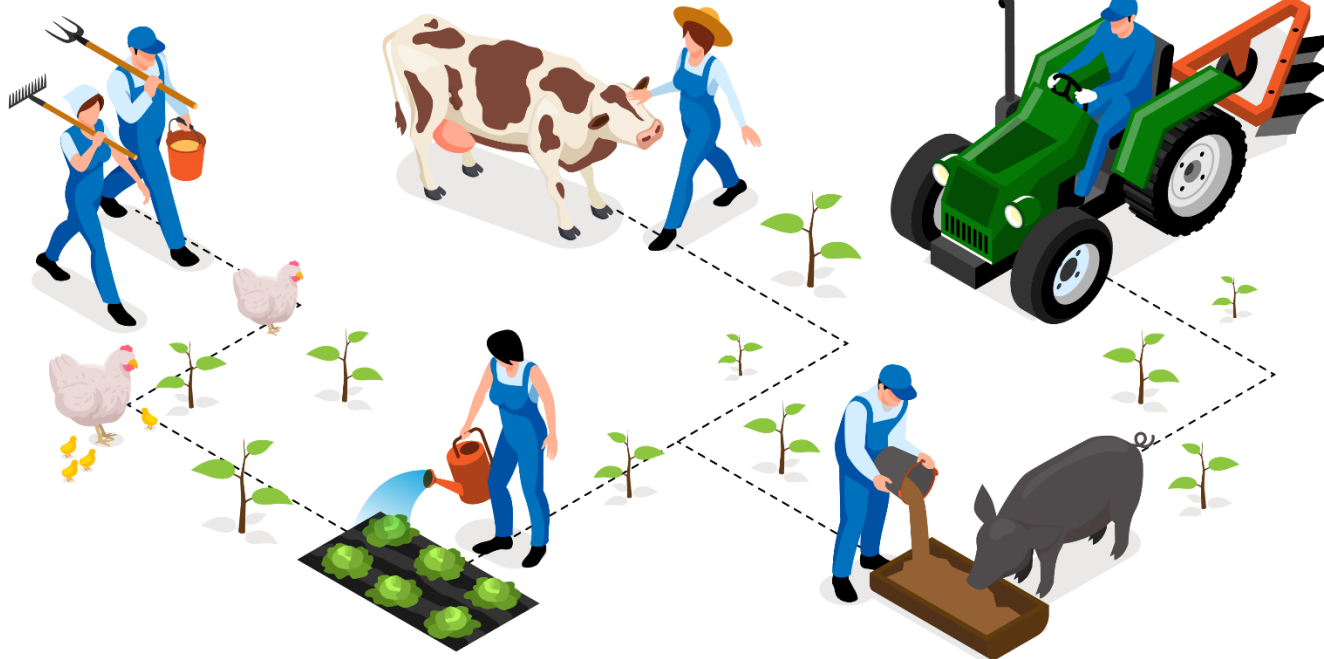


3rd one-day symposium of the Animal Task Force & the EAAP Commission on Livestock Farming Systems: *Sustainable livestock farming – defining metrics and rationalising trade-offs?*

**‘SUSTAINABLE LIVESTOCK SYSTEMS’
– what does this mean?**

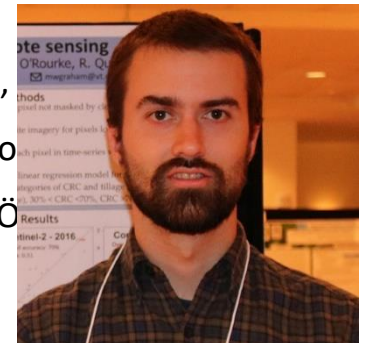


Multiple mitigation strategies can lead to GHG emissions reduction in Kenyan dairy systems

Lutz Merbold, Michael W. Graham,

Ricardo González-Quintero, Daniel Ko

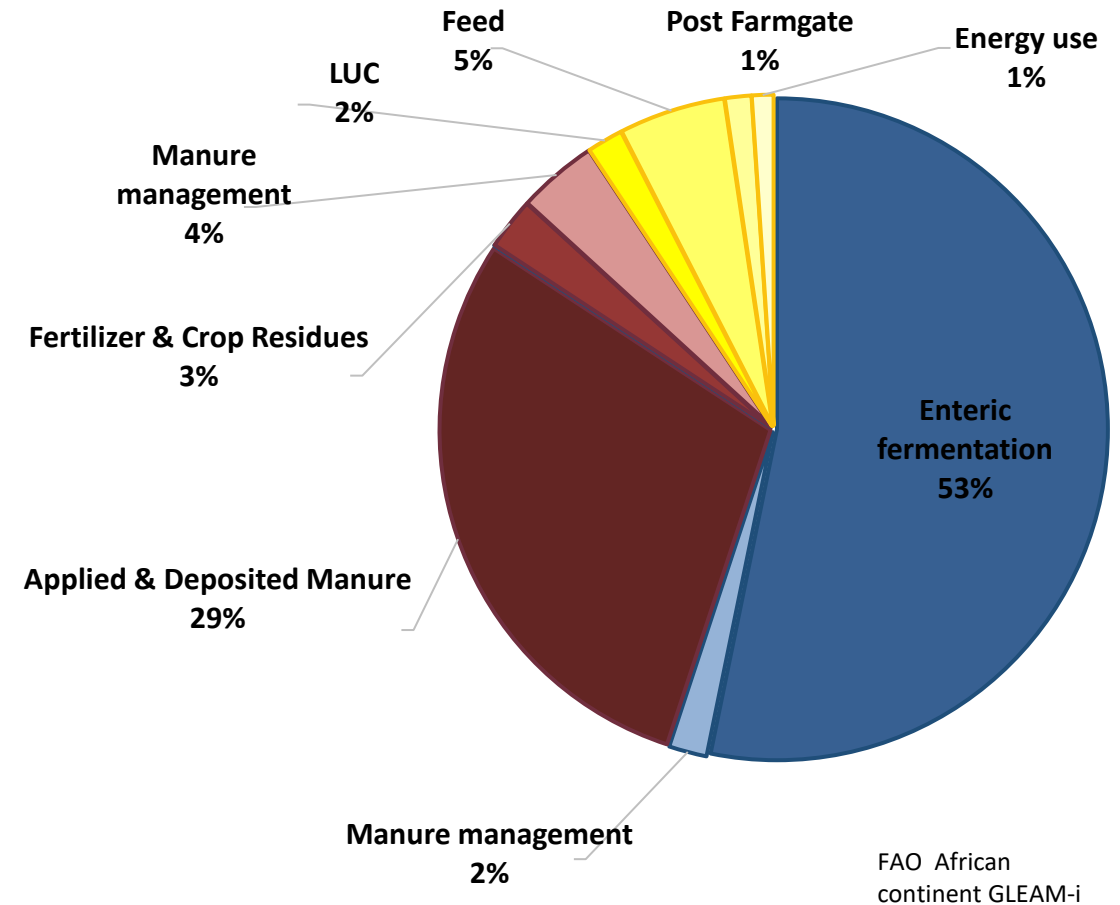
Phyllis W. Ndung'u, An Notenbaert, Seyda Ö



Background

- Livestock importance: livelihoods, food security, and income
- Livestock sector: large source of GHG emissions (33% agriculture EDGAR DB)
- Demand for livestock products will increase in the future
- African countries need to increase production while reducing emissions compared to business-as-usual (BAU)

-> need to develop locally appropriate, climate-smart interventions for the livestock sector



What would we like to know?

- Can climate-smart interventions for smallholder farming systems improve milk production and simultaneously have positive consequences on GHG emissions (i.e. emission intensities) at national scale?
- Can these interventions help to meet Kenyan national targets for milk production and GHG emissions reduction in smallholder dairy systems by 2030?

Kenya dairy systems case study - data and methods

- Resource limited mixed crop-livestock systems
small farm size (<2 ha), low milk production (<4 kg/cow/day)
- Scarcity of data on production and GHG emissions
(Mazingira Centre aims at filling this gap)
- Five interventions and three intervention packages were identified
- Upscaled data to national level and modelled business-as-usual (BAU) and intervention scenarios using the Global Livestock Environmental Assessment Model – *interactive* (GLEAM-*i*) tool



Claudia Arndt

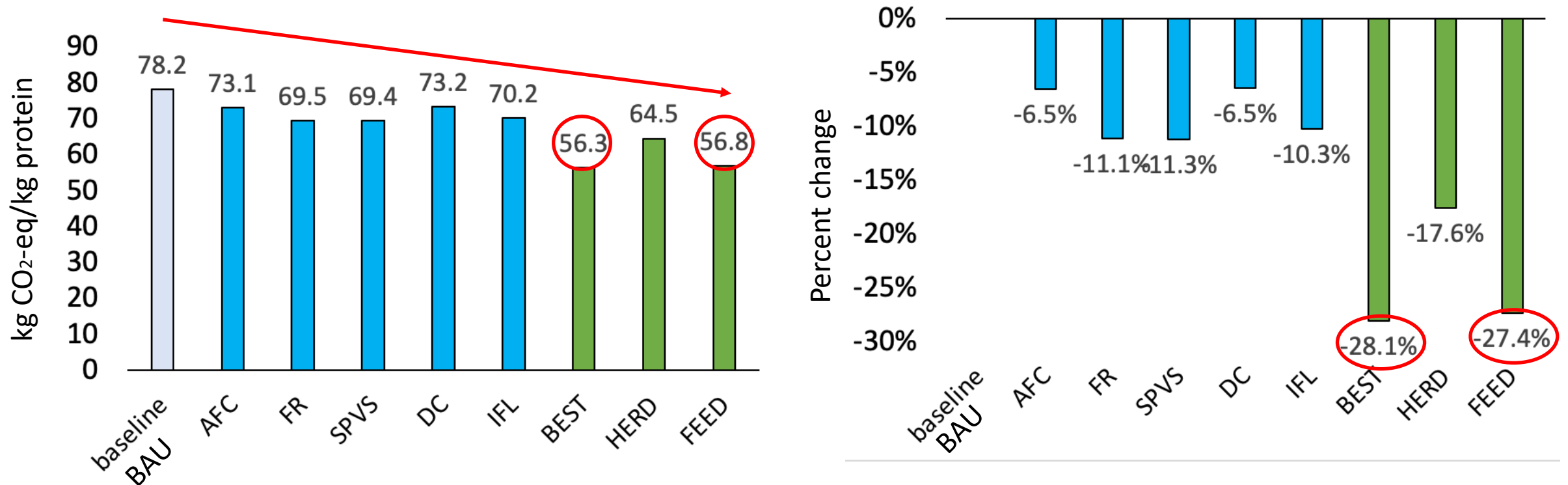
Data and methods cont.

- Five interventions tested at national scale in Kenya
SPVS (Sweet Potato Vine Silage), DC (Dairy Cubes), IFL (Improved Feeding Level), AFC (Age at first calving), FR (Fertility Rate)
- Three intervention “packages”
BEST BET (FR + SPVS + IFL); HERD (AFC + FR); FEED (SPVS + DC + IFL)

Intervention scenario	baseline-BAU value	intervention value	baseline-BAU milk yield (kg year ⁻¹)	intervention milk yield (kg year ⁻¹)
decreased age at first calving (AFC)	36 months	24 months	1449	1524
increased fertility rate (FR)	36%	60%	1449	1754
sweet potato vine silage supplementation (SPVS)	1% of diet DM	8% of diet	1449	1728
dairy concentrate supplementation (DC)	0% of diet	6% of diet	1449	1539
increased feeding level (IFL)	NA	NA	1449	1695

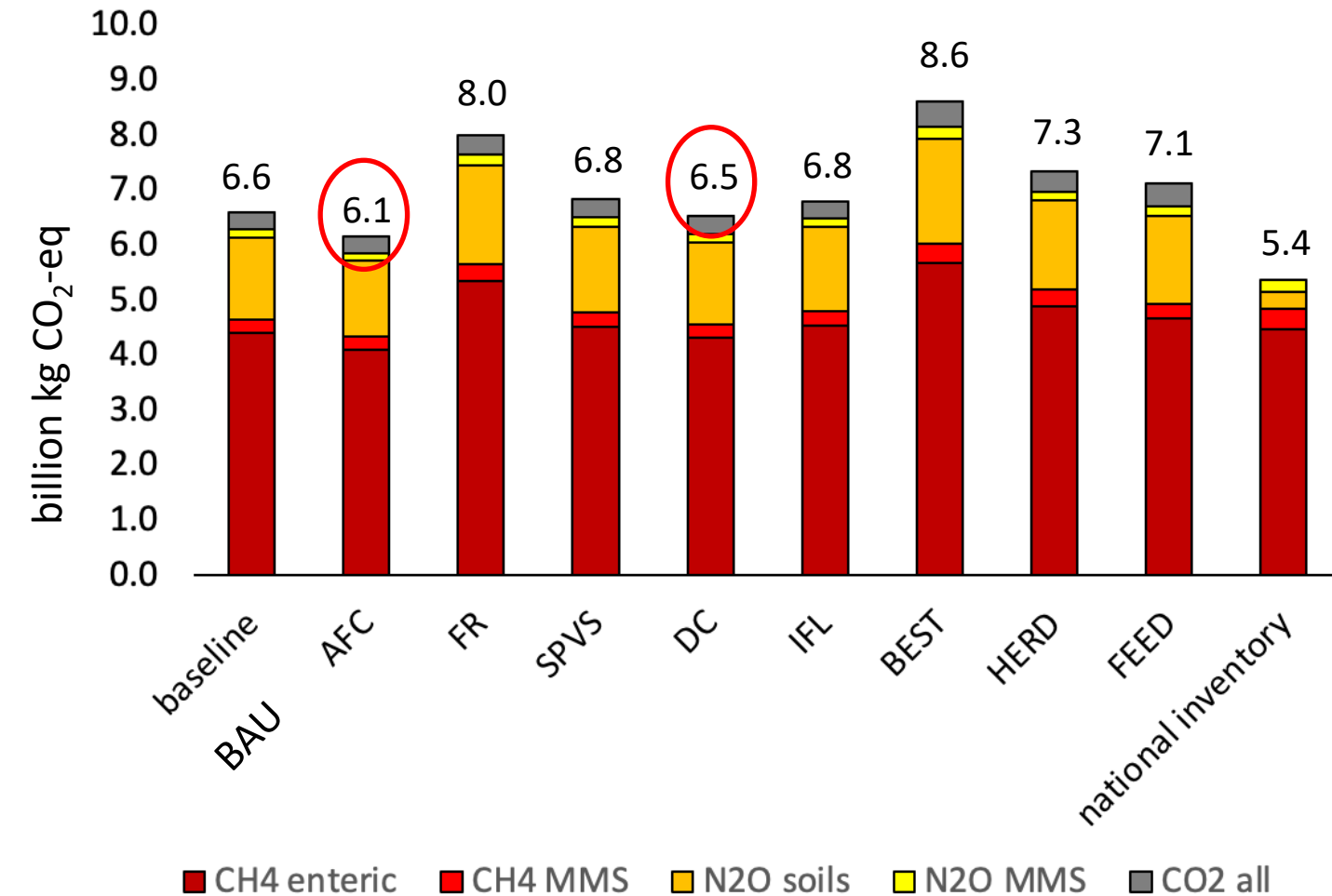
Results – Emission intensities

- Emission intensities (EIs) decreased in all scenarios
- Largest reductions for BEST and FEED intervention packages
- EIs still high compared to industrialized systems



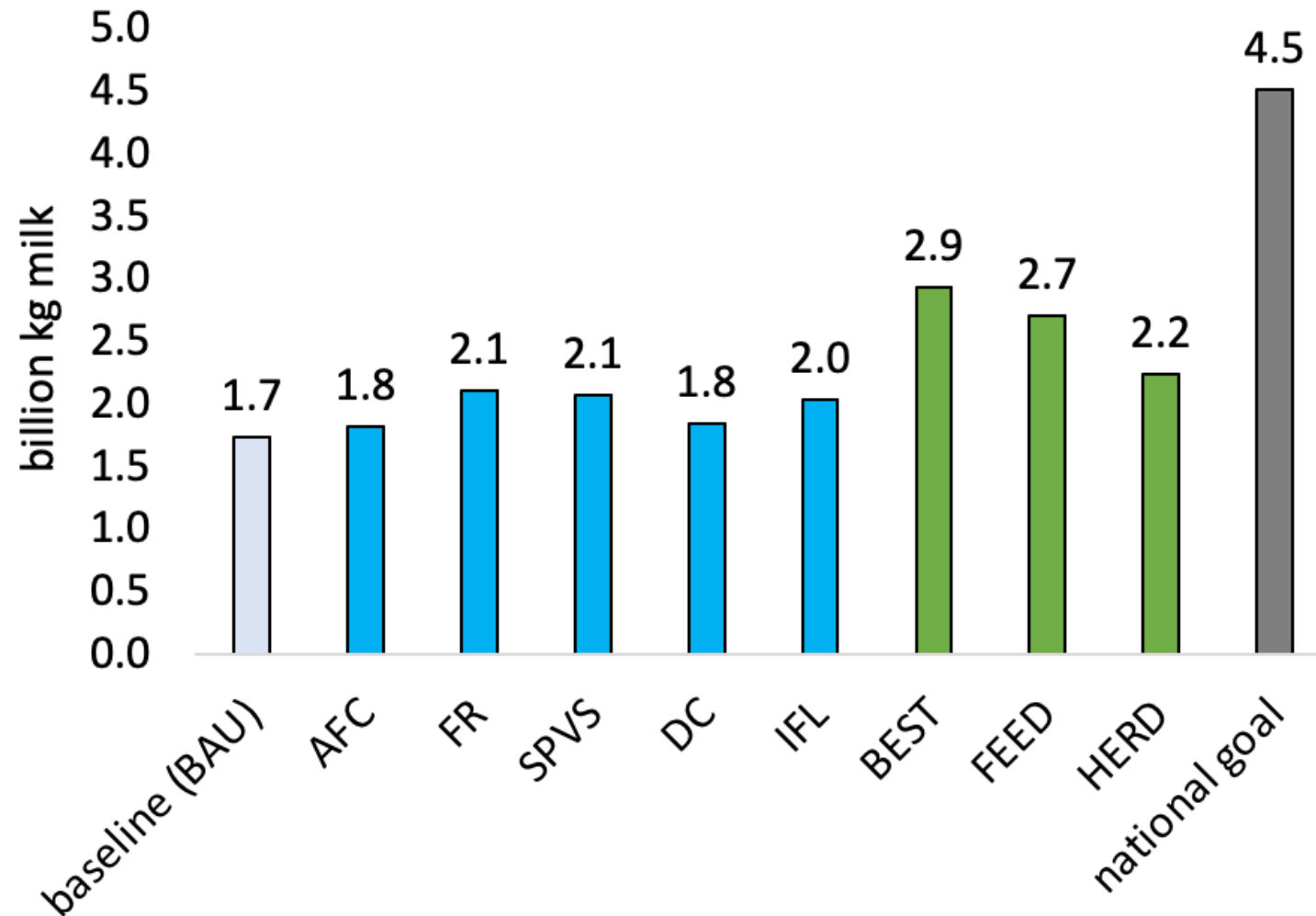
Results – Absolute emissions

- Absolute emissions went up in most scenarios, except AFC and DC
-> reduction in livestock numbers to reach a specific milk yield



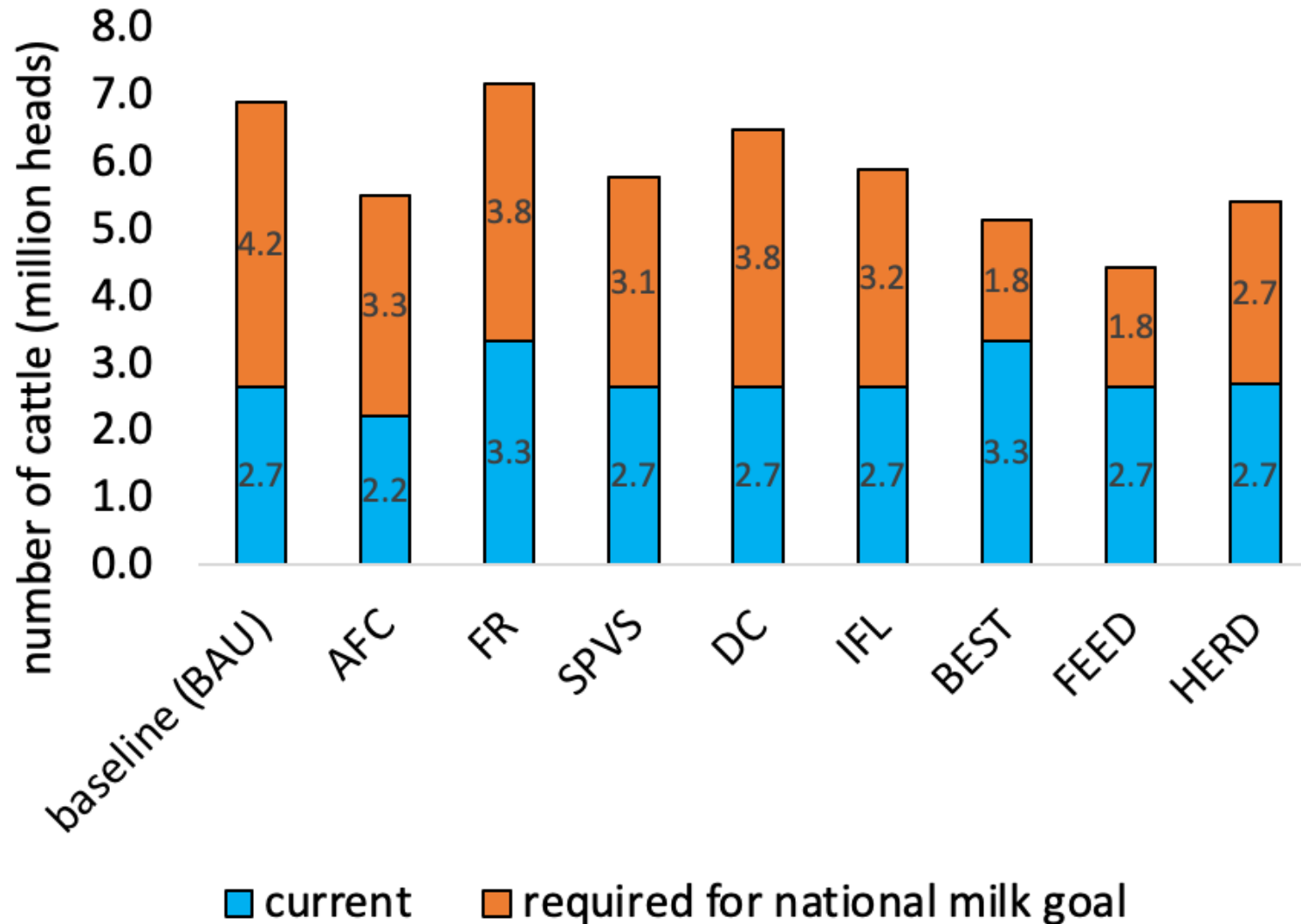
Results – Milk production

- Milk production remained lower than national goal
-> milk production increase by 150% by 2030 (9.4 billion kg milk – 4.5 smallholders)



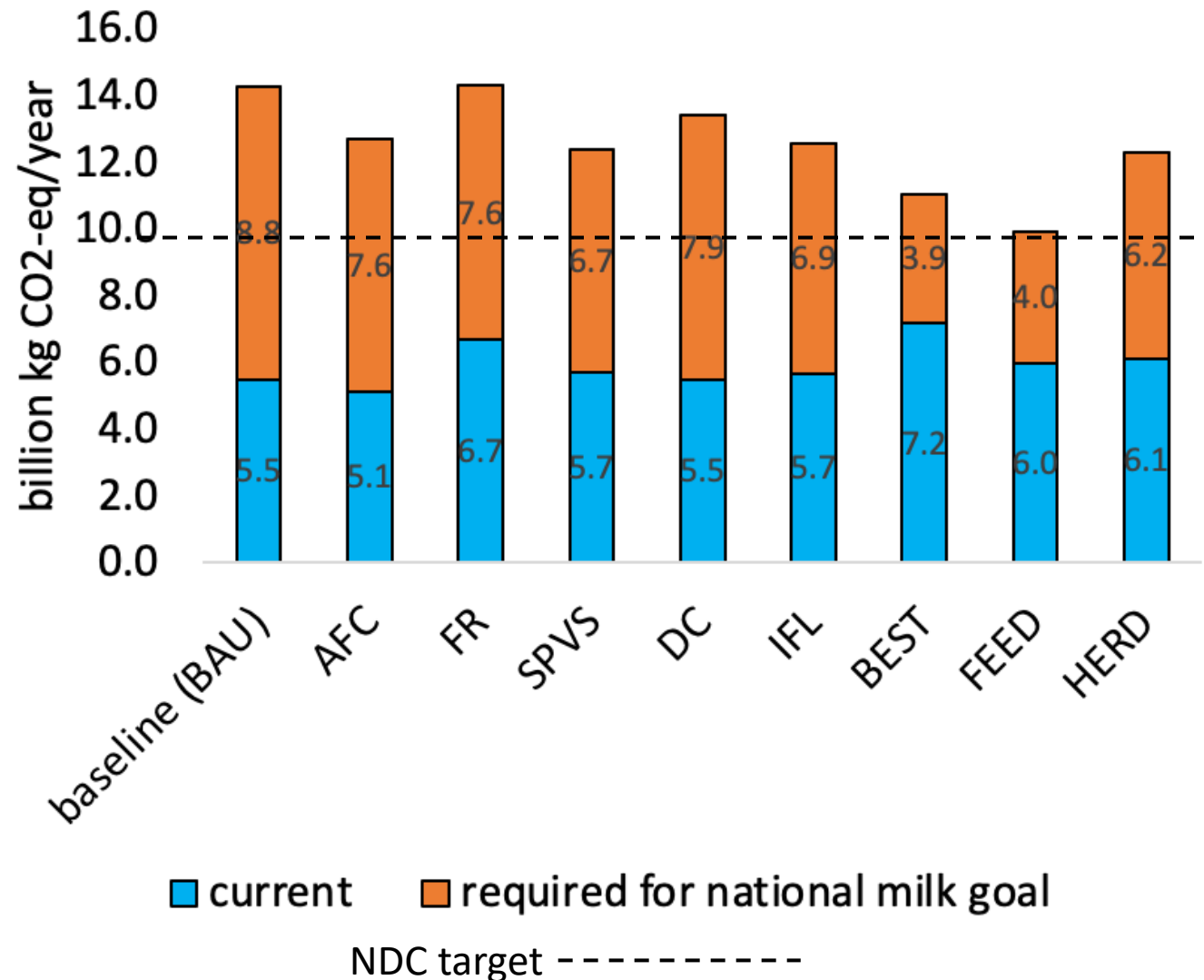
Results – What is needed to meet the demand?

- Increase in herd size to meet milk production goal for 2030



Results – Meeting NDC target for dairy GHGs?

- Kenya's NDCs state that it will reduce GHG emissions by 32% compared to BAU



Conclusions and recommendations

- Locally appropriate interventions can reduce emission intensities, but record is more mixed on absolute emissions in Kenya dairy systems
- An increase in national herd size is required to meet Kenya's national milk production goals by 2030
- None of the scenarios meet Kenya's climate goal of reducing emissions by 32% compared to BAU by 2030 (FEED is close, but...)
- Increase in animal numbers may not be environmentally sustainable
 - Examine GHG emissions and other environmental dimensions (e.g. water pollution, etc) due to land use change associated with potential expansion of feed production
 - Discrepancies between climate target and production/demand target
 - Counter effects need to be accounted for

Thank you very much for your Attention!



This research was funded by

