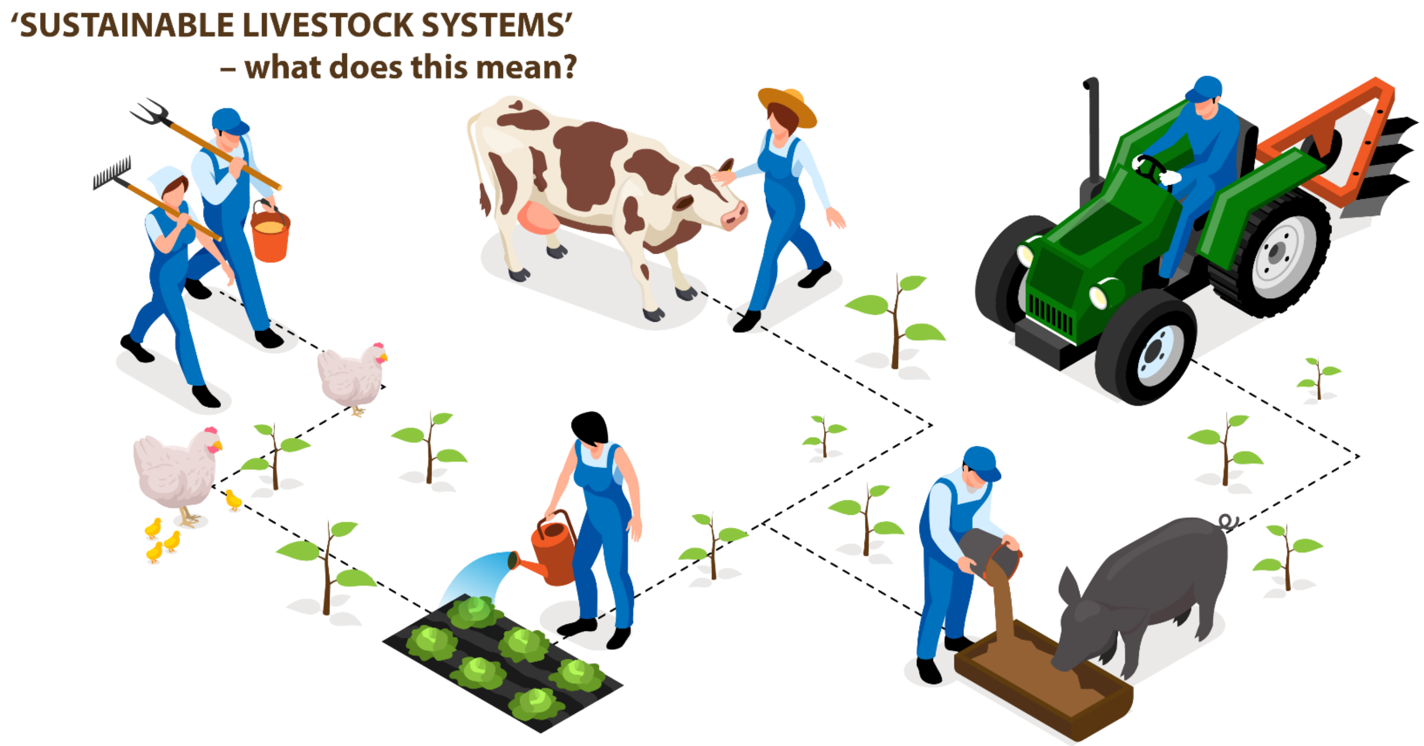
atf animal task force
A European Public-Private Partnership

EAAP
European Federation of Animal Science

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?



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

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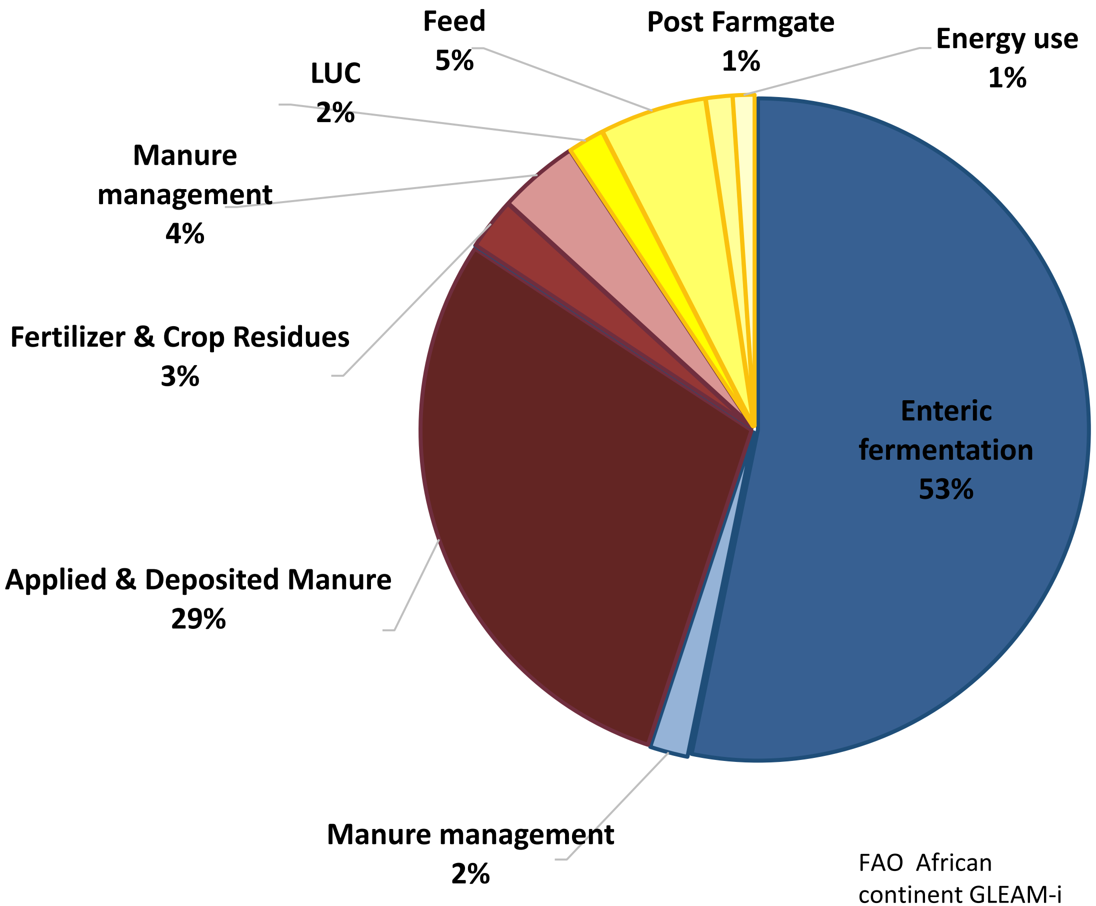
Background

- 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



FAO African continent GLEAM-i

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

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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)

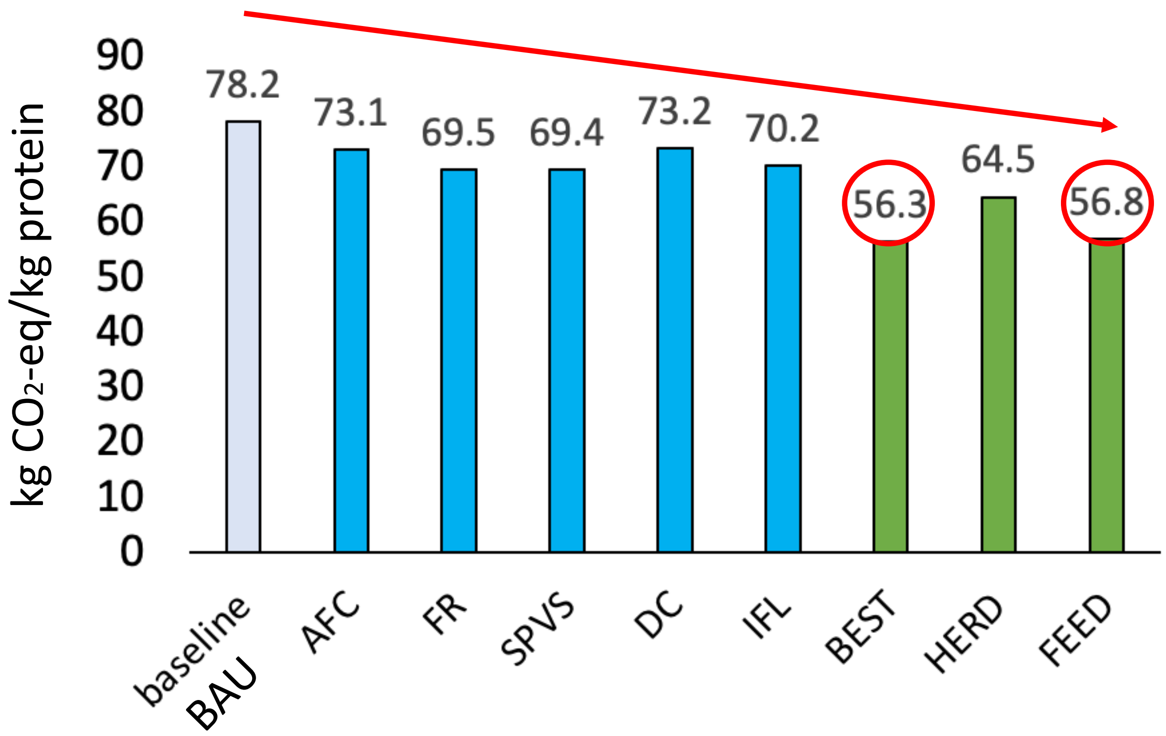
- Three intervention "packages"

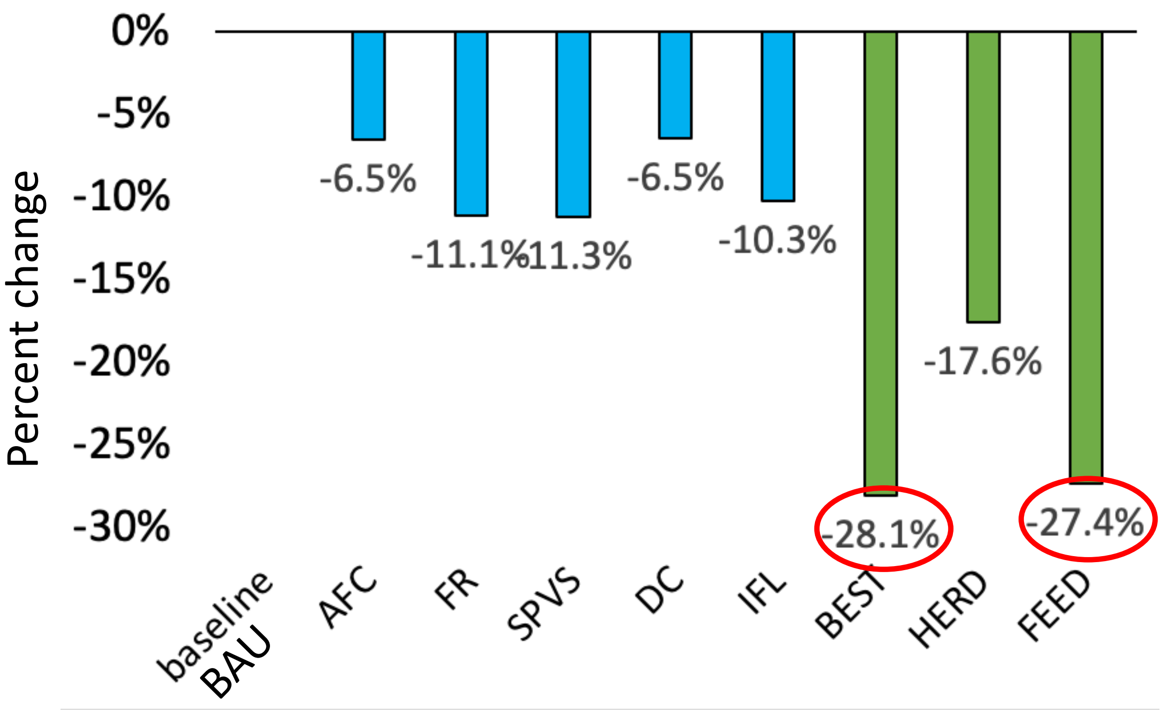
BEST BET (FR + SPVS + IFL); HERD (AFC + FR); FEED (SPVS + DC + IFL)

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

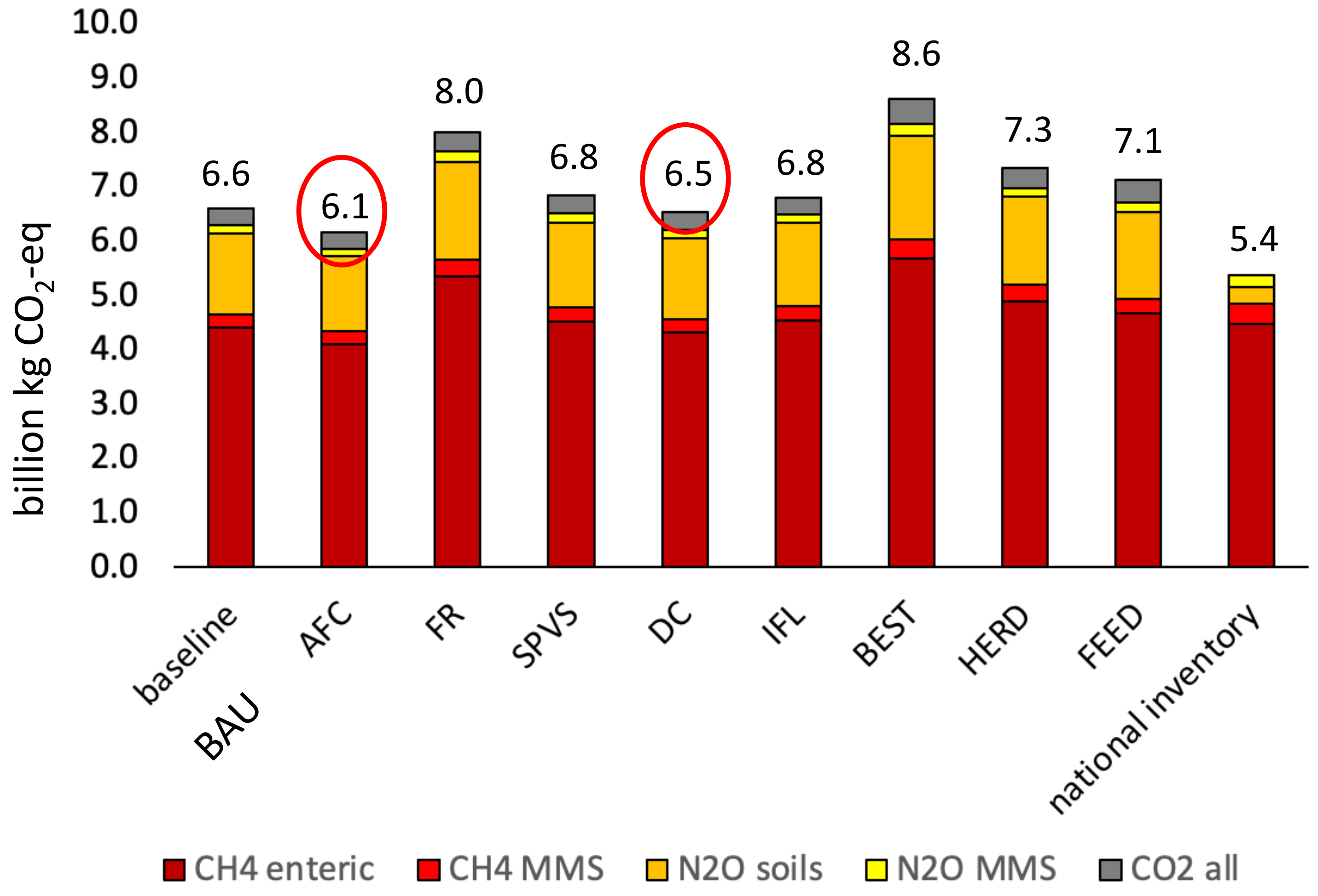




Results – Absolute emissions

- Absolute emissions went up in most scenarios, except AFC and DC

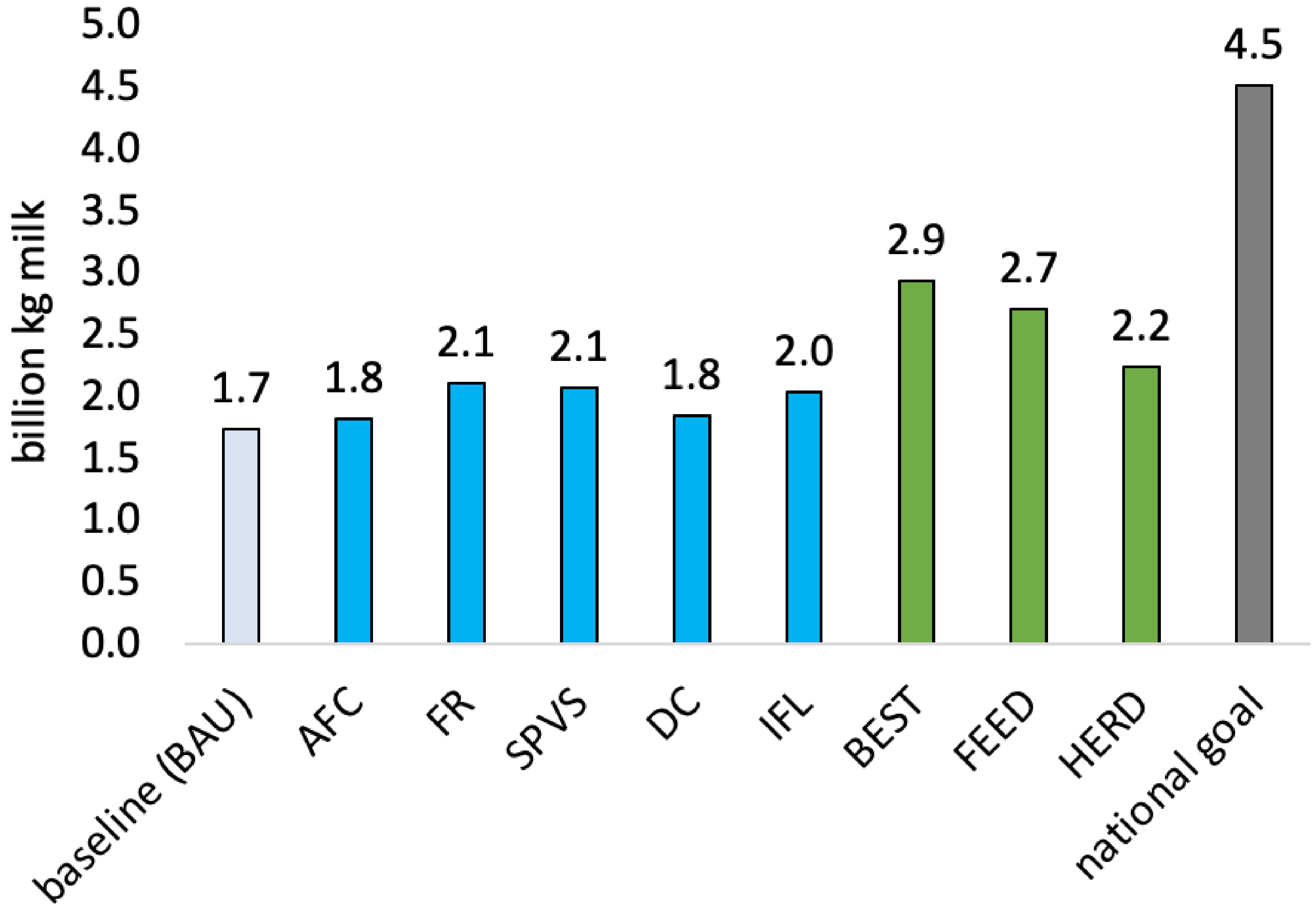
-> reduction in livestock numbers to reach a specific milk yield



Results – Milk production

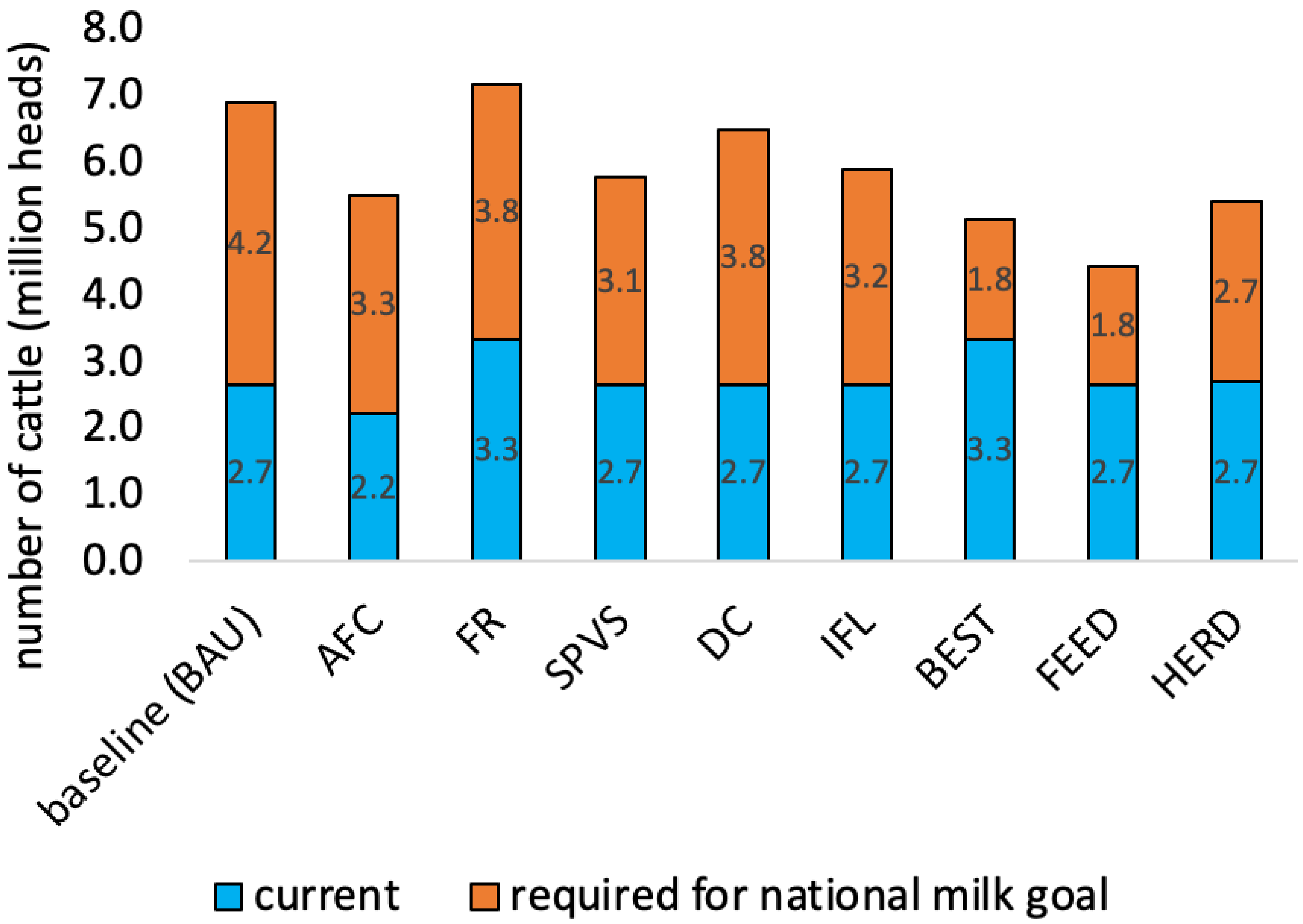
- Milk production remained lower than national goal

-> milk production increase by 150% by 2030 (9.4 billion kg milk – 4.5 smallholders)



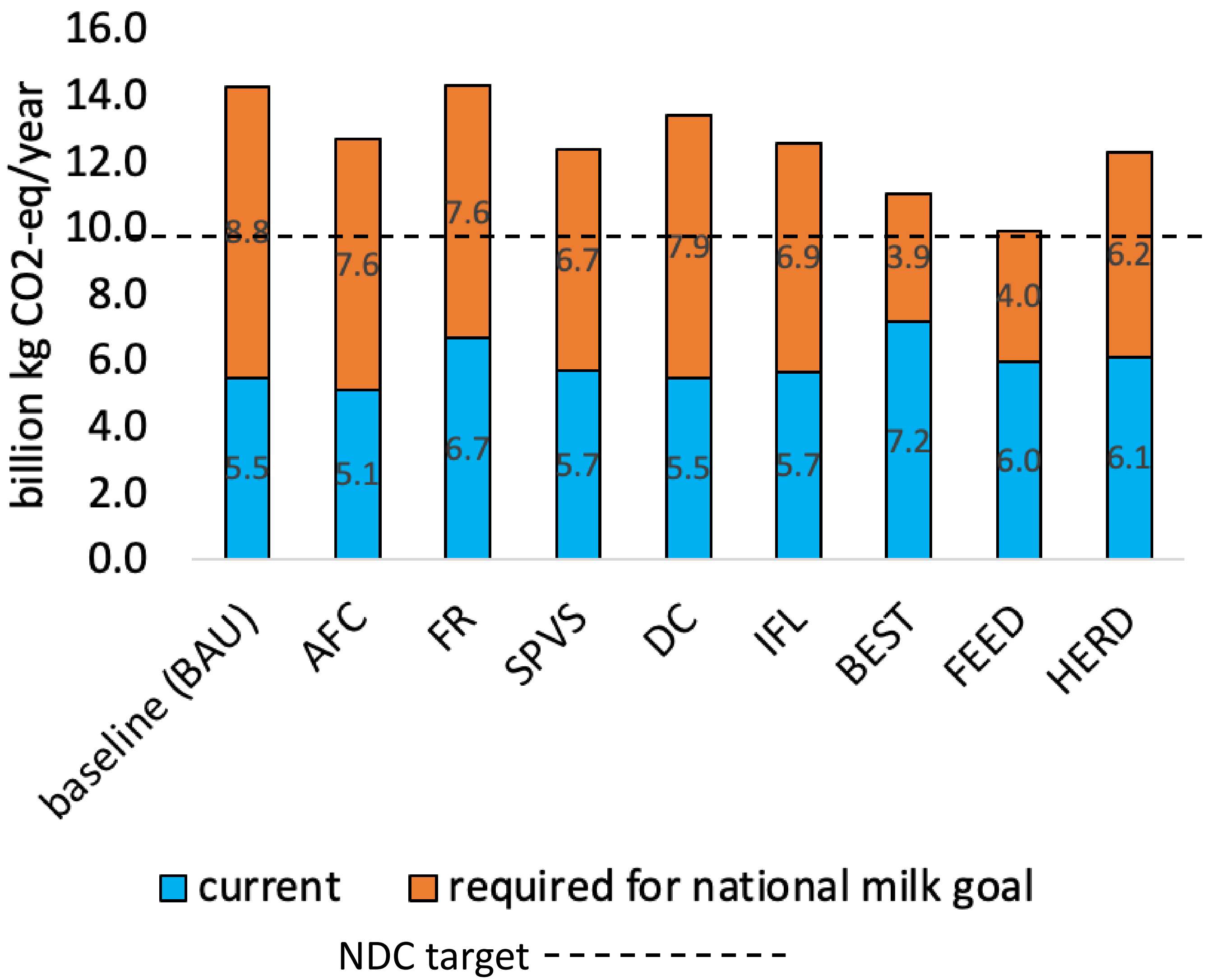
Results – What is needed to meet the demand?

- 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