Developing climate-smart management strategies to improve sustainability of smallholder dairy cattle production systems in Rwanda

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Brachiaria Mulato II grass

Why this research project matters

- Poor animal feeding practices, i.e., both quality and quantity, remain a major constraint for dairy production in Rwanda.
- In addition, climate change is expected to have negative impacts on crop-livestock systems; hence, measures are needed for more adaptive and resilient systems.
- Technologies and practices that can increase dairy production and reduce the projected impacts of climate change on the dairy sector are available, such as improved forage grasses and climate-smart agricultural practices in crop systems, but their level of adoption within dairy farming systems remains low.


Cow feeding trial in one of previous RAB trials

Overarching goal

Assess the benefits of improved forage grasses and climate-smart agricultural practices on feed production, and analyze their economic and environmental sustainability, in smallholder dairy production systems in Nyanza, Burera, and Nyagatare districts in Rwanda.

Our work is based in

The project works in the districts of Nyanza, Nyagatare and Burera. The biophysical modeling work with DSSAT will be mainly in Nyagatare and Burera as the on-station trial in Nyanza is no longer operational. The household survey will be done in all three districts.

DISTRICTS OF INTEREST
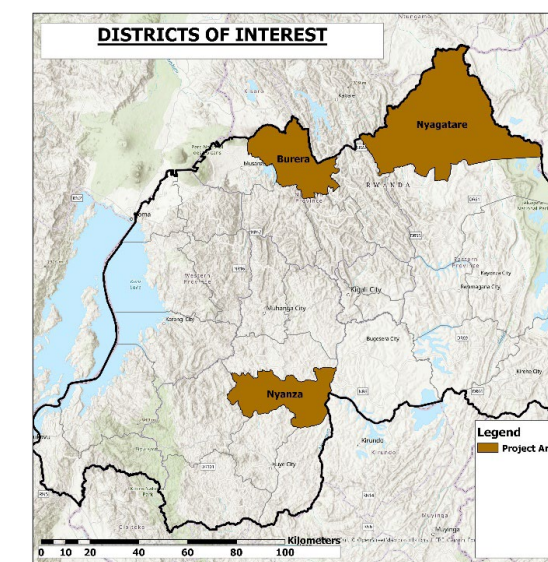
What we have done so far

✓ Completed the design of a household survey which will collect information on household characteristics, dairy farming, forage cultivation and management, climate-smart agricultural practices and market information. The survey targets 244 households.

✓ Submitted the survey for approval to Alliance of Bioversity and CIAT (ABC) Internal Review Board and completed application for the permit from Rwanda NCST

✓ Reviewed the available data for initializing,, running, and evaluating the DSSAT model and identified the missing soil data that is needed for model initialization. A protocol for collecting additional soil samples for model initialization has been developed.

Early insights

LIVESTOCK PRODUCTION SYSTEMS

ELEVATION

ANNUAL AVERAGE RAINFALL 2022
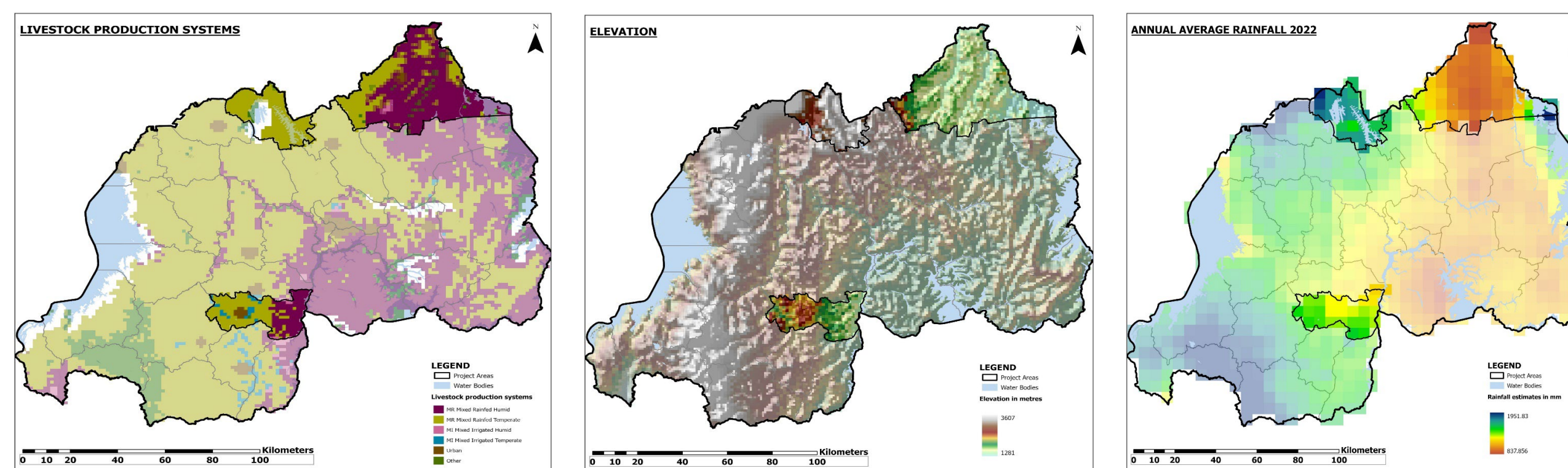
Given the differences in the livestock production systems, elevation, and precipitation patterns, the selection of the households to include in the survey will be selected taking into account these factors in order to capture the spatial variability.

On-station demonstration trial in Karama farm, Nyagatare

Our work on the cross-cutting themes

Local Capacity Development

- One farmer field day on each demonstration trial to exchange knowledge on improved management practices for forages
- Seminar on the DSSAT CROPGRO Perennial Forage model
- Training of RAB staff on the use of the farm design model

Future Livestock Systems and Resilience

- Scenarios with improved manure and water management on improved forages under climate change will inform farmer management practices.

Gender and Youth

- Household survey will inform the extent of women and youth engagement in dairy farming, forage commercialization and adoption of climate-smart agricultural practices.

Farmer field day in a previous dairy project in Rwanda