Efficiency gains for enteric methane mitigation and productivity: contribution to CSA and investment opportunities

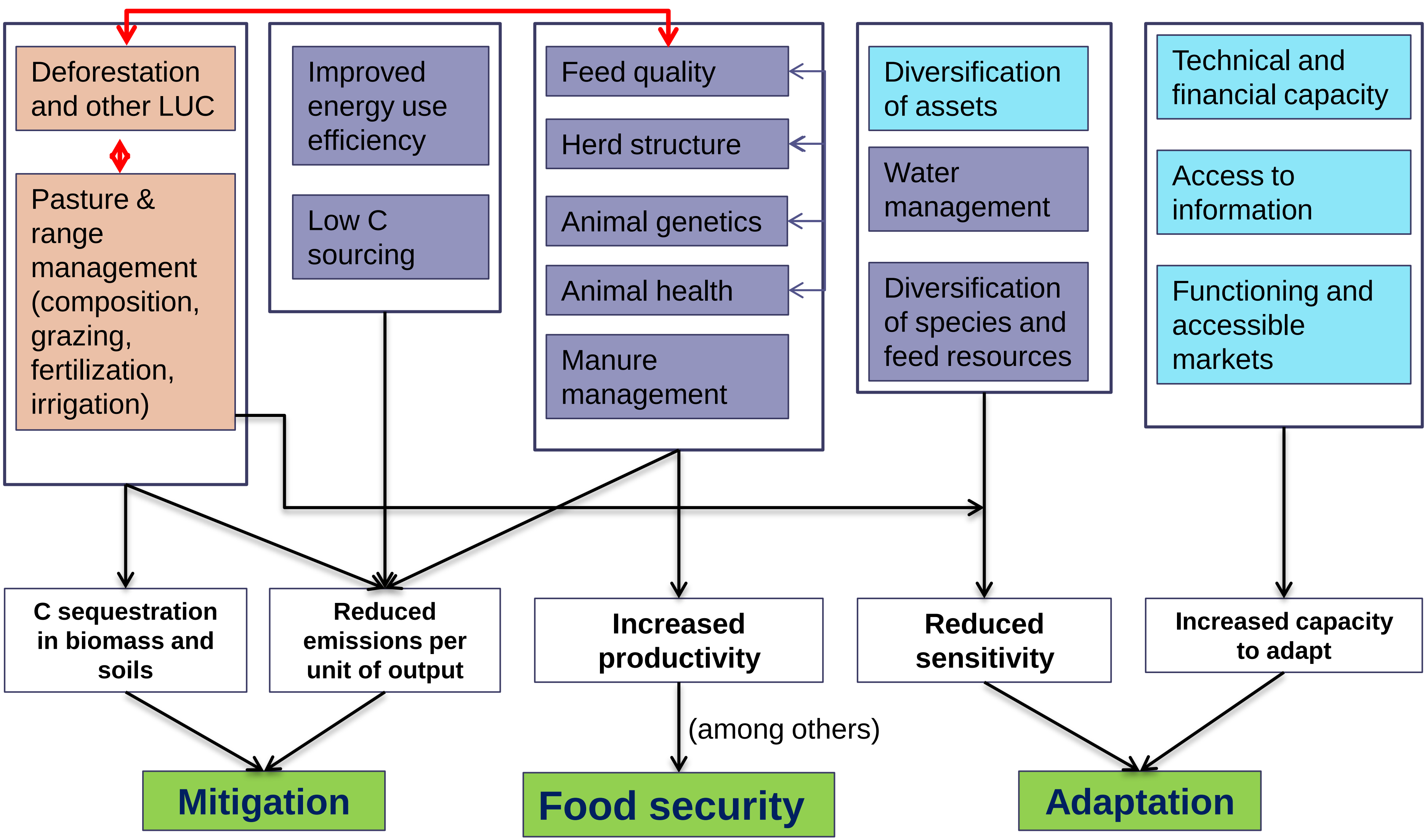
Montpellier, CSA 2015

Pierre Gerber, FAO/WB

Main messages:

- There is technical truth in Climate Smart Livestock
- Ruminants in relatively low productivity systems deserve priority attention
- Some practices are ready for investment but we need a thorough M&E

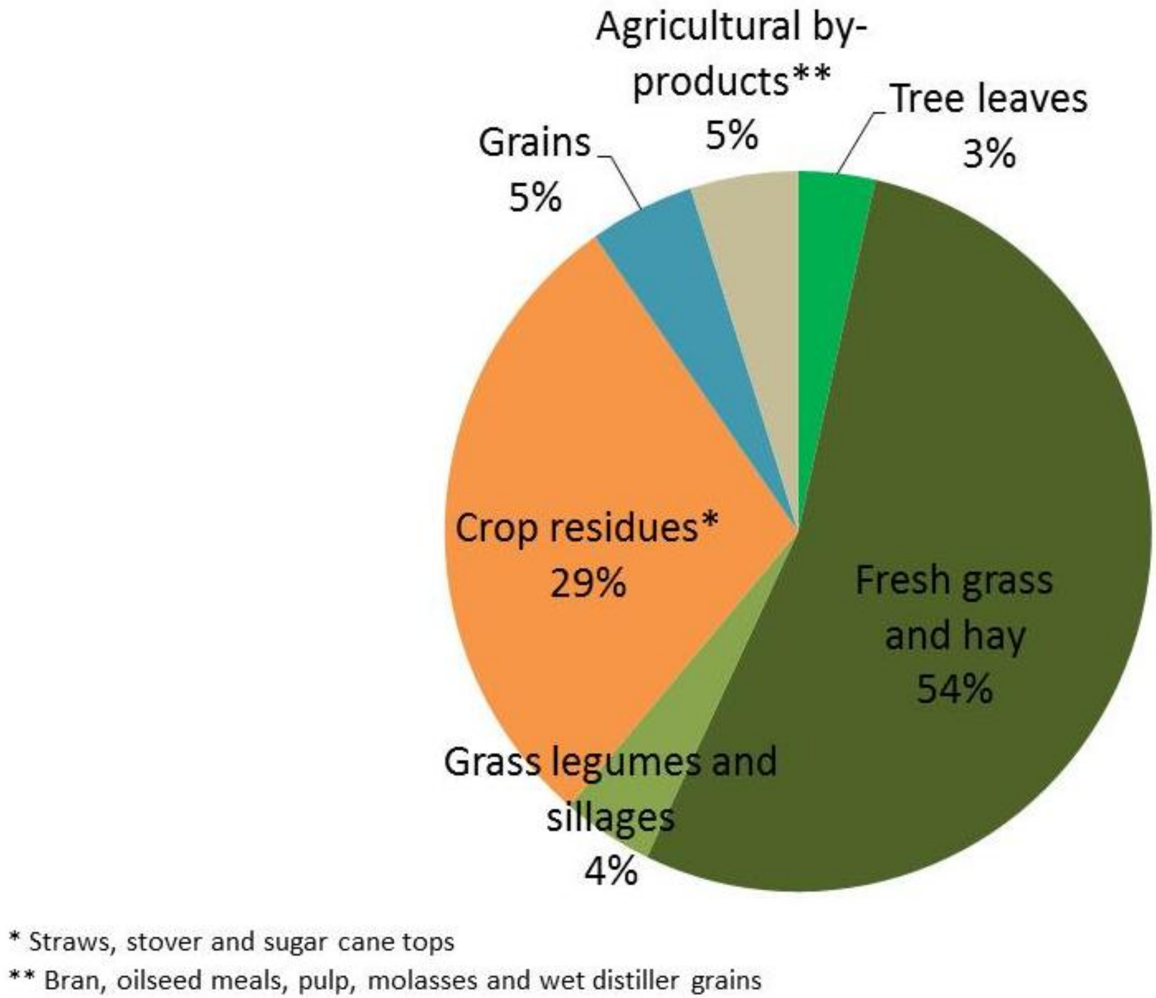
Climate smart livestock



Ruminants

- 70% of livestock sector emissions (LCA)
- Critical role in food security (half of the total livestock protein output), especially in marginal land
- About a billion poor depend on livestock and mostly ruminants
- About half of the ruminant production taking place outside OECD countries
- Presence in areas particularly affected by climate change
- Predominantly converting natural biomass (not feed derived from crops)

Global feed ration of cattle (share of DM)



Source: Global Livestock Environmental Assessment Model (GLEAM)

Enteric Methane

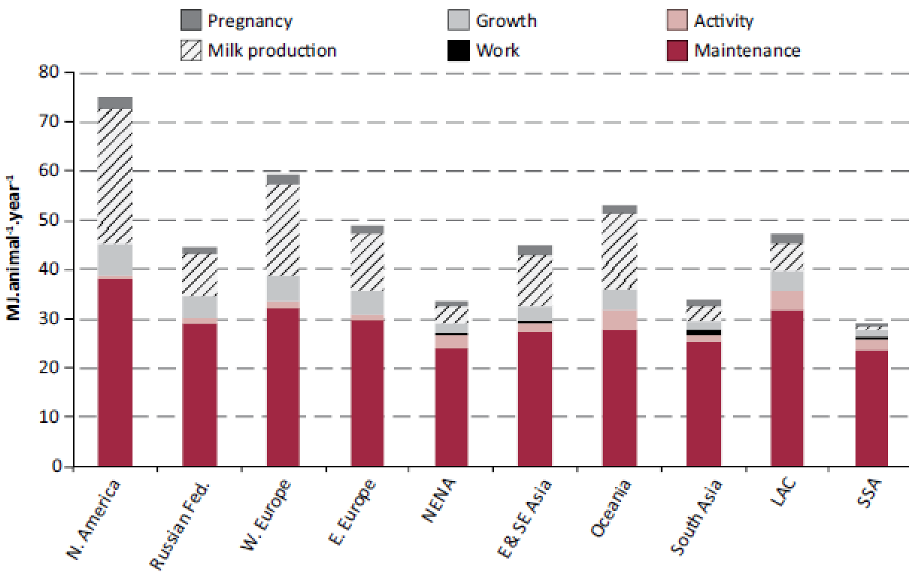
- Half of GHG emission from ruminants (40% of total livestock emissions)
- 30% of total human induced CH_4 emissions

- Enteric CH_4 emissions are energy losses (equivalent to 144 Mt oil equivalent per year
- Strong link with animal productivity

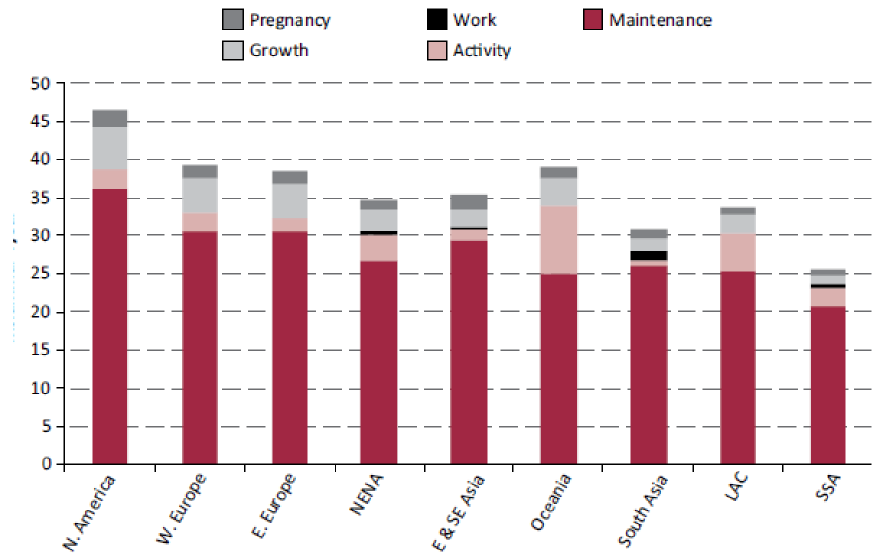
- Practices for mitigation are known

Energy partition across different function (cattle)

Dairy herd

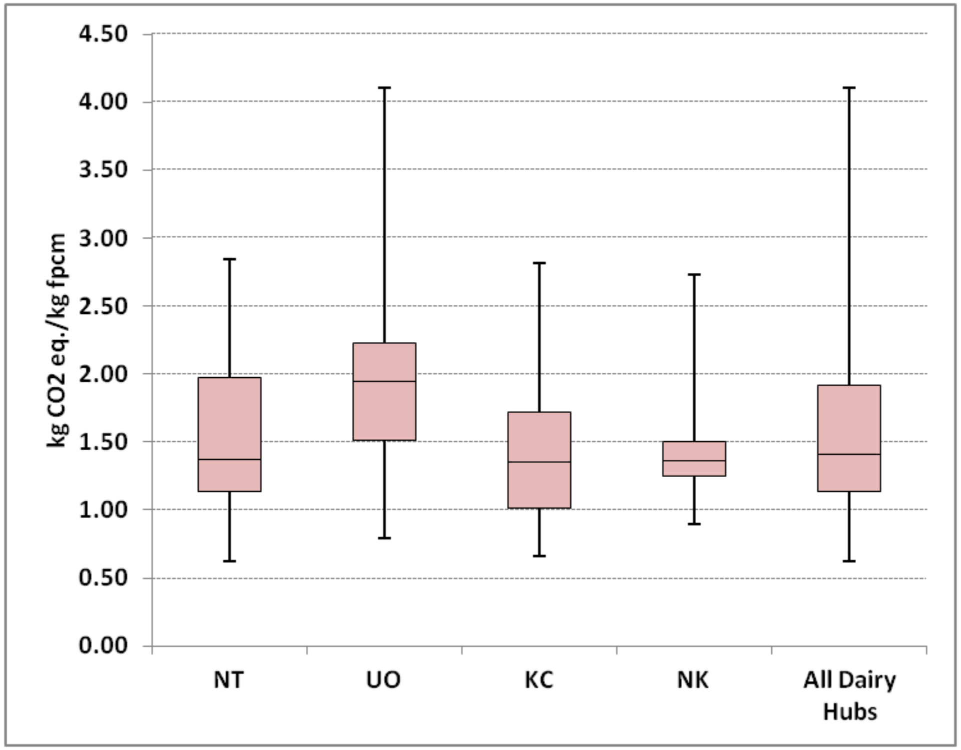


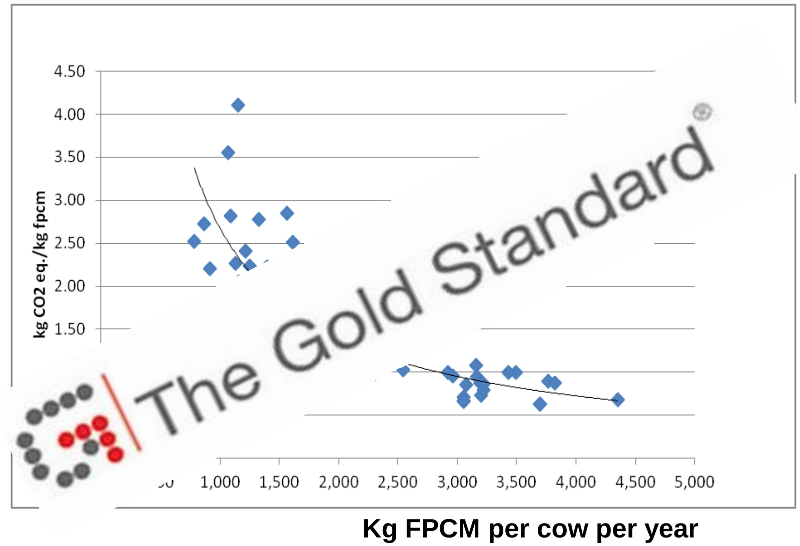
Beef herd



Opio et al., 2013

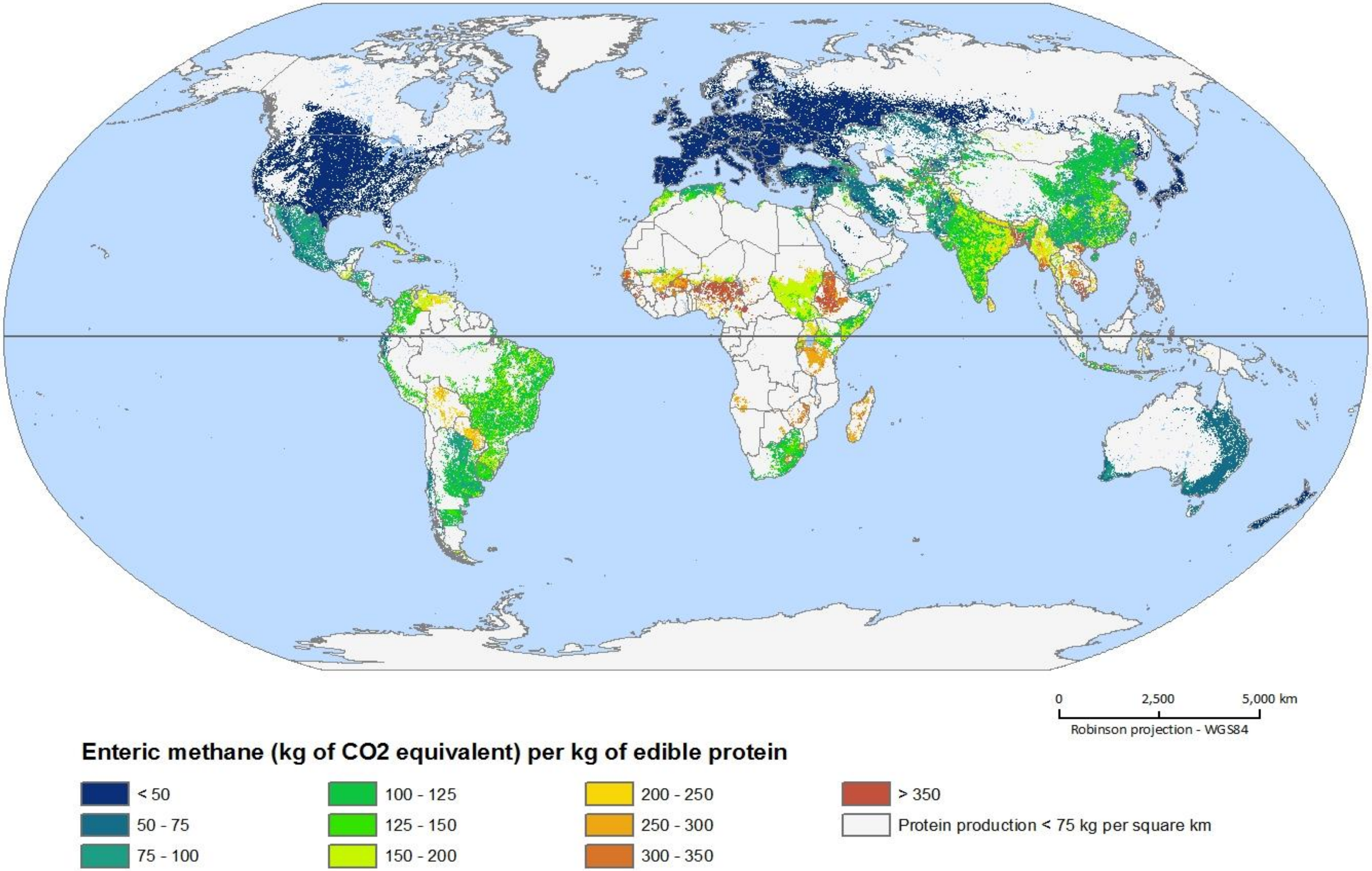
Emissions gap within systems: dairy production in Western Kenya





- smallholder mixed dairy system, temperate climate zone
- average milking herd: 2 cows per farm
- average milk yield: 1800 litres/cow/year

Methane Emission Intensities



Strategies for reduction of enteric methane

	Feeding practices						Supplements & additives								Herd mgt.		
	Improved forage	Feed processing	Feeding of concentrates	Nutrient balancing	Precision feeding	Alkaline treatment	Lipids	Nitrates	Ionophores	Growth hormones	Tannins	Probiotics	Halogenated compounds	Vaccination	Culling practices	Reproduction management	Improved genetics
Mitigation potential w/in the relevant production sector	◯ (large)	○ (small)	◯	◯	○ (small)	○ (small)	◯	◯ (large)	◯	○ (small)	○ (small)	○ (small)	○ (small)	○ (small)	◯	○ (small)	○ (small)
Size of the relevant production sector	◯	◯	◯	◯	○ (small)	◯	◯	◯	○ (small)	◯	◯	◯	◯	◯ (large)	◯	◯	◯ (large)
Level of certainty	✓	✓	?	?	✓	?	?	?	✓	✓	??	??	??	??	✓	✓	?
Productivity gains	⬆	⬆	⬆	⬆	⬆	⬆	⬆	⬆	⬆	⬆	⬇	–	⬇	–	–	⬆	⬆
Cost	$	$	$$	$$	$$$	$	$$	$	$$	$$	$$	$$$	$$$	$$$	$	$$	$$$
Risk / tradeoffs	•	•	•	•	•	•	•	●	●	●	●	•	⬤ (very large)	•	●	•	●

- ➢ A wide range of technical options for reducing methane from enteric fermentation, but many have some mitigation uncertainty, are not cost effective, have poorly understood interactive effects with other emission sources, or other associated risk.
- ➢ Mitigation options that have relatively small risk and are uniformly associated with increased productivity and improved feeding practices.
- ➢ In regions of the world that have not yet adopted these practices, significant GHG reductions are possible while also providing a steady or growing supply of animal products.

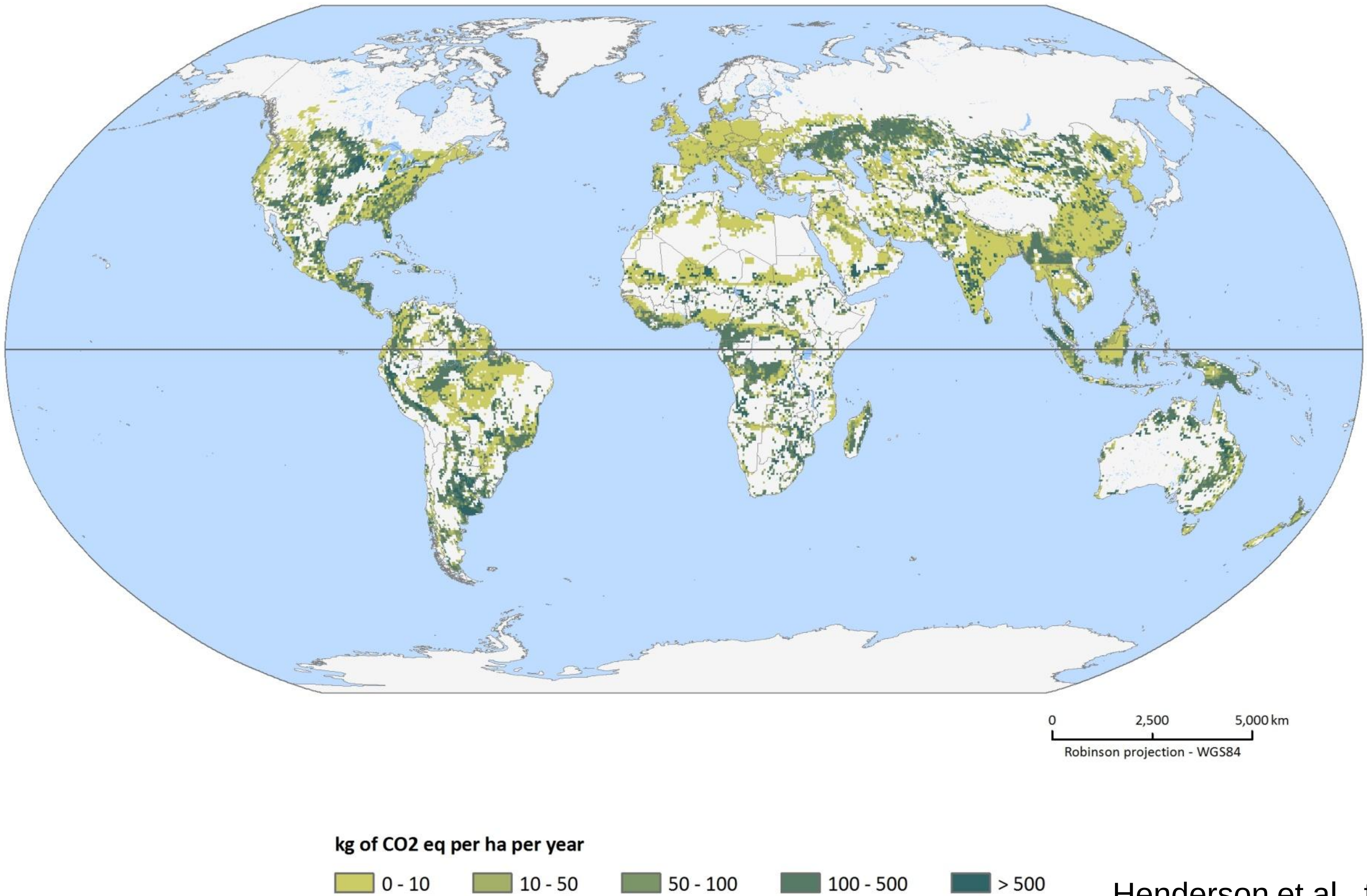
Dickie et al., 2014

Pasture management

- Carbon sequestration
- Production resilience
- Productivity gains in livestock herd

- Synergies with other environmental outcomes

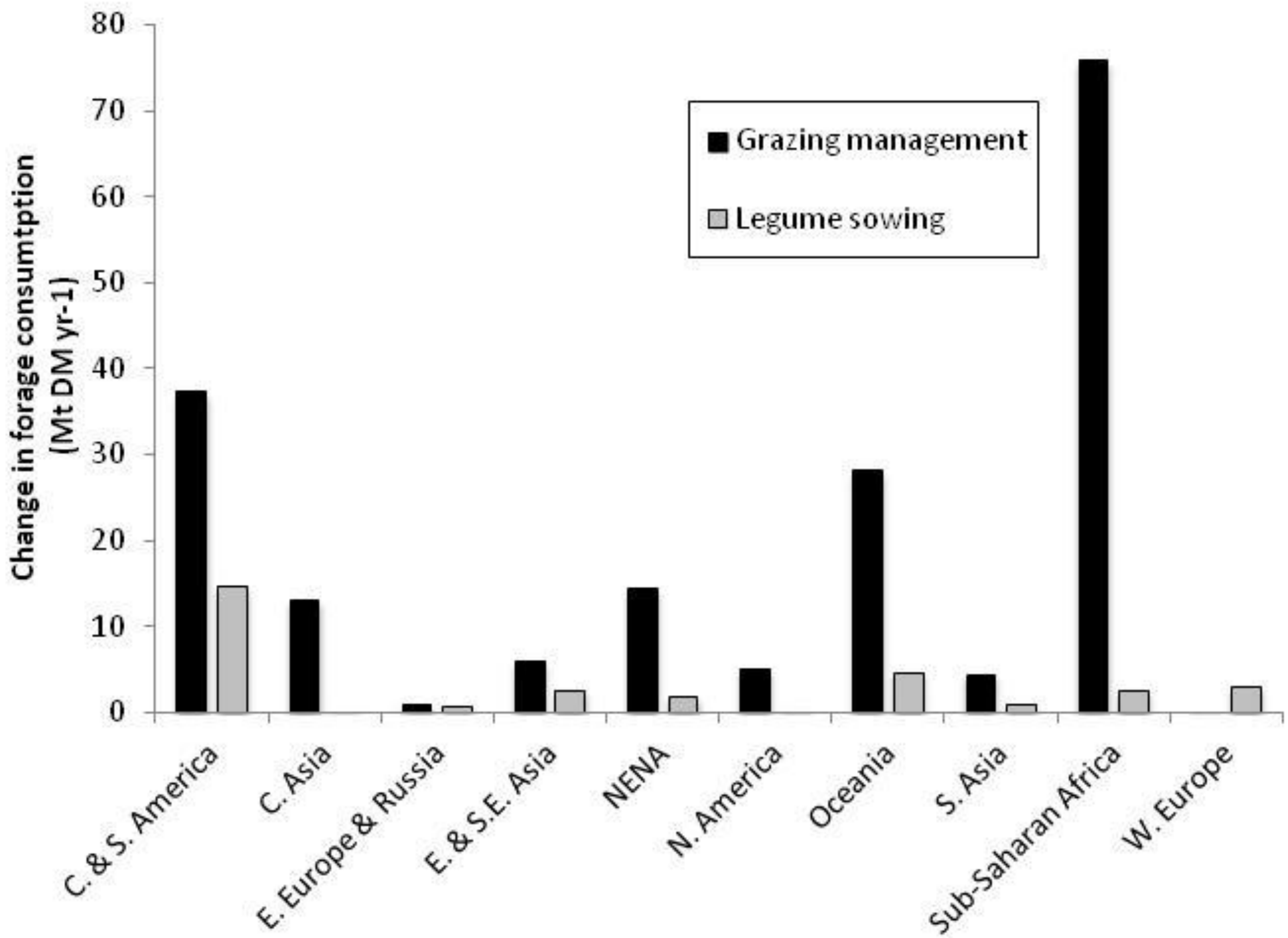
Global results: soil C sequestration potential from grazing management



Henderson et al., forthcoming

Global changes in forage consumption

- Grazing management = 187 Mt DM yr^{-1} (0.39 t DM ha^{-1})
- Legume sowing = 32 Mt DM yr^{-1} (0.44 t DM ha^{-1})



Henderson et al., forthcoming

Climate smart livestock investments projects

- Design of CSL packages (economics, multi-functionality, other environmental outcomes)
- Controlled implementation in limited areas (about 30,000 ha)
- Replication (NAMA, financial mechanisms, certification)
- Support to national policies and communications
- Capacity building

Enteric Methane Workstream – Climate and Clean Air Coalition

Objective

- Higher incomes, food security
- Lower emission intensity

Approach:

Phase 1: Identification and prioritization of mitigation opportunities and interventions

- geographical areas and production systems
- technologies and policy options to implement
- specific test sites and local implementers

Phase 2: Validation of interventions and mechanisms and incentives for upscaling

- test, validate and quantify system specific technology packages
- identify barriers to adoption
- develop policy framework for scaling up

Further areas for work

- Expand the network of projects

- Setup a transversal activity
  - Mitigation MRV
  - M&E for adaptation still weak
  - Profitability and equity
  - Adoption process

  - Trade-offs with equity and other environmental outcomes
  - Rebound effects

  - Dissemination