



Exploring mitigation potential of GHG emissions from livestock farming systems at the global level

EAAP

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FAO-AGA's work on GHG emissions in the livestock sector to identify low emission pathways

Pierre Gerber (team leader), Henning Steinfeld, Benjamin Henderson, Carolyn Opio, Anne Mottet, Tim Robinson, Alessandra Falcucci, Giuseppe Tempio, Michael MacLeod (SRUC), Theun Vellinga (WUR)...

- Produce disaggregated assessments of global GHG emissions and related mitigation potential
- Carry out economic analyses of mitigation costs and benefits
- Engage in multi-stakeholder initiatives on methods and practice change



GLEAM

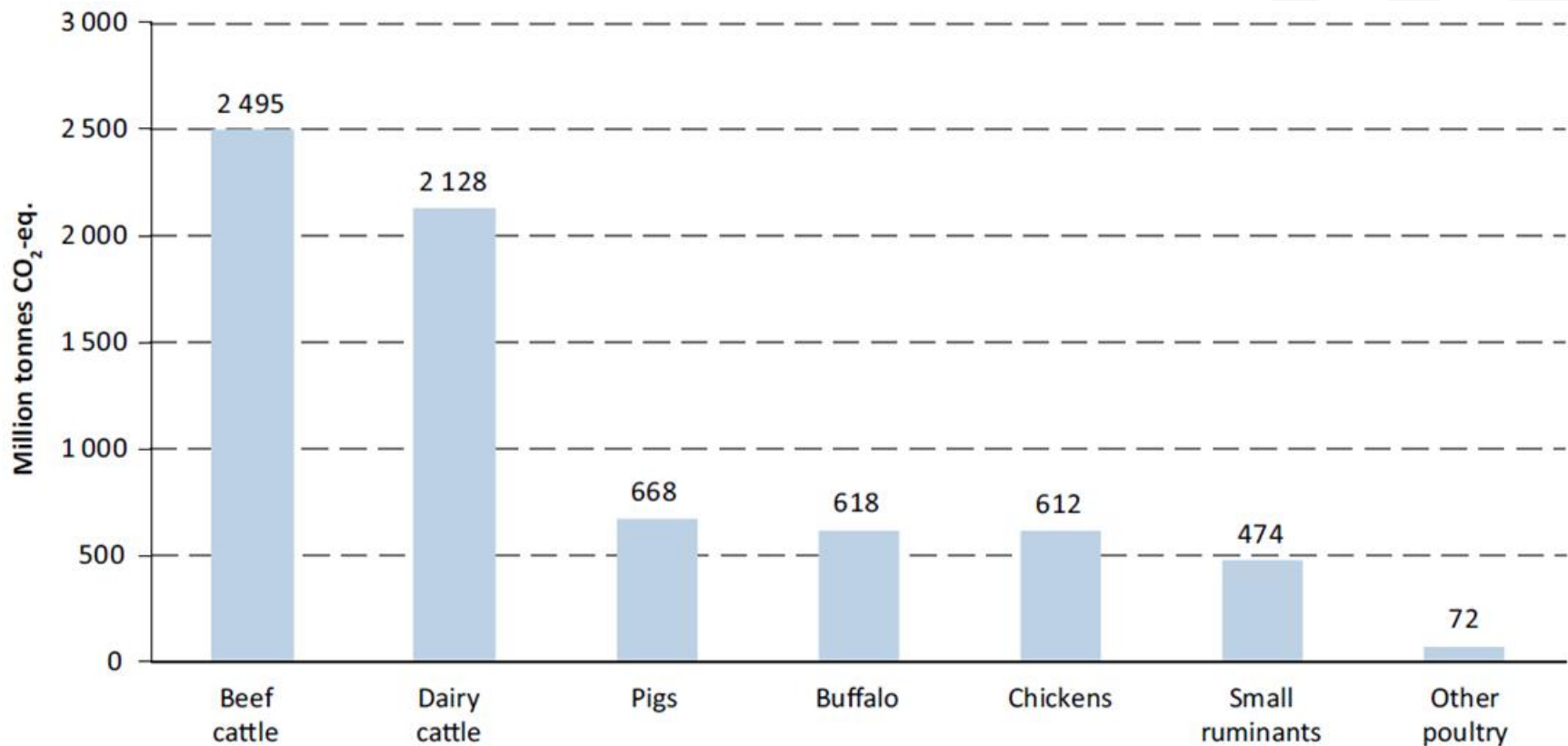
Global Livestock Environment Accounting Model

- Life Cycle Assessment modelling
- Cradle to retail, all major sources of emissions included
- Computes emissions at local level (cells on a map)
- Can generate averages and ranges at different scales
- Developed at FAO, in collaboration with other partners
- Allows for scenario analysis

A tool to improve the quantification of GHG emissions from livestock supply chains; will be expanded to other livestock-environment interactions (e.g. land use, nutrients, water)



Total GHG emissions from livestock supply chains (2005): 7.1 Gt CO₂-eq per year

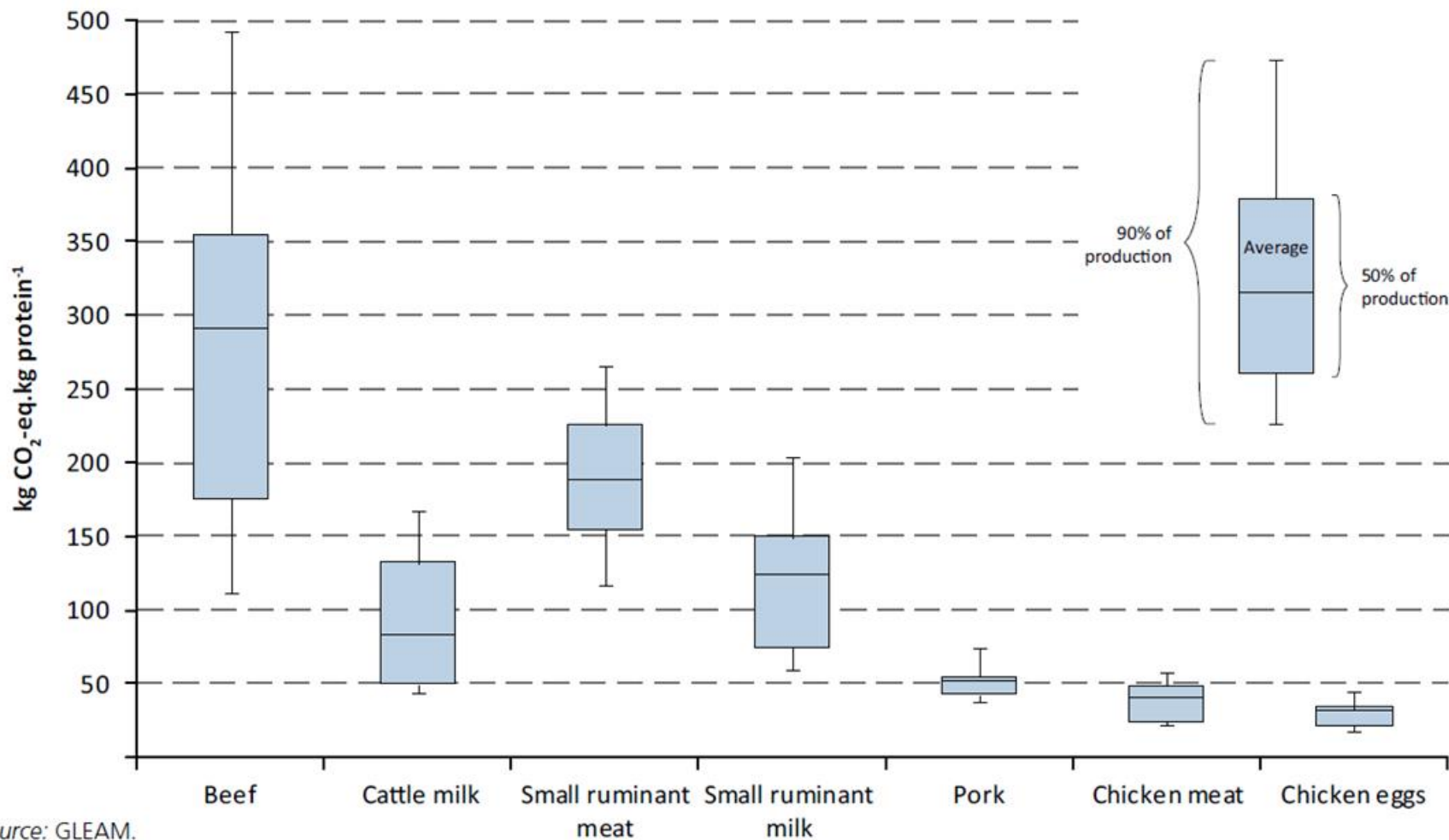


* Includes emissions attributed to edible products and to other goods and services, such as draught power and wool.

Source: GLEAM.



Estimated global emission intensities

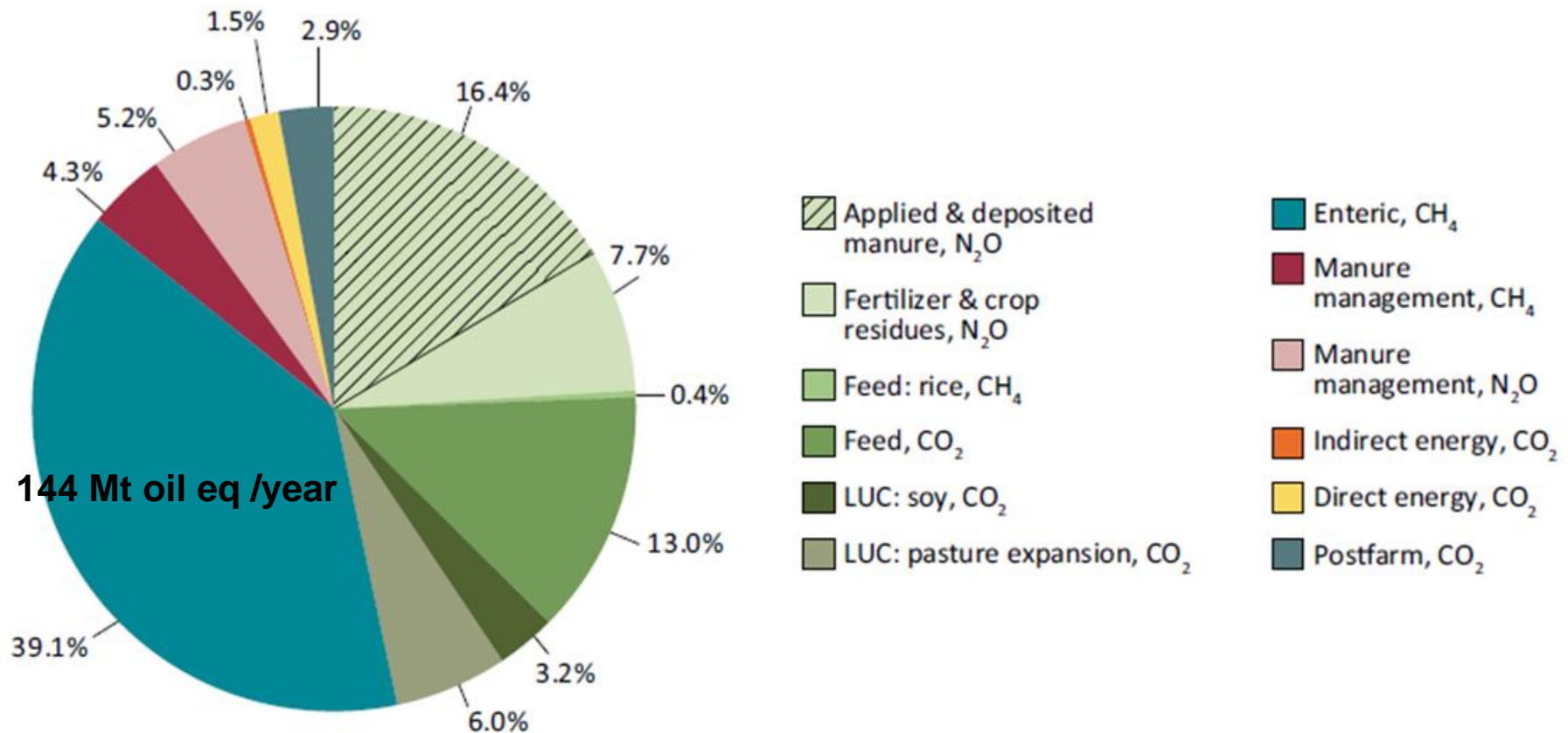


Source: GLEAM.

FAO 2013, forthcoming



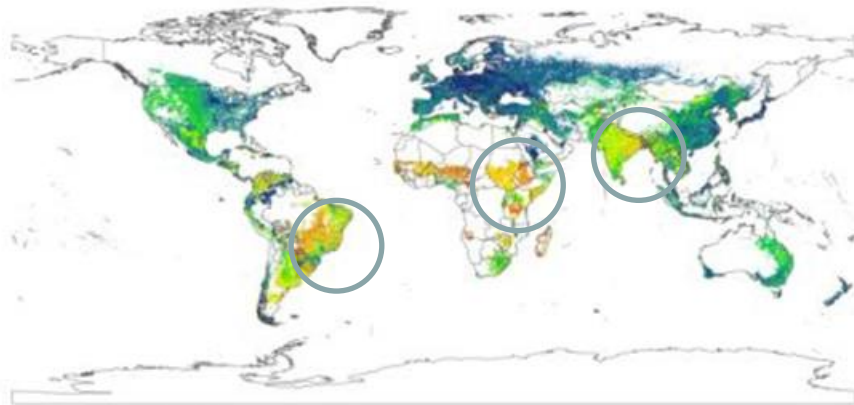
Global emissions from livestock supply chains, by category of emissions



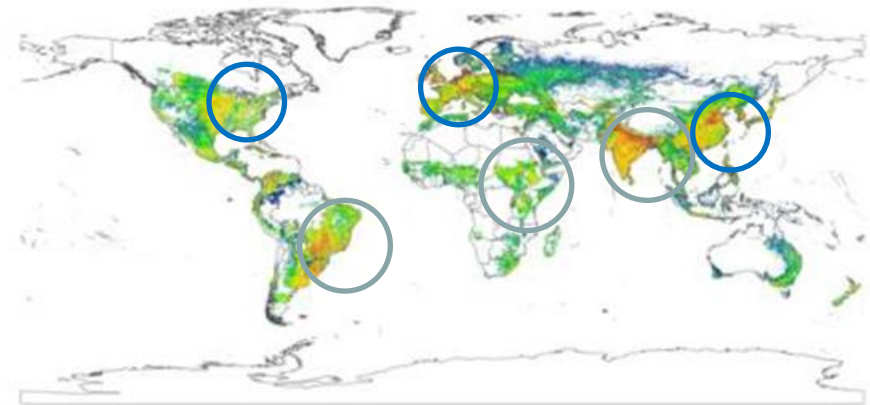
FAO 2013, *forthcoming*

"Hot Spots"

(Areas with animal protein production lesser than 75 kg per square km are not displayed).



kg CO₂ eq per kg of protein



Tons CO₂e.km⁻²



Emission intensity per unit of product

Emission intensity per land area

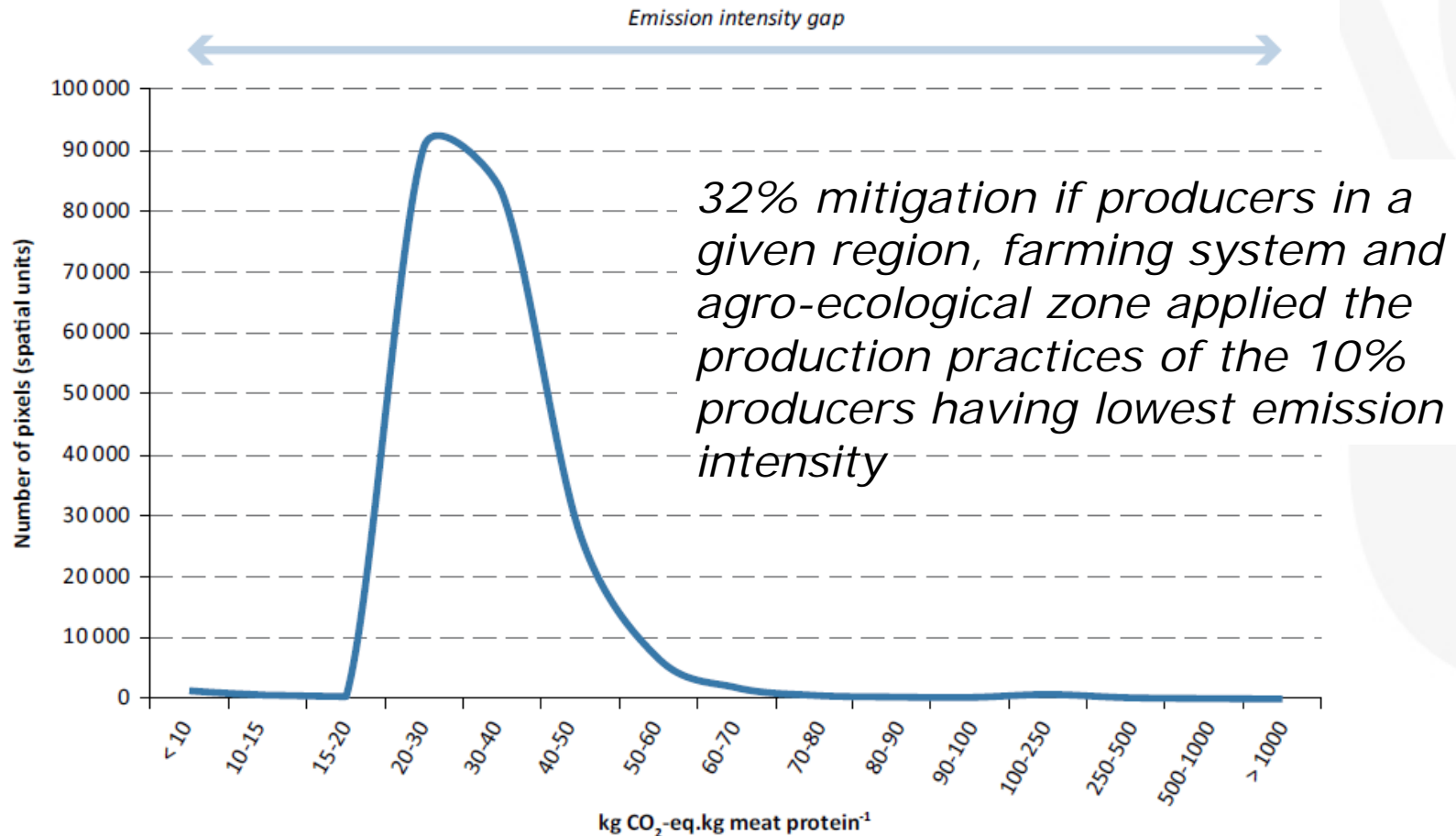


Mitigation potential

- **Statistical analysis**: mitigation potential of ca. 30%
Bridging the emission intensity gap without system change
- **Case studies**: designed on anticipated positive effects on producers income, food security, and broader environmental performance.
Mitigation potential of 10 to 45 % **for constant output**
- **Soil carbon sequestration**: 0.4 to 0.5 Gt, often resulting in an increased production of grass (ca. 7 %of baseline emissions)
 - Mitigation potential exists for all species, systems and regions,
 - System change is not require to mitigate emissions
 - Strong correlation between mitigation and productivity gains, especially among ruminant systems operating at low productivity



Distribution of intensive broiler supply chains according to their emission intensity in temperate zones of East and Southeast Asia

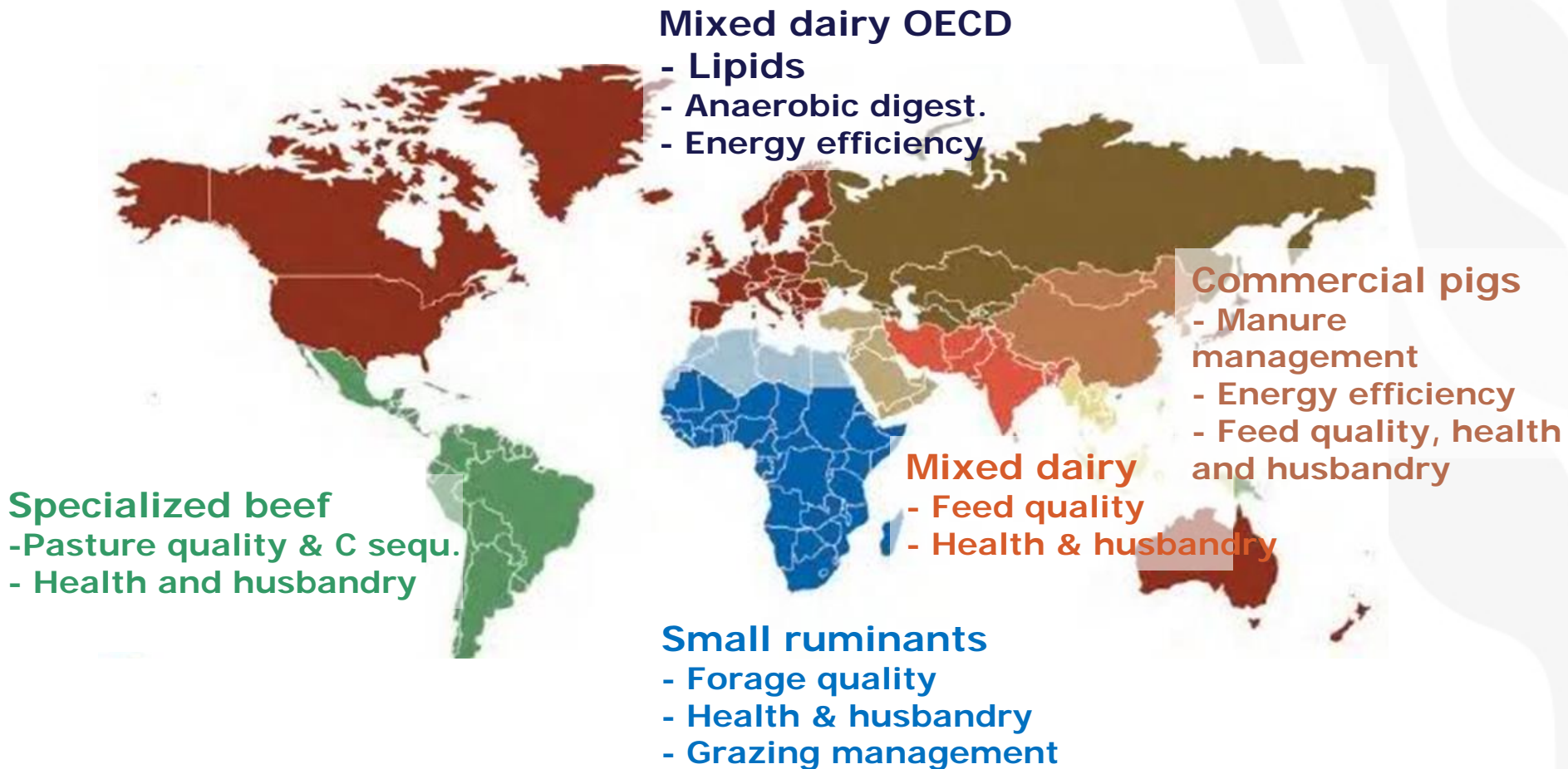


Source: GLEAM.

FAO 2013, forthcoming

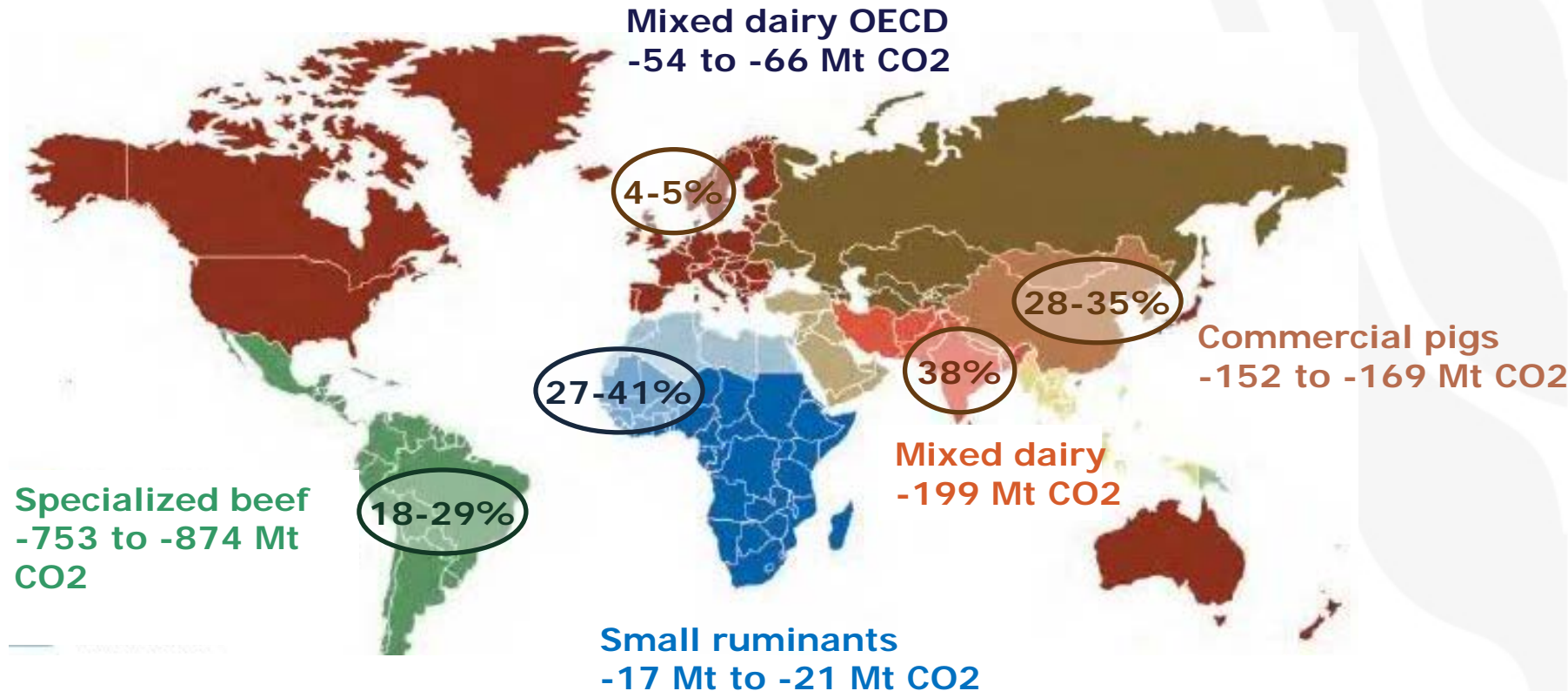


Case studies: mitigation packages





Case studies: mitigation potential





Concluding remarks

- A vast range of mitigation practices is already available
- Implementation will require education, awareness raising and incentives for technology transfer
- Quantification and inventory methods (common metrics): providing the right incentives
- Support the designing tailored mitigation packages
 - supply chain modeling / area wide modeling
 - economics of mitigation
 - tradeoffs with adaptation and other environmental concerns
- Move the Ei frontier: R&D (e.g. Ei gap assessment, technology break through)



Thank you

