

International Conference on Agricultural GHG Emissions and Food Security

Major summary points of scientific part of the conference

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Theme 1: Innovative approaches in GHG monitoring and MRV: Major discussion points

Heinz Flessa, Thünen-Institut, Germany



What are the major research highlights/ research progresses presented?

- There is considerable progress in national GHG reporting:
 - Tier 2 and Tier 3 approaches are developed
 - Motivation: including mitigation beyond "shooting the cow"
 - Challenges: keeping transparency, new activity data, back to 1990
 - Basis: large GHG monitoring programs and networks
- Measurements at different scales including different disciplines:
 - CH₄: microbiome, genotyping, chambers, tracer gases, models
 - N₂O: molecular microbiology, flux chambers & towers, models

What major research gaps, open points for discussion could be identified?

- Data harmonization: different scales, models, inventories:
 - Regionalization of emission inventories
 - Increasing number of farm scale GHG models
 - Consistency of different inventories (e.g. GHGs and NH₃)
- Linking GHG mitigation to other agroecological goals
- Strong regional bias of research activities and results:
 - How to support and include other regions and countries?

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Theme 2: Mitigation potential

Frank O'Mara, Teagasc, Ireland



What are the major research highlights/ research progresses presented?

- ◆ H1: 3-NOP feed additive can reduce enteric methane emissions by 30-40%. Questions: delivery mechanism, cost benefit, consumer acceptance
- ◆ H2: Alternate wetting and drying in rice production can reduce CH₄ emissions. Questions: N₂O, uptake
- ◆ H3: Urease inhibitors on urea fertiliser will reduce N₂O compared to calcium ammonium nitrate (CAN) fertiliser and keep ammonia emissions in line with CAN
- ◆ H4: Evidence of continued C sequestration on intensively managed grassland soils over 47 year period in Northern Ireland; increased by cattle slurry
- ◆ H5: preview of 2nd State of the C Cycle report – C stocks and net C uptake in grasslands can be maintained by appropriate land management and grazing
- ◆ H6: many other strategies presented: agroforestry/silvopastoralism, water management in peat soils, sustainable cultivation of durum wheat, urea coated with neem oil, etc, etc, and many other strategies not presented

What major research gaps, open points for discussion could be identified?

- ◆ D1: Many mitigation options under investigation, but need to consider adoptability, trade-offs, barriers to adoption
- ◆ D2: No universally applicable measures – need to be tailored to regions and production systems
- ◆ D3: Knowledge of management to increase soil C still at an early stage, and needs much more study
- ◆ D4: Need to future proof mitigation strategies and consider adaptation
- ◆ D5: Efficiency of system is still a promising route, e.g. animal/plant breeding and genetics, soil quality, animal/crop productivity, etc but hard to change these beyond business as usual progress because **'people'** need to change
- ◆ D6: need to involve all actors (e.g. end users, industry, community, consumers) in scoping out viable mitigation options

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Theme 3: Cost and implementation

Bernhard Osterburg, Thünen-Institut, Germany



What are the major research highlights / research progresses presented?

- ◆ There are cost-efficient GHG mitigation measures which increase productivity and/or save inputs: e.g. improved rice cultivation, improved pastures and forage production, silvo-pastoral systems, nutrient management (→ rebound effects)
- ◆ Adaptation to CC, increase of productivity or cost saving are important entry points for implementing mitigation measures
- ◆ Understand farmers situation and views (→ small-scale farms)
- ◆ Overcome limits to implementation: raise awareness, knowledge, finance, new markets, cooperation

What major research gaps, open points for discussion could be identified?

- ◆ Few UNFCCC parties report on abatement cost in agriculture
 - Fill the cost data gap
 - develop methodology to consider multiple (non-mitigation co-) benefits
- ◆ How useful are marginal abatement cost curves (MACC)?
 - negate cost but no adoption – misleading concept?
 - “cost” is not the only ranking criteria, cost at which level (farm, national economy)
 - MACC help to raise awareness, to be complemented by analysis of barriers to adoption
- ◆ Many measures only exist on paper – how to put them into practice?
 - Research on acceptance and willingness to adopt
 - How to create enabling environments and improve education and extension

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Theme 4: Global potentials and policies

Lini Wollenberg, CGIAR - CCAFS and University of Vermont, USA



„Targets and trade-offs“

- ◆ Mitigation competes with other policy objectives, despite political pressure for win-win arrangements
 - Food security trade-offs with climate ambition, e.g. 1.5°C scenario can lead to 80-100 million undernourished (S. Frank, IIASA)
 - Uniform carbon tax increases prices of beef, milk, rice
 - „Wet“ peatland management conflicts with CAP policies, e.g. maintaining permanent grassland (J. Peters)
- ◆ Global policy scenarios examine how to minimize trade-offs
 - All countries need to mitigate in agriculture to achieve targets
 - Global taxes and subsidies: global subsidy for mitigation produces best overall results, but has to be paid for (B. Henderson, OECD)
 - Global coordination outperforms regional and sectoral efforts (S. Frank, IIASA)
 - Diet shifts produce significant mitigation at low costs
 - Targeting can enable higher efficiency of mitigation; SOC, LUC + technical and structural Non CO2 reduce trade-offs best
 - Bioenergy intensification produces least trade-offs with food prices (F. Humpeöder)

Global challenges and policies theme: Targets and trade-offs

◆ Meeting mitigation targets

-NDCs correspondence to countries' emissions can be explained by countries' capacity, need for international support, adaptation priority and fairness. (S. Höhle)

- Allocating global mitigation target among countries provides reference for whether we are doing enough to meet the 2°C goal. 11 African countries already doing enough. (Richards)

Global challenges and policies theme: Targets and trade-offs

◆ Technical options

- Suitability mapping and targeting, e.g. agroforestry (S. Kay, E. Yeboah, CSIR)
 - Food, loss and waste reduction calculator available for emissions (J. Broeze, WUR)
- Support better policy recognition of agroforestry potential and support plot, farm and landscape scales (M-R. Mosquera)
- Fertilizer use v food security-N fertilizer use in maize in East Africa: high yields can be achieved with lower emissions if fertilizer use is more efficient (R. Hijbeek)
 - NUOnet –new US database for efficient use of nutrients to optimize production and contribute to ecosystem services (J. Delgado, USDA).

What major research gaps, open points for discussion could be identified?

- ◆ Mitigation-driven policies need to be „in line with larger sustainable development“ e.g. social equity, so need policies that balance across objectives, and include broader metrics (T. Crane, ILRI)
 - Examine scenarios under full food security conditions
 - Metrics and indicators that reflect full multiple criteria are needed (E. Gajos, NRI)
 - Be careful about narrow analyses that do not consider other sectors and objectives
 - Need for more integrative frameworks for modeling, including multiscale

What major research gaps, open points for discussion could be identified?

- ◆ Need for attention to consumption and diet!
- ◆ Examine match between ambition and progress towards mitigation
 - Not just with NDCs but with actual policies and their implementation (A. Reisinger)
 - Transparency about countries' intended mitigation contributions
- Area-specific approaches needed: technical options, carbon tax, higher efficiency, targeting countries with large land areas for AFOLU mitigation more successful
- More robust evidence exists for tradeoffs than synergies between adaptation and mitigation – implications and need for more evidence (L. Barbieri, UVM)