

Sustaining genetic improvement for more milk in Tanzania

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Introduction

Smallholder dairy cattle systems in Tanzania and elsewhere in Africa are predominantly based on crossbreeds between exotic dairy breeds (*Bos taurus*) and local indigenous cattle (*Bos indicus*) with breed compositions ranging from almost pure indigenous to almost pure exotic (1). The exotic breed composition of cows under smallholder systems in Tanzania averages at 0.78 ± 0.2 (2), which is very high for smallholder farmers to manage. More than 80% of cows are bred to local and uncertified bulls primarily because artificial insemination (AI) service is unreliable or unavailable in most areas and/or some farmers exercise free grazing. However, there are a few dairy animals in the country estimated at 1.2 million heads and there was a recorded annual increase of 3% in milk production from 3.01 billion litres in 2019/2020 to 3.1 billion litres in 2020/2021 (3).

The recording system

A Dairy Performance Recording Center (DPRC) established through the ADGG initiative is registering dairy farmers and their cattle. New data collated from the dairy farms is captured using Open Data Kit (ODK) and linked to a centralized database with physical (phenotypic) and genotyped characteristics of dairy cows and bulls. This information is used to estimate

Key messages

- Herd recording is the basis of improvements of production efficiency worldwide. An Information and Communications Technology (ICT)-based national recording system that captures dairy farmers' data and in turn provides feedback including extension messages has been shown to effectively operationalize herd recording for smallholder farmers in Tanzania.
- Animal identification and registration at the farm level underpins the genetic evaluation component of the recording system and should be institutionalized and financed by responsible authorities as part of the national herd recording system.
- Sustaining the recording system as part of the national breeding program requires concerted participation of the government, private sector, breed societies and associations. Government must deliberately invest to sustain the recording system and incentivize other players through appropriate policies and regulations.

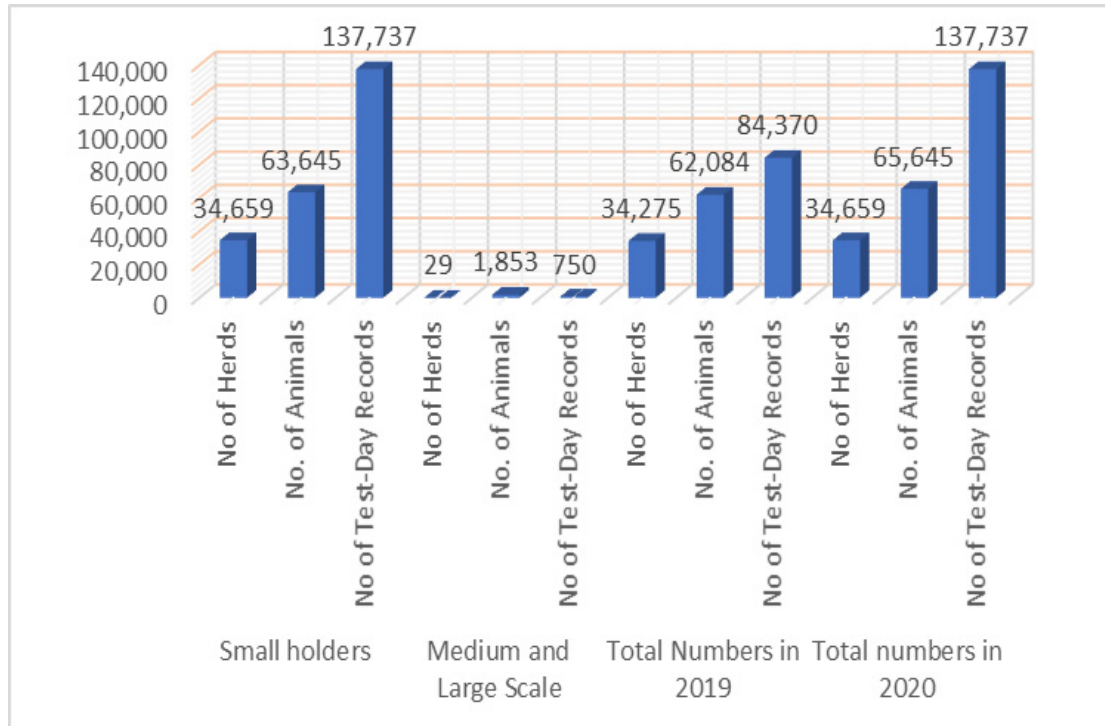
breeding values for ranking and selection of bulls and cows. The DPRC database has so far (2021) collected records totaling 34,659 herds, 65,645 animals from which 137,737 test-day milk records have been documented digitally (Figure 1). Up-to-date summaries on performance of animals are available via the [ADGG Data Platform-Tanzania](#).

Recommendations for sustainability

- The use of genomic evaluation in the selection of improved bulls and cows will enable selection of young bulls at an early age. NAIC should continually select top-ranked bulls for semen production that can be accessed by smallholder farmers.
- Public livestock extension officers have played a key role as Performance Recording Agents (PRAs) alongside other public and private AI technicians in linking farmers to the DPRC. We recommend that this role be enhanced for more public extension officers and other extension service providers.
- The engagement of other actors and stakeholders such as dairy farmers' cooperatives, groups and associations, medium-sized and large dairy processing plants, the NAIC, public and private universities, research institutions, the Tanzania Milk Producers Association and the Tanzania Milk Processors Association was equally important. They provide advisory, training, input supply and marketing services to the dairy sector. The Ministry of Livestock and Fisheries, Tanzania Livestock Research Institute (TALIRI) and Tanzania Dairy Board have to work more closely in ensuring stronger stakeholder engagement for genetic improvement.
- Concerted effort is required to ensure that the Livestock Identification, Registration and Traceability Act (2010) is fully enforced. It is equally important to ensure that the necessary identification facilities including ear tags are available and affordable.
- The NAIC should be strengthened to sustainably produce and avail semen of desirable sires and to support expansion of AI as a profitable business especially for the young entrepreneurs.

The African Dairy Genetic Gains (ADGG) Program has been implemented in Tanzania in seven regions (Arusha, Kilimanjaro, Tanga, Iringa, Njombe, Mbeya and Songwe) and in their respective 24 Local Government Authorities (LGA) since November 2016. The goal of [ADGG](#) is to develop and support herd data capture, analytics and feedback systems that are underpinned by public-private partnerships and that have a clear route to long-term sustainability of genetic improvement and profitability of dairy cattle production in Africa. The Tanzanian component of the program supports a farmer-focused partnership that routinely records on-farm performance, pedigree, and genetic information on dairy cattle, synthesizes and analyses the data generated, and digitally shares feedback of the results alongside related educational messages with the farmers (<https://www.ilri.org/research/projects/african-dairy-genetic-gains>; <https://africadgg.wordpress.com/>; and <https://portal.adgg.ilri.org/>). National and international partners have contributed to the success of ADGG activities in Tanzania including the International Livestock Research Institute (ILRI), the University of New England, Land O' Lakes v37, Green Dreams Technology, the Ministry of Livestock and Fisheries, the Regional and District Administrations in respective Local Government Authorities and the National Artificial Insemination Center.

Figure 1. Dairy performance recording centre (DPRC) data in 2019 and 2020.



Source: The African dairy genetic gain platform conceptual framework.

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