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Claus Deblitz, Thuenen-Institute of Farm Economics / agri benchmark

Economics of GHG mitigation at farm level in global cattle production systems – EMiFa

Who we are



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Situation/Issue

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What's the problem?

Economic perspective on GHG mitigation strategies is a challenge in global climate research.

Especially, the costs of implementation and realization of GHG mitigation strategies at the farm level are not yet well-known.

Data needed for economic assessment of GHG mitigation options at farm level is often not available or not comparable.

Mitigation potentials, production costs as thus mitigation costs vary between production systems, but also within the same production systems.

Countries need cost data to implement their NDCs and decide on how to allocate financial resources to support climate mitigation measures.

Why is a global collaborative approach required to solve it?

The situation has to be addressed globally

Local knowledge, language, access to producers

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Flagship Project Goal(s)

Objectives

- Investigate the feasibility and cost-effectiveness of GHG mitigation strategies on farm-level
- Identify the most cost-effective management and technology options in different global production systems and regions
- Provide evidence-based policy recommendations on GHG mitigation strategies at the farm level

Methods

- *agri benchmark* SOP Typical Farms
- IPCC and national GHG calculators
- Focus groups

Working steps and anticipated outcomes/impacts



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Work packages Data collection and management pscali PO Baseline/ Sce-2 Status quo narios Б recommendation Ø to Development of regiona mitigation strategies Analysis of co-benefits leve Analysis of adoption barriers

- Collecting data for Baseline (using agri benchmark tools, data quantity and formats)
- Defining, specifying and quantifying mitigation measures
- Calculating results and produce a data base for updating
- Analysing co-benefits and constraints
- Analysing adoption barriers
- Develop country- and production system specific policy recommendations, considering effectiveness and efficiency
- Upscaling results to regional level

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Flagship Project Partners

Countries (active)

Argentina	Universidad Nacional de Córdoba, Instituto Nacional de Tecnología Agropecuaria (INTA)
Australia	Charles Sturt University
Colombia	Centro para la Investigación en Sistemas Sostenibles de Producción Agropecuaria (CIPAV)
Germany	Thuenen Institute (Farm Economics, Coordination Unit Climate and Soil)
Peru	Universidad Nacional Agraria La Molina
Portugal	Algarve University and Mediterranean Institute for Agriculture, Environment and Development

Countries (to be included)

Belgium	Flanders Research Institute for Agriculture, Fisheries and Food (ILVO)
Canada	CanFax Research Services
Ghana	Council for Scientific and Industrial Research
New Zealand	Beef and Lamb New Zealand
South Africa	Agricultural Research Council
UK	Agriculture and Horticulture Development Board (AHDB)

Activities To Date

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May – Oct 2021	Discussion within the Network to launch the project
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- Oct 2021 Preparation and discussion of project details, coordination meeting
- Mar 2022 Kickoff meeting EMiFa project
- Mar 2022 Presentation and approval in GRA council meeting
- May 2022 Status-quo Meeting
- Mar Jun 2022 Collection of first data from first countries

Jun 2022 Presentation of first results in *agri benchmark* Beef and Sheep Conference



GHG emissions - Baselines Cow-calf

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in kg CO₂ equivalents per kg live weight added



- Feed CO2
- Soil CO2
- Managed soils N2O
- Deposited/Applied manure N2O
- Manure management N2O
- Manure management CH4
- Enteric fermentation CH4

Animal performance indicators – Cow-calf



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Age at first calving (mean)





Weaned calves per 100 cows and year

Total live weight sold per cow (kg)



- "(P)re-productive" overhead
- Cow and herd productivity
- System approach: Land use, stocking rate and sequestration service

GHG emissions – Scenario Peru Implementation of Silvopastoral System



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in kg CO₂ equivalents per kg live weight added



Peru: Reduction in GHG emission intensity through pasture and herd performance improvement

- Preliminary simulation of expected effects on pasture und herd productivity
 - Effects of pasture renewal and maintenance not reflected
 - Sequestration services <u>not reflected</u>
- Expected costs for SPS establishment: ~800
 USD/ha, maintenance expected with ~190
 USD/ha
 - Expected changes in costs and returns due to changes in animal herd and productivity



GHG emissions – Baselines Finishing

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in kg CO₂ equivalents per kg live weight sold

- Managed soils N2O
- Deposited/Applied manure N2O
- Manure management N2O
- Manure management CH4
- Enteric fermentation CH4

Animal performance indicators – Finishing



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Daily weight gain (g/day)



- Animal performance
- Feeding system, length of feeding period and origin of feed
- Housing and manure management system



📕 Net gain



GLOBAL RESEAR

GHG emissions – Scenario Germany Use of methane-reducing additive in manure storage^{on Agricultural Greenhouse gases}

in kg CO₂ equivalents per kg live weight sold



Germany: Reduction in GHG emission **intensity** through inhibiting methanogenesis in manure storage

- Temporary limitation of methanogenesis in the manure storage through addition of calcium cyanamide substrate
 - Increase of N applied on soils and possibly related increase in N₂O from managed soils not reflected
- Expected increase in costs through product costs
 - Possibly reduction in fertilizer amount and costs through fertilisation properties of additive

Opportunities to get involved and next steps



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Getting involved

- Researchers with interest in joining please let us know
- They can be from countries not participating or already participating
- We would then decide jointly where it is best to get involved (beef and/or dairy)
- Just note that starting from scratch is an effort (at least for the first year's data collection)

Next steps in the project

- Consolidate / update existing figures
- Add new countries and case studies
- Prepare a publication
- Get funding for upscaling the project