

FACCE ERA-GAS



MONITORING & MITIGATION OF GREENHOUSE GASES FROM AGRI- AND SILVI-CULTURE

OVERVIEW OF THE ERA-NET COFUND ACTION
HIGHLIGHTS OF THE JOINT TRANSNATIONAL RESEARCH CALLS
ABSTRACTS OF THE FUNDED RESEARCH PROJECTS

JUNE 2019



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Welcome from the Coordinator



The agricultural sector in Europe faces significant challenges in curbing greenhouse gas (GHG) emissions while maintaining food security and sustainability in a changing climate. Projected increases in the world's population and a shift in emerging countries towards higher consumption of resource-intensive food items will put unprecedented pressure on global agriculture. To meet this demand, agriculture will have to produce almost 50% more food, feed and biofuel in 2050 than it did in 2012, according to the FAO. This will require the development of innovative farming and forestry systems that ensure sustainability while increasing productivity. Developing the knowledge and technologies to tackle these global societal challenges will require a coordinated international approach. In particular, innovative GHG mitigation and monitoring solutions that extend beyond the local context are needed.

While the Horizon 2020 Framework Programme is an important source of funding for research and innovation in the EU, most research funding is still controlled nationally. An ERA-NET Cofund is a funding mechanism whereby national money is pooled to fund transnational projects. Cofunding for the action is also provided by the European Commission. FACCE ERA-GAS is the ERA-NET Cofund for Monitoring and Mitigation of Greenhouse Gases from Agri- and Silvi-culture. The FACCE ERA-GAS consortium comprises funding agencies and project partners from 19 organisations across 13 European countries. Our aim is to strengthen the transnational coordination of research programmes in the EU and provide added value to research and innovation on GHG monitoring and mitigation. Through this enhanced cooperation and better alignment of national research priorities, FACCE ERA-GAS activities will have the scale and scope necessary to maximise the impact of GHG research activities in Europe. In October 2017, FACCE ERA-GAS launched 10 funded projects at the first Research Programme Meeting held at Wageningen University & Research, The Netherlands. These projects represented an investment of €14 million from the European Commission, FACCE ERA-GAS partners and the Ministry for Primary Industries, New Zealand. These projects, which are conducted from 2017-2020, involve 71 project partners from 39 different research institutions/SMEs across 13 European countries, New Zealand and the US.

In October 2018, FACCE ERA-GAS, in collaboration with ERA-NET SusAn and ICT-AGRI 2 ERA-NET launched a joint call on "Novel technologies, solutions and systems to reduce greenhouse gas emissions in animal production systems". In addition to the members of the three ERA-NETs, the Global Research Alliance on agricultural greenhouse gases promoted the call amongst their members. This resulted in an international call worth €17 million, with funding from 27 funding agencies in 24 countries. As well as members of the three ERA-NETs, the call involved Canada, Chile, New Zealand and Uruguay. We look forward to the results of this call and the commencement of the funded projects.

On behalf of the FACCE ERA-GAS consortium, I welcome you to learn more in the following pages about our work and the projects co-funded by FACCE ERA-GAS and the European Commission.

Dr Frank O'Mara

Director of Research at Teagasc, the Irish Agriculture and Food Development Authority

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Overview of the ERA-NET Cofund Partnership

Who we are

FACCE ERA-GAS is the ERA-NET Cofund for Monitoring & Mitigation of Greenhouse Gases from Agri- and Silvi-culture. It was initiated by the Joint Programming Initiative on Agriculture, Food Security and Climate Change (FACCE-JPI). The ERA-NET consortium of FACCE ERA-GAS consists of 19 partner organisations from 13 countries: Denmark, Finland, France, Germany, Ireland, Latvia, The Netherlands, Norway, Poland, Romania, Sweden, Turkey and the United Kingdom. New Zealand also contributed to the 2016 Joint Co-funded Call and to the 2018 Joint Call between FACCE ERA-GAS, ERA-NET SusAn and ICT-AGRI 2. To the 2018 Joint Call Third countries Canada, Chile and Uruguay also contributed. Teagasc, the Irish Agriculture and Food Development Authority, coordinates the ERA-NET.

FACCE ERA-GAS runs from May 2016 to April 2021 and receives funding from the European Union's Horizon 2020 Research & Innovation Programme under Grant Agreement No. 696356.

Our aim

The aim of FACCE ERA-GAS is to strengthen the transnational coordination of research programmes and provide added value to research and innovation on greenhouse gas (GHG) mitigation. By coordinating and aligning research efforts, FACCE ERA-GAS aims to develop enabling technologies and innovative solutions to improve inventories, increase the GHG efficiency of food, feed and fuel production and enhance carbon sinks. FACCE ERA-GAS works closely with other ERA-NET Actions and reinforces existing collaborations between actors in the research area (e.g. via FACCE-JPI and the Global Research Alliance on Agricultural Greenhouse Gases (GRA)).

Impact

Expected impact of the ERA-NET Cofund is to provide solutions for the agricultural sector in Europe which faces significant challenges in curbing GHG emissions while maintaining food security and sustainability in a changing climate. It does so for example by incorporation of abatement strategies into tailored sustainable production systems and by inclusion and verification of carbon sinks as an offsetting option, particularly in forestry and agricultural soils.



Overview of the FACCE ERA-GAS work packages

WP1 Management of the Consortium.

WP2 Preparation and launch of the co-funded call.

WP3 Evaluation and proposal selection for the co-funded call.

WP4 Follow-up and monitoring of the projects resulting from the co-funded call.

WP5 Communication, exploitation and dissemination of the results.

WP6 Implementing an additional joint call and further activities without EC co-funding.

WP7 Short and long-term strategy on agricultural and forestry greenhouse gas monitoring and mitigation.

FACCE ERA-GAS activities

FACCE ERA-GAS undertakes a wide range of joint activities:

- a co-funded joint call for transnational research projects, launched in 2017;
- a joint call of FACCE ERA-GAS, ERA-NET SusAn and ICT-AGRI 2 without European Union co-funding;
- aligning thematic priorities across member countries;
- establishing and maintaining initiatives to engage with global GHG networks and researchers;
- working closely with other ERA-NETs to coordinate efforts in areas of mutual interest;
- increasing engagement with stakeholder communities.

A plan will also be drawn up for future collaborative actions to ensure that enhanced cooperation will be maintained past the lifetime of the ERA-NET.

FACCE ERA-GAS events

- 20-30 November 2016 Joint Workshop of FACCE ERA-GAS, ERA-NET SusAn and ICT-AGRI-2
- 10-11 October 2017 First Research Programme Meeting
- 20-21 February 2018 Second Joint Workshop of FACCE ERA-GAS, ERA-NET SusAn and ICT-AGRI-2
- 12 June 2019 Second Research Programme Meeting - Progress presentation of the running projects & Valorisation Workshop
- 12-13-14 June 2019 Summer School
- 2021 Final Research Programme Meeting



Highlights of the 2016 Joint Transnational Research Call

FACCE ERA-GAS launched a co-funded joint call for transnational research projects in Europe and New Zealand on 4 March 2016. Financial support for this call was provided by funding agencies from 13 European countries and New Zealand, together with co-funding from the European Commission. Each project consortium had to involve partners from at least three different countries participating in the call.

The scientific scope of the 2016 call for proposals addressed four research themes:

1. Improving national GHG inventories and monitoring, reporting and verification of emissions;
2. Refining and facilitating the implementation of GHG mitigation technologies;
3. State-of-the-art production systems that are profitable and improve food and forest biomass production while reducing GHG emissions;
4. Assessment of policy and economic measures to support emissions reductions across the farm-to-fork and forest-to consumer chain.



Projects

Ten projects were selected to receive funding in the frame of FACCE ERA-GAS. A total budget of €14 million supports these 3-year research projects, which started between August and November 2017.

Title	Acronym	Countries
Combining remote sensing and 3D forest modelling to improve tropical forests monitoring of GHG emissions	3DForMod	FR, FI, NL
Capturing Effects of Diet on Emissions from Ruminant Systems	CEDERS	NL, UK, DK, SE, DE, IE, FI, NZ
Mobilizing and Monitoring Climate Positive Efforts in Forests and Forestry	FORCLIMIT	NO, NL, US, SE, FI, RO
Managing and Reporting of Greenhouse Gas Emissions and Carbon Sequestration in Different Landscape Mosaics	GHG-Manage	IE, DE, FR, PL, NL, FR
Improving National forest inventory-based carbon stock change estimates for greenhouse gas inVENTories	INVENT	NO, LV, DK, SE
Mitigating Agricultural Greenhouse Gas Emissions by improved pH management of soils	MAGGE-pH	NO, IE, DK, DE, SE, FI, FR, NZ, UK
Refining direct fed microbials (DFM) and silage inoculants for reduction of methane emissions from ruminants	METHLAB	IE, FR, NL, NZ, IT
Wise use of drained peatlands in a bio-based economy: development of improved assessment practices and sustainable techniques for mitigation of greenhouse gases	PEATWISE	NO, SE, DK, NL, FI, NZ, DE
Improved estimation and mitigation of nitrous oxide emissions and soil carbon storage from crop residues	ResidueGas	DK, SE, NO, UK, DE, FR
Predicting appropriate GHG mitigation strategies based on modelling variables that contribute to ruminant environmental impact	RumenPredict	UK, NZ, FI, SE, IE, NL, FR

Highlights of the 2018 Joint Transnational Research Call

FACCE ERA-GAS launched on 8 October 2018 a second joint call for transnational research projects. This call was organised together with ERA-NET SusAn (Sustainable Animal Production Systems) and ICT-AGRI 2 ERA-NET (Information and Communication Technologies and Robotics for Sustainable Agriculture). The call theme is on novel technologies, solutions and systems to reduce greenhouse gas emissions in animal production systems. This call was a result of two joint workshops of the ERA-NET Actions on “Smart Mitigation of GHG in Livestock Production”, the first on 29-30 November 2016, Potsdam, Germany, and the second on 20-21 February 2018, Dublin, Ireland.



The partnership for organising this call consists of 27 national public Funding Parties from 20 European countries and 4 Associated or Third Party countries (Canada, Chile, Uruguay, New Zealand). A total amount of approximately €17 million has been provisionally reserved. Each project consortium had to involve partners from at least three different countries participating in the call.

The scientific scope relates to animal production systems with respect to GHG emissions including: feed chain, manure management, nitrogen excretion, and integrated approaches to animal production systems.

The call has three research themes:

1. The “holistic theme”: agroecological approach to whole animal production systems;
2. The “technical theme”: technical options for the monitoring and mitigation of GHG emissions from animal production systems;
3. The “societal theme”: social and/or economic approach to livestock production and consumption of animal products.

Notification of proposal selection (one step procedure) is expected in June 2019 with projects to start in October 2019.



FACCE ERA-GAS Summer School

One of the planned additional activities of FACCE ERA-GAS is the organisation of a Summer School. It was decided to organise this Early Career Researcher Summer School on greenhouse gas (GHG) monitoring and mitigation in agriculture and forestry intergrated and parallel with the 8th International Symposium on Non-CO2 Greenhouse Gases (NCGG8) in June 2019. The Summer School is aimed at early career researchers (PhD candidates and post-doctoral researchers), who want to deepen their understanding of the role of key GHGs in the Earth System with a special focus on GHG emissions and carbon sequestration related to the agriculture and forestry sectors. Twenty-three applications were submitted by the deadline 24th April 2019 from researchers involved in projects funded by FACCE ERA-GAS as well as researchers from FACCE ERA-GAS partner countries or New Zealand working on national and international R&D projects addressing GHG monitoring and mitigation in agriculture and forestry. After central eligibility check and evaluation carried out by three independent experts 20 participants (7 post-doc fellows and 13 PhD students) were invited to participate to the Summer School. The selected participants: 13 female and 7 male Early Career Researchers are coming from 9 European countries (Denmark, France, Germany Ireland, The Netherlands, Norway, Poland, Romania, Sweden) and New Zealand. The majority of the FACCE ERA-GAS Summer School participants (15) are working in FACCE ERA-GAS funded projects, 5 of the participants are involved in national projects.

The three-day FACCE ERA-GAS Summer School comprises keynote lectures, practical exercises, sessions for networking and knowledge exchange and an excursion. Dedicated sessions addressing career and professional development also provide invaluable insights into how future opportunities can best be exploited by Early Career Researchers. International experts in atmospheric science, terrestrial biogeochemistry, GHG inventories and mitigation of GHG emissions attending the NCGG8 will be involved.

The programme includes participation to the 2nd FACCE ERA-GAS Research Programme Meeting, giving the oppurtunity to learn about the latest findings of the 10 research projects funded by FACCE ERA-GAS.

Fifteen FACCE ERA-GAS Awards are granted to applicants to cover their participation in the Summer School, conference fees for the NCGG8, catering and the Symposium dinner. The value of this award is €750.

The five excellent applicants that achieved the highest ranking in the evaluation will also have their travel and accommodation costs reimbursed up to a maximum of €1,000, so these five winners receive an award with the value up to €1,750.



Abstracts of the 2016 Call Funded Research Projects





3DForMod

Combining remote sensing and 3D forest modelling to improve tropical forests monitoring of GHG emissions

Deforestation and forest degradation is considered the second largest source of global anthropogenic GHG emissions. While there is a pressing need to go beyond satellite-based LULCC survey to accurately monitor carbon stocks in the tropics, there is still no operational integrated framework to achieve this goal. In particular, much uncertainty comes from the difficult evaluation of forest degradation impact, which doesn't entail forest conversion. Our project aims at integrating advances in 3D forest modelling and very-high-resolution remote sensing technology to improve monitoring of forest aboveground biomass, especially in tropical countries that have signed the Paris Agreement. Our final goal is to supply stakeholders and decision-makers with reliable and accessible information on vegetation carbon stocks in forest territories along with simple predictive, GIS-based models on the consequences of forest degradation in terms of GHG emissions. The consortium of partners allows covering all steps that need to be considered to rigorously scale-up aboveground carbon estimates from tree to forest plot and region. We shall combine: advanced Terrestrial Laser Scanning technology to derive massive tree volume data for allometry development without employing destructive harvesting; 3D forest modelling to link remote sensing information to ground data in order to improve capability of high-resolution satellite data to estimate biomass and detect changes and emissions related to forest degradation for regional up-scaling; collaboration with developing country forest monitoring agencies for integrating project results into their national REDD+ monitoring system and related capacity building with international partners. The project mainly builds on existing data and partnership across 3 continents (central Africa, north-Azononia and south-east Asia) gathered from the three European consortium members.

Coordinator

Research Institute for Development, France

Total requested funding

702.000 €

Project duration

36 months

Other project partners

Yaoundé I University, Cameroon
Tampere University of Technology, Finland
Wageningen University, The Netherlands



CEDERS

Capturing effects of diet on emissions from ruminant systems

Feed management decisions are critical for ruminant production systems and also strongly affect agricultural greenhouse gas (GHG) emissions. Although ruminant management and production conditions differ between countries, a transnational approach is critical for (i) extending knowledge of ruminant dietary effects on GHG emissions and sustainable production, and (ii) improving GHG accounting methodologies. CEDERS (Capturing Effects of Diet on Emissions from Ruminant Systems), a 3-year proposal submitted to FACCE ERA-GAS, aims to align national agricultural GHG inventory and mitigation research across an international consortium of 9 countries (8 partner countries plus New Zealand). Its main objective is to delineate dietary effects on various on-farm GHG sources and their trade-offs, at the farm and national scales. Specific aims are to: (1) develop, expand and refine databases to evaluate dietary mitigation strategies on digestion, excretion, manure composition, and related GHG emissions; (2) fill, by experimentation, high-priority knowledge gaps on dietary effects on ruminant and manure emissions; (3) evaluate, using monitored farm cases in a modelling platform, the consequences of dietary mitigation measures on total farm GHG emissions; (4) improve farm accounting and national inventory methodologies to capture effects of dietary mitigation measures for on-farm GHG emissions; and (5) disseminate the implications of these findings to end-users of GHG accounting. CEDERS's activities will extend to other countries participating in the 'Global Network', 'Network and Database on Feed and Nutrition in Relation to GHG Emissions' and 'Manure Management Network' (both part of the 'Global Research Alliance'), FAO and CIRAD. These relationships will aid CEDERS to fill knowledge gaps for future GHG research priorities and inventory methodologies and reporting, to governments, non-governmental and advisory/extension organisations and the ruminant livestock sector.

Coordinator

Wageningen Research, The Netherlands

Total requested funding

1.830.000 €

Project duration

36 months

Other project partners

University of Reading, United Kingdom
French National Institute for Agricultural Research, France
Aarhus University, Denmark
Swedish University of Agricultural Sciences, Sweden
Leibniz Institute for Farm Animal Biology, Germany
Teagasc, Ireland
Natural Resources Institute Finland, Finland
AgResearch Ltd., New Zealand



FORCLIMIT

Mobilizing and monitoring climate positive efforts in forests and forestry

Forest potential in the climate policy framework remains underutilized and significantly under-mobilized. Questions about the relative uncertainty surrounding the assessment of carbon content in soils and trees have been one problem. The introduction of strategies for encouraging climate friendly efforts on the part of landowners and other users of wood-based products represents another side of the problem. And finally, how forest carbon is accounted, and thus incentivised or not, in national, regional and international frameworks, represents a third problem. We address each of these at depth. We analyse national level strategies emerging in the context of the 2015 Paris Agreement and how these incentivise the role of forests and forest-based resources in the climate policy framework. Further, we analyse national level incentive systems for encouraging carbon friendly actions on the part of forest owners and consumers of harvested wood products. With this knowledge in hand, we consider new technologies and methods for the more accurate estimation of soil and tree carbon, from the national all the way down to the landowner level. Likewise, we investigate potential mitigation scenarios at the national and local level in three case studies (The Netherlands, Romania and Sweden), analysing response curves to economic and policy incentives. Finally, we analyse how international and regional climate change mitigation strategies can be better linked to subnational incentive systems. The goal is to promote methodologies that will provide a more accurate accounting of forest carbon, and permit the greater mobilization of forests and forest-based resources in national, regional and international climate policy frameworks.

Coordinator

Norwegian University of Life Sciences, Norway

Total requested funding

1.123.000 €

Project duration

32 months

Other project partners

Wageningen University, The Netherlands
U.S. Forest Service, United States of America
Swedish University of Agricultural Sciences, Sweden
Finnish Meteorological Institute, Finland
Transylvania University of Brasov, Romania



GHG-Manage

Managing and reporting of greenhouse gas emissions and carbon sequestration in different landscape mosaics

Different landscape mosaics contribute an as yet poorly quantified contribution to greenhouse gas (GHG) emissions and carbon sequestration, as well as having an uncertain direct warming effect through variations in their surface properties thereby limiting our ability to implement mitigation measures at the farm scale. In this project we aim to assess the GHG characteristics and surface-related warming effects of the most relevant European landscape types and examine the optimum configuration of different land uses and management interventions, including afforestation-related GHG offsetting, to minimise or reduce GHG emissions. We will provide information that will be utilised to run and validate whole farm models, to provide a comparison with outputs from the Cool Farm Tool (CFT), as well for inclusion in socio-economic analyses and other reporting tools. This information will also be used to both refine and increase the utility of these approaches, particularly for CH₄ and N₂O accounting and to provide a better assessment of crops on organic soils. Important compensation mechanisms will be quantified and their impact on regional to national scale GHG emissions and soil carbon stocks assessed. Finally, appropriate methodologies to report and verify the effects of landscape-scale GHG emission compensation mechanisms, both top-down and bottom-up, will be developed and assessed.

Coordinator

University College Dublin, Ireland

Total requested funding

1.229.000 €

Project duration

36 months

Other project partners

German Research Centre for Geosciences, Germany
French National Institute for Agricultural Research, France
University College Dublin, Ireland
Teagasc, Ireland
Wageningen University, The Netherlands
Institute of Agrophysics of the Polish Academy of Sciences, Poland



INVENT

Improving national forest inventory-based carbon stock change estimates for greenhouse gas inventories

Forest land in Europe annually sequesters atmospheric carbon (C) comparable to the emissions from the agricultural or industrial process sectors. Despite its importance, the full potential of C sequestration on forest land in climate change mitigation strategies is not utilized. In large part, this is due to the high uncertainty of C stock change estimates of living biomass and forest mineral soil using current national-level methods. New estimation methods, which increase the spatial resolution of estimates by incorporating existing auxiliary data sources, are required to further mobilize the mitigation potential of forest land in Europe. INVENT uses data from national forest inventory (NFI), forest harvest and spatially-explicit remote sensing to increase the precision and spatial resolution of living biomass estimates. INVENT uses forest and soil inventory data, spatially-explicit remote sensing data, and modelling procedures to increase the accuracy and spatial resolution of forest mineral soil C stock change estimates. Enhanced methods are evaluated at the national and sub-national scales by their potential to document mitigation measures and in their effects in national greenhouse gas inventories. Different challenges in the partner countries are acknowledged and used as a platform for knowledge exchange. Preliminary results show that the combined use of satellite mapping services and NFI data reduces the uncertainty of C stock change estimates substantially; database on tree litter production holds the potential to improve soil C model input; machine learning is applicable for digital soil mapping with legacy soil data and elevation models.

Coordinator

Norwegian Institute of Bioeconomy Research,
Norway

Other project partners

University of Copenhagen, Denmark
Latvian State Forest Research Institute, Latvia
Swedish University of Agricultural Sciences, Sweden

Total requested funding

1.027.000 €

Project duration

36 months



MAGGE-pH

Mitigating agricultural greenhouse gas emissions by improved pH management of soils

Climate forcing by crop production is dominated by N_2O emissions. Although emissions can be marginally reduced by “good agronomic practice”, we need more targeted approaches to make progress. For that, MAGGE-pH concentrates on the microbial processes responsible for production and consumption of N_2O in soils. Our point of departure is the emerging understanding of how soil pH pervasively controls the $N_2O / (N_2O + N_2)$ product ratio of denitrification. Since denitrification is the dominant source of N_2O , this indicates that N_2O emissions from cultivated soils can be reduced substantially by increasing the pH of moderately acidic soils beyond that needed to secure adequate crop growth. This necessitates policy instruments to secure effective implementation, and MAGGE-pH will deliver socio-economic analyses to identify such instruments. The evidence for the pH effect on N_2O emissions stems almost exclusively from laboratory experiments. Now we need stringent testing of different liming strategies under realistic field conditions. This will be the core activity in MAGGE-pH and generate emission factors for a range of N fertilizers / manure / urine / biochar applications explicit for soil pH. We will also explore the use of non-calcareous rock powders as a replacement for traditional limes (carbonates). This is highly relevant, because CO_2 emissions from carbonates can negate their potential GHG reducing effect. MAGGE-pH will also explore novel approaches to manage soil pH via fertilizers and manure, in order to reduce both N_2O emission and NH_3 volatilization. Thus, the project adds some “blue sky” research to the core objectives and puts it to the critical evaluation by a broad European consortium consisting of researchers, fertilizer companies and practitioners.

Coordinator

Norwegian University of Life Sciences, Norway

Total requested funding

2.269.000 €

Project duration

36 months

Other project partners

National University of Ireland, Galway, Ireland
Teagasc, Ireland

Aarhus University, Denmark
Thuenen Institute, Germany

Swedish University of Agricultural Sciences, Sweden
University of Helsinki, Finland

Institut National de Recherche en Agronomie, France
University of Otago, New Zealand

Natural Environment Research Council, United Kingdom



METHLAB

Refining direct fed microbials (DFM) and silage inoculants for reduction of methane emissions from ruminants

This proposal is focused on implementing the use of lactic acid bacteria (LAB) as an approach to reduce methane emissions from ruminant livestock. The goal will be to refine current on-farm LAB technologies such as direct-fed microbial supplements and/or silage inoculants, currently used to increase production and improve health of animals, with a methane-reducing benefit. Selected METHLAB strains will be tested in ruminants (cows and sheep) to confirm efficacy of methane reductions in vivo. LAB offer a safe, practical and natural way to influence the rumen microbial community for methane mitigation, creating a more sustainable, emission-efficient food production system. LAB are natural inhabitants of the gastrointestinal tract of ruminants but are also well established as industrial micro-organisms, economically produced in large quantities for incorporation into feed products, making them ideally suited as a microbial technology. The partners in this proposal are from Global Research Alliance (GRA) member countries that share the goal of reducing methane emission intensity across ruminant classes in a manner that maintains agricultural production and sustains environmental integrity. METHLAB brings together a global network of multidisciplinary researchers to enhance impact and advance the knowledge transfer of LAB on-farm technologies to address the reduction of enteric methane emissions in ruminant (specifically cattle and sheep) production systems. Using superior microbial inoculants (which we will identify in the project), we aim to improve the quality of ruminant feeds which will lead to a reduction in methane and enhanced livestock production. METHLAB will thus lead to environmental and societal benefits with the potential to deliver green jobs and increase competitiveness in the agri-food sector.

Coordinator

Teagasc, Ireland

Total requested funding

1.036.000 €

Project duration

36 months

Other project partners

University College Cork, Ireland
French National Institute for Agricultural Research, France
Wageningen University, The Netherlands
AgResearch Ltd, New Zealand
SACCO S.R.L, Italy



PEATWISE

Wise use of drained peatlands in a bio-based economy: development of improved assessment practices and sustainable techniques for mitigation of greenhouse gases

Drained peatlands are important contributors to GHG emissions. For sound land management policies and decision making, an improved scientific knowledge base of GHG fluxes and transparent and verifiable methods for measuring and accounting for emissions reductions is needed. PEATWISE builds on past experience and interdisciplinary research to quantify emission factors from different land uses and production systems, agriculture and paludiculture in particular. PEATWISE assess best suitable soil and water management technologies (e.g. elevated water levels) for managed peatlands to reduce GHG emissions and maintain biomass production in different land use systems. A combination of on-going long term studies are carried out in different regions to study greenhouse gas emission from peatlands. The general water table-GHG relationship as a proxy tool to reduce GHG emissions will be critically assessed. Paludiculture, involving production of flooding tolerant species which can be used for biorefinery, biomaterials, fodder and bioenergy, is another mitigation option that will be tested. Soil management and addition of foundry sand will be tested in field trials. PEATWISE will work with stakeholders such as farmers, policy makers and industry, applying a questionnaire to find out their opinion and producing also policy briefs on key important policy relevant issues. Studies are carried out at various cases across northern Europe and New Zealand. The project collaboration will provide opportunities for knowledge transfer across a wider peatland context than has been achieved before. PEATWISE will analyse existing incentive based policy instruments for different ecosystem services in each case study country to develop a coherent strategy that allows complementarity and bundling of governmental and private sector incentive funding schemes.

Coordinator

Norwegian Institute of Bioeconomy Research,
Norway

Total requested funding

1.939.000 €

Project duration

36 months

Other project partners

Swedish University of Agricultural Sciences, Sweden
Aarhus University, Denmark
Radboud University Nijmegen, The Netherlands
University of Eastern Finland, Finland
University of Oulu, Finland
University Of Waikato, New Zealand
Leibniz Centre for Agricultural Landscape Research, Germany



ResidueGas

Improved estimation and mitigation of nitrous oxide emissions and soil carbon storage from crop residues

Crop residues provide large inputs of carbon (C) and nitrogen (N) to soils and contribute to the net GHG balance of soils in different ways. They are included as a key component in national emissions inventories for nitrous oxide (N₂O) from agriculture. Residues are also a major contributor to sustaining or enhancing soil organic carbon (SOC) and N contents and thus soil fertility. Depending on the amount of C and N in crop residues and their contributions to N₂O emissions or to the SOC balance residues might increase or decrease the GHG footprint of agroecosystems. Studies have shown that N₂O emissions from N in crop residues vary considerably depending on residue quality, residue management and soils. This is currently not reflected in emissions inventories or likely not sufficiently in simulation models. This makes current emission inventories uncertain and in many cases biased. Lack of knowledge and precise model estimation of N₂O emissions and SOC storage from crop residues limits the design of improved crop management systems for net GHG emissions reductions. ResidueGas will document an improved methodology to quantify N₂O emissions from agricultural crop residues management, including standards for estimating the amount of N in residues and improved emission factors for crop residue that include effects of residue quality, management, soils and climate on emissions. ResidueGas will further identify and communicate best practice for crop residue management strategies with respect to their net greenhouse gas effect in terms of N₂O emissions and SOC storage. The research in ResidueGas has shown the importance on focusing on critical moments in cropping systems, where residues with high N content and degradable carbon are fully or partially incorporated into the soil. This includes situations include: 1) Incorporation of residues after vegetative crops; 2) N-rich crop residues on the soil surface during winter, including frost kill of cover crops; 3) incorporation in spring of N-rich residues of cover crops; and 4) termination of grasslands. ResidueGas will further study these situations for inclusion in inventories and for developing mitigation strategies.

Coordinator

Aarhus University, Denmark

Total requested funding

1.376.000 €

Project duration

36 months

Other project partners

Swedish University of Agricultural Sciences, Sweden

Norwegian University of Life Sciences, Norway

Norwegian Centre for Organic Agriculture, Norway

Scotland's Rural College, United Kingdom

Karlsruhe Institute of Technology, Germany

RSK ADAS Ltd, United Kingdom

French National Institute for Agricultural Research, France



RumenPredict

Predicting appropriate GHG mitigation strategies based on modelling variables that contribute to ruminant environmental impact

Ruminant production is responsible for ~ 9% of anthropogenic CO₂ emission and 37% of CH₄ emissions. Release of methane results in 6-12% less energy being available to the animal. Ruminants also contribute towards N₂O within the environment, a persistent gas in the atmosphere which has 296 times more warming potential than CO₂. RumenPredict brings together members of the international Rumen Microbial Genomics network (led by IBERS, AU), of which the Hungate 1000 (focussed on sequencing 1000 rumen microbes) and the Rumen Census (focussed on evaluating effects of diet, host genetics and geographical location on the rumen microbiome) are projects within. RumenPredict brings together key members of the RMG network to generate the necessary data to link rumen microbiome information to host genetics and phenotype and develop feed based mitigation strategies. This will enhance innovative capacity and allow integration of new knowledge with that previously generated to devise geographic and animal-specific solutions to reduce the environmental impact of livestock ruminants. The project members have access to recent data/tools resulting from an array of projects, and RumenPredict will build upon and enhance the integration of knowledge generated from these projects whilst providing innovation through further testing and validation of key hypotheses resulting from the previously obtained data. RumenPredict will provide a platform for predicting how host genetics, feed additives or microbiome may affect emission phenotypes and develop genetic/diet/prediction technologies further for implementation to improve nitrogen use efficiency whilst decreasing environmental impact of ruminants.

Coordinator

Teagasc, Ireland

Total requested funding

1.036.000 €

Project duration

36 months

Other project partners

University College Cork, Ireland
French National Institute for Agricultural Research, France
Wageningen University, The Netherlands
AgResearch Ltd, New Zealand
SACCO S.R.L, Italy

Consortium

The FACCE ERA-GAS consortium consists of 19 partner organisations from 13 countries. The consortium is led by Teagasc, Ireland.

Country	Organisation
	DK INNOVATIONSFONDEN (IFD)
	FI MINISTRY OF AGRICULTURE AND FORESTRY (MMM)
	FR AGENCE NATIONALE DE LA RECHERCHE (ANR)
	DE FORSCHUNGSZENTRUM JÜLICH
	DE FEDERAL OFFICE OF AGRICULTURE AND FOOD (BLE)
	DE FEDERAL MINISTRY OF FOOD AND AGRICULTURE (BMEL)
	DE FACHAGENTUR NACHWACHSENDE ROHSTOFFE E.V. (FNR)
	IE TEAGASC - AGRICULTURE AND FOOD DEVELOPMENT AUTHORITY
	IE DEPARTMENT OF AGRICULTURE, FOOD AND THE MARINE (DAFM)
	LV STATE EDUCATION DEVELOPMENT AGENCY (VIAA)
	NL MINISTRY OF AGRICULTURE, NATURE AND FOOD QUALITY (MinLNV)
	NL NETHERLANDS ORGANISATION FOR SCIENTIFIC RESEARCH (NWO)
	NL WAGENINGEN UNIVERSITY & RESEARCH (WUR)
	NO RESEARCH COUNCIL OF NORWAY (RCN)
	PL NATIONAL CENTRE FOR RESEARCH AND DEVELOPMENT (NCBR)
	RO EXECUTIVE AGENCY FOR HIGHER EDUCATION, RESEARCH, DEVELOPMENT AND INNOVATION FUNDING (UEFISCDI)
	SE THE SWEDISH RESEARCH COUNCIL FORMAS
	TR MINISTRY OF FOOD, AGRICULTURE AND LIVESTOCK (GDAR)
	UK DEPARTMENT FOR ENVIRONMENT, FOOD & RURAL AFFAIRS (DEFRA)

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More information on the FACCE ERA-GAS website

www.eragas.eu



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