5</sup> Options for Low-Emission Development in the Uganda Dairy Sector: Reducing enteric methane for food security and livelihoods. Published by the Food and Agriculture Organization of the United Nations and the New Zealand Agricultural Greenhouse Gas Research Centre, Rome, 2019 <http://www.fao.org/3/CA3375EN/ca3375en.pdf>

- animal health and disease control, influenced by weaknesses in surveillance and public veterinary services, compounded by livestock management practices and susceptibility to animal and plant diseases, including aflatoxins, and prevalence to tick-borne diseases, and poor-quality animal health products.
- difficulties for smallholders in accessing technologies like AI
- under-resourced and thinly-spread extension services
- lack of market-driven innovation support systems, arising from the disconnect and limited interaction between research providers, farmers and private sector
- a range of milk and meat quality issues arising from residues, contaminants, hygiene practices, adulteration, transportation infrastructure, small-scale and low-quality abattoirs etc.
- transactional relationships between dairy farmers, co-operatives and processors contributing to underused capacity and a reliance on informal markets
- vulnerability to climate change impacts and abnormal weather patterns including drought and flooding, and adaptability of current breeds and fodder species to predicted changes in climate and climate-related disease risks.

### Dairy

Uganda is experiencing a growing demand for dairy products in both its domestic and East African export markets. This demand is driven by a growing population, increasing disposable income and increasing urbanisation. National milk production in 2018 reached 2.04 billion litres up from 1.6 billion litres in 2017<sup>1</sup>. Over the past decade, total milk production has shown a modest increase with supply evenly split between local and exotic breeds (Figure 2). Estimates for *per capita* milk consumption in Uganda vary between 36l<sup>6</sup> and 58l<sup>7</sup>, far lower than the 110l *per capita* in neighbouring Kenya<sup>8</sup>.

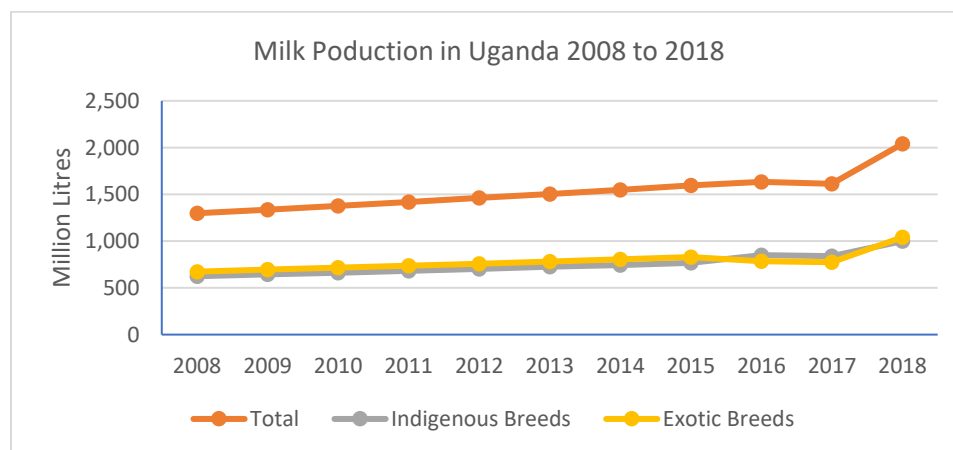


Figure 2: Milk production in Uganda (Source: Uganda Bureau of Statistics)

<sup>6</sup> Africa Sustainable Livestock 2050. The Future of Livestock in Uganda – Opportunities and Challenges in the face of Uncertainty. FAO 2019. <http://www.fao.org/3/ca5420en/ca5420en.pdf>

<sup>7</sup> Nationally Appropriate Mitigation Action on Climate Smart Dairy Livestock Value Chains in Uganda, United Nations Development Programme, 2017 <https://www.undp.org/content/undp/en/home/librarypage/environment-energy/mdg-carbon/NAMAs/nama--climate-smart-dairy-livestock-value-chains-in-uganda.html>

<sup>8</sup> Kenya Dairy Industry: Status and Outlook, Margaret Rugut Kibogy, Ogw, Managing Director-Kenya Dairy Board, Presented at the 15<sup>th</sup> Esada Dairy Conference and Exhibition, Kenyatta International Conference Centre, Nairobi, 14 August 2019 <https://dairyafrika.com/afda/wp-content/uploads/2019/08/MARGARET-KIBOGY.pdf>

The dairy industry is the most important livestock sub-sector, estimated to contribute about 50% of livestock-related GDP<sup>9</sup>- nearly 20% of the total agricultural GDP<sup>5</sup>- and has maintained an average positive growth rate of 3% per year<sup>10</sup>. Dairy production is dominated by small-scale farmers who own 98% of the national dairy herd and contribute nearly 86% of national milk output<sup>5</sup>. Most milk (80%<sup>11</sup>) is sold on the informal market, with just 20% sold for processing<sup>5</sup>. The dairy sub-sector contributes to the livelihoods of 1.2 million dairy farming households through income generation, employment and food. Amongst this sub-sector are some of the poorest and most marginalised, with some 23% of those households headed by women farmers<sup>5</sup>. These traditional small-scale farms are characterised by small herds of low yielding animals.

There are six distinct milksheds (milk producing regions) along the cattle corridor. The Western and Central regions have higher populations of exotic and crossbreeds. While the Central region has the highest milk productivity at 9.8 litres/cow/week<sup>12</sup> and commands the best prices due to proximity to the urban areas of Kampala and Entebbe. The Peri-urban dairy sector, based on stall-fed cut and carry dairy systems provide a significant amount of milk through informal markets, and has been widely promoted by NGOs.

### *Beef*

Cattle are the main source of meat in Uganda. The production of beef in 2018 was 217,065 MT representing a 2.7% increase from 211,358 MT the previous year<sup>1</sup>. Beef production comes predominantly from indigenous breeds (shorthorn Zebu, long horned Sanga, Ankole, Turkana and Toposa) which are mainly kept under an extensive system characterised by low productivity per animal and per acre, often on land unsuitable for other agricultural systems. The majority of the national herd, 90%, is kept under pastoral and mixed small holder farming systems, while commercial beef ranching accounts for less than 10%. The main sources of beef come from culled animals and excess steers in the various farming systems<sup>3</sup>.

### *Processing Sector*

The dairy and beef processing sectors both suffer from a high level of over-capacity. The 9 largest dairy processors run at 57% of capacity and the sector as a whole at 66% capacity<sup>13</sup>. The situation in the beef sector is more severe which runs at less than 20% of capacity (having previously been well-organised and a source of exports across East Africa). High transport and electricity costs have been cited as contributing factors. In general cattle are slaughtered near the point of sale and consumption.

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<sup>9</sup> Balikowa, D. (2011). Dairy Development in Uganda, A Review of Uganda's Dairy Industry. Ministry of Agriculture Animal Industry and Fisheries (MAAIF), Food and Agriculture Organization of the United Nations, and Dairy Development Authority (DDA). <http://www.fao.org/3/a-aq292e.pdf>

<sup>10</sup> International Finance Corporation (2019) [https://www.ifc.org/wps/wcm/connect/news\\_ext\\_content/ifc\\_external\\_corporate\\_site/news+and+events/news/impact-stories/uganda-dairy-farmers-develop-taste-for-new-markets](https://www.ifc.org/wps/wcm/connect/news_ext_content/ifc_external_corporate_site/news+and+events/news/impact-stories/uganda-dairy-farmers-develop-taste-for-new-markets)

<sup>11</sup> Uganda Dairy Processors Association, Some Facts, <https://dairyuganda.com/>

<sup>12</sup> Factsheet Dairy Sector Uganda, Dutch Ministry of Foreign Affairs, 2016 <https://www.agroberichtenbuitenland.nl/binaries/agroberichtenbuitenland/documenten/rapporten/2019/04/11/factsheet-dairy-sector-uganda/Factsheet+Dairy+sector+Uganda.pdf>

<sup>13</sup> Agro-industrialisation in Uganda, International Growth Centre, F-IH-UGA-006-2, 2019. <https://www.theigc.org/wp-content/uploads/2019/11/Fowler-and-Rauschendorfer-2019-Working-paper-v2.pdf>

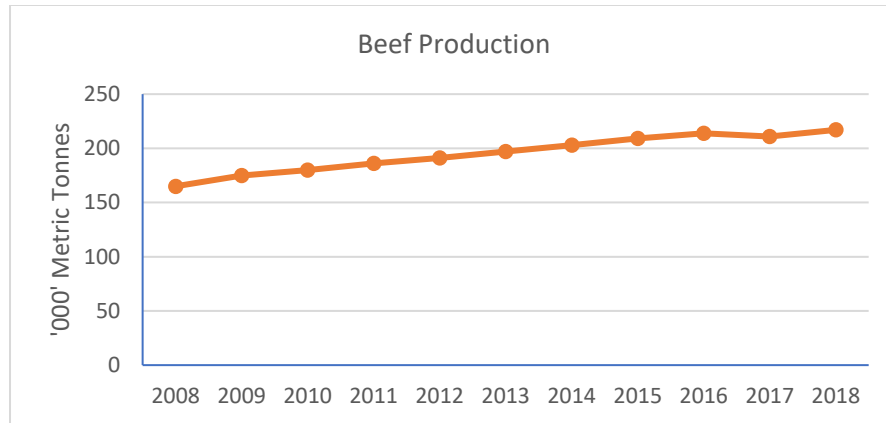


Figure 3: Beef Production in Uganda 2008 to 2018 (Source: Uganda Bureau of Statistics)

## 2. Design Assignment

The project partners are required first to undertake a design assignment, scheduled between September and end December 2020. The objective is to examine the feasibility of a range of potential interventions and capability-building measures, to assess the associated resource requirements and potential impacts, and agree with Embassy Kampala a final project plan and budget, with a view to implementation between 2021 and 2025, probably in two phases (phase one to end 2022, phase two to end 2025).

The range of potential interventions to be examined will include, but not be limited to:

- *Applied research and innovation and related institutional strengthening.* The Teagasc counterpart in Uganda is the National Agricultural Research Organisation (NARO) and its livestock subsidiary body, the National Livestock Resources Research Institute (NaLIRRI). Applied research into productive farm systems, including genetics, breeding, animal nutrition, fodder production and conservation can play a leadership role in terms of establishing the evidence of farm system performance in the Ugandan context, contributing to future policy creation and serving to demonstrate good livestock practice for farmers. The creation of a joint research agenda between participating institutional partners will be an important element of long-term institutional relationship-building. In order to strengthen Ugandan service delivery in this area, capability-building needs in problem-oriented research, including in physical infrastructure, should be assessed.
- *Demonstration farm infrastructure.* On-station and on-farm demonstration methods are key extension tools to show good practice and research outcomes, especially on farm systems, animal genetics, fodder production and conservation, animal health and environmental efficiency. However, Uganda has had many demo farm investments, many of which have not survived donor-funded project duration. The assignment should review the options and viability for creating or restoring demonstration facilities.
- *Innovation support.* Improving knowledge transfer and development of new extension methods including peer-to-peer learning and digital tools are especially important and should be integrated into improved delivery methods. The assignment should also identify pilot regions and potential producer group/co-operatives and their farmer networks as participating partners in extension and value chain activities supported under the project.

- *Animal Health.* Ugandan livestock farming suffers from the prevalence of tick-borne diseases. An effective strategy based on test and selective treatment, using locally based, low-cost veterinary investigation laboratories, has proven effective in other countries in the region to target productive and zoonotic diseases and reduce overuse of medicines and antimicrobial resistance (AMR). A pilot approach in one region should be examined for feasibility and cost-benefit.
- *Livestock Value Chain Capacity.* By assessing and testing needs for value chain development, specific interventions under a menu of options (e.g. breed of cow/ cattle traits, feeding systems, fodder production and conservation, mixed crop-livestock systems, access to finance, milk collection and processing, meat processing infrastructure including leather, milk and meat marketing, inclusion strategies etc) can deliver improved outcomes for farmers, processors and consumers. The design assessment should narrow the potential interventions for further assessment and implementation under the long-term project.
- *Digital Tools.* Tools for collecting and using data in a systematic way, combined with an extension network and linked to potential offtakers in the value chain, could present significant gains in terms of smallholder participation in formal value chains. The assignment should examine the application of a number of digital tools for use in extension and value-chain integration activities – for instance, data collection systems that are used to locate and identify smallholder farmers. GIS mapping and other tools may also be examined for relevance.
- *Vocational Education.* The opportunity to build the capacity and curriculum of Ugandan agriculture education should be examined, with the possibility of creating an institutional relationship between Teagasc and private vocational colleges in Ireland and their counterparts in Uganda.
- *Gender:* The study will look at protecting and expanding womens’ roles in the livestock sector and opportunities to address barriers to women’s investment in the livestock sector.

### **Resources to be Applied**

Fieldwork in Uganda and Ireland will be required to gather information, test ideas and gain acceptance with stakeholders including:

- Embassy of Ireland Kampala
- Ministry of Agriculture, Animal Industry and Fisheries
- Local government in one or two regions, including extension management
- National Agricultural Research Organisation (NARO)/NaLIRRI
- Uganda Agribusiness Alliance
- A selection of Ugandan dairy producer groups/co-operatives
- Pastoralist Associations/ Alliances
- Ugandan farmers representatives
- Mid and large sized commercial dairy and beef farmers
- Commercial dairy and meat processors
- Farm education providers and agriculture faculties of lead Universities
- Digital tools providers – AgriFarm Uganda and GeoGecko
- Veterinary public health authorities

- Other development partners - EU Delegation, FAO, other active bilateral donors, Livestock NGOs (VSF, Heifer International) etc.

In Ireland, the team will consult with Teagasc dairy, beef, education and extension specialists, and other research performing organisations as appropriate. Depending on Covid-19 restrictions, if it is possible to field an expert team from Ireland, this will be part of the design process. If not, the locally based team will be supported by virtual and online participation from Ireland.

### **Deliverables**

The team will present a summary concept note by end November 2020, with a draft proposal by end December 2020, followed by a final proposal reflecting feedback from the Embassy of Ireland Kampala.