



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

Deliverable D7.4

Report on additional activities carried out under FACCE ERA-GAS

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0 Introduction

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

FACCE ERA-GAS is the ERA-NET Cofund for monitoring and mitigation of greenhouse gases (GHGs) from agri- and silvi-culture. This ERA-NET aims to ensure cooperation, alignment and impact to avoid duplication of efforts and ensure synergies with relevant partnerships and initiatives. This deliverable lists the efforts FACCE ERA-GAS has made to develop **additional activities outside of the joint EU co-funded call** in 2016. It does not include additional joint research calls, which were implemented through Work Package 6 along with the workshops, seminars and project networking events associated with these additional joint calls. Those activities are detailed in full in Deliverable D6.4 (*Report on implementation of other activities*).

Instead, this deliverable details how Work Package 7 sought to further boost the impact of FACCE ERA-GAS through other additional activities focussed on:

- Best practices in value creation
- Dialogue and engagement with stakeholders
- Developing a short and long-term strategy for research in the area
- Training and networking of early-career researchers

This report is the result of **Task 7.2 Coordination and overseeing of implementation of additional events (workshops, networking meetings, scientific conferences...)**. Work Packages 7 and 5 have worked together to create joint meetings & workshops with projects, contributions to international conferences and the organisation of training and networking activities with the above goals in mind.

1 Sharing of best practices

1.1 A workshop to exchange best practices in value creation and stakeholder engagement

The 2nd FACCE ERA-GAS Research Programme Meeting (RPM) held in Amsterdam in June 2019 had three objectives:

1. In common with all three RPMs, to present the objectives and results of the 10 research projects co-funded by FACCE ERA-GAS through its 2016 call
2. To discuss value creation and stakeholder engagement in the FACCE ERA-GAS programme
3. To address a short and long-term strategy for agri- and forestry GHG monitoring and mitigation in relation to the FACCE ERA-GAS Strategic Research Agenda



After the presentation of the progress of the projects, two workshops were hosted addressing objectives 2 and 3, respectively. The first workshop was aligned with the FACCE-JPI Communication & Valorisation Strategy and Valorisation Workshops. These are one of the tools FACCE-JPI uses to make researchers of funded projects aware of value creation of research results and to engage in more active interaction with stakeholders.

The session began with presentations from researchers who provided personal experience of providing independent scientific advice and support to EU policy and generating impacts on national policy through research results. Then, an interactive session on value creation examined how best to translate research results to policy and practice and the challenges often encountered. An interactive session on stakeholder engagement followed, exploring the benefits and experiences (positive or negative) in involving stakeholders. The workshop concluded with a presentation from an IPCC member on the importance of the agriculture and land use sector in climate change. More information about the results of these sessions is reported in [Deliverable 5.6 "Report on the 2nd FACCE ERA-GAS Research Programme Meeting: Progress presentation of the running projects & Valorisation Workshop"](#).

1.2 A workshop in support of a short and long-term strategy for agricultural and forestry greenhouse gas monitoring and mitigation

A second workshop hosted during the 2nd Research Programme Meeting in Amsterdam focussed on supporting the development of a short and long-term strategy for agri- and forestry GHG monitoring and mitigation within FACCE ERA-GAS. The workshop began with a presentation introducing the Strategic Research Agenda (SRA) of FACCE-JPI, because a key priority of the FACCE

ERA-GAS consortium is to ensure that the ERA-NET's activities help to achieve the FACCE–JPI SRA and FACCE-JPI objectives, notably those concerning the agricultural and forestry greenhouse gas monitoring and mitigation at present and in the future. An interactive session followed focussing on how FACCE ERA-GAS projects can contribute to the implementation of the key themes of the FACCE-JPI SRA. The second session focused on future research needs relating to mitigation of climate change – whether the current research needs identified in the FACCE-JPI SRA are still relevant and what are the most pressing needs now under the research need areas. The workshop concluded with a keynote presentation on *“Public agricultural research in an era of transformation: The challenge of agri-food system innovation”*. More information about the results of these sessions is reported in [Deliverable 5.6 "Report on the 2nd FACCE ERA-GAS Research Programme Meeting: Progress presentation of the running projects & Valorisation Workshop"](#).

1.3 Stakeholder-led workshop on *“Research and innovation for transformative change: co-delivering on the 2030 climate targets”*

As part of the 3rd Research Programme Meeting held virtually in March 2022, FACCE ERA-GAS organised a stakeholder-led workshop on research and innovation for transformative change. The workshop aimed to bring key stakeholders of the FACCE ERA-GAS projects together with researchers to reflect on how R&I can be leveraged for transformative change for climate action. This workshop was guided by these key questions:

1. What is the role of research & innovation in transformative change for the climate?
2. What are the needs of practitioners, researchers and society at large and how can R&I respond to them?
3. How to enable a shared vision and co-creation of R&I for climate impact?



The workshop began with a keynote address on the topic of *“A changing climate for knowledge generation in agriculture”*. Then, ‘stakeholder ambassadors’ presented themselves, their day-to-day work, how they utilise research and interact with knowledge providers, followed by individual questions. The three key questions above were discussed in a panel with a FACCE ERA-GAS researcher.

Two focus areas consisted of panels with different groups of stakeholders:

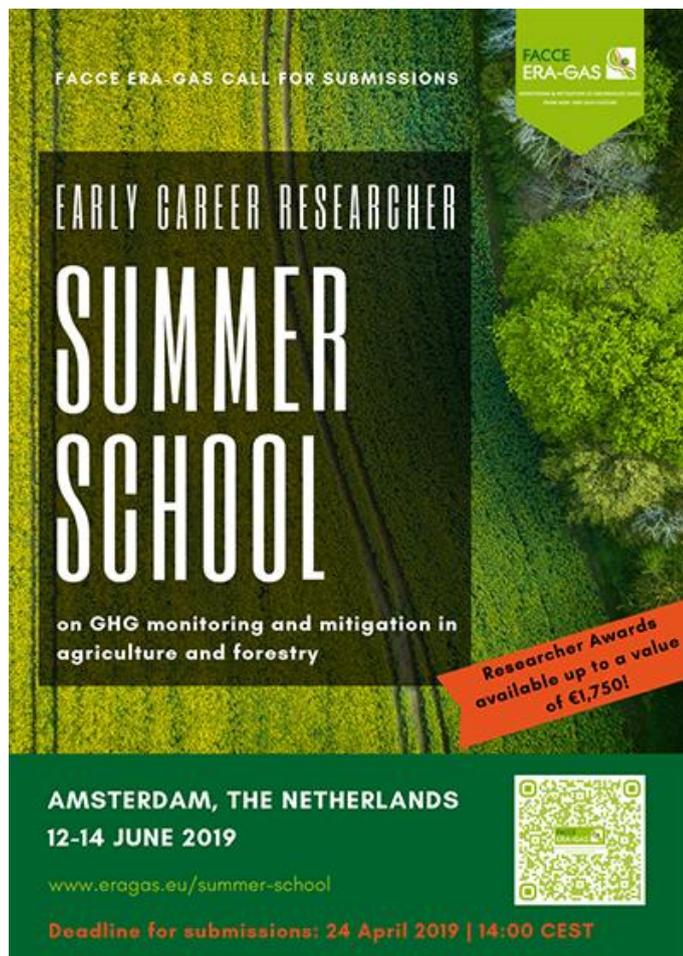
- **Focus area 1:** policy & national greenhouse gas inventories and
- **Focus Area 2:** farming, forestry & supporting innovation.

More details about the outcomes of the workshop are available in [Deliverable 5.7: Report on the 3rd FACCE ERA-GAS Research Programme Meeting & Stakeholder-led workshop on R&I for](#)

[transformative change “Farming & forestry in a climate-neutral Europe: Bringing 6 years of research into action for climate”.](#)

2 Training activities

2.1 Summer school for Early-Career Researchers



FACCE ERA-GAS organised an [Early Career Researcher Summer School on greenhouse gas monitoring and mitigation in agriculture and forestry, from the 12-14 June 2019, in Amsterdam, the Netherlands](#) with FNR as a partner. It was integrated and parallel with the 8th International Symposium on Non-CO₂ Greenhouse Gases (NCGG8). The Summer School was aimed at early career researchers (PhD candidates and post-doctoral researchers), who wanted 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 a 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. Nineteen of the selected applicants (13 female and 6 male) coming from 9 European countries (Denmark, France, Germany Ireland, The Netherlands, Norway, Poland, Romania, Sweden) and New Zealand attended the Summer School. The majority of the FACCE ERA-GAS Summer School participants (14) 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 comprised keynote lectures, presentations, sessions for networking and knowledge exchange. International experts in atmospheric science, terrestrial biogeochemistry, GHG inventories and mitigation of GHG emissions attending the NCGG8 were involved. A dedicated session addressing proposal writing also provided invaluable insights into how

future opportunities can best be exploited by Early Career Researchers. The programme included participation to the 2nd FACCE ERA-GAS Research Programme Meeting, giving the opportunity to learn about the latest findings of the 10 research projects funded by FACCE ERA-GAS.

Fourteen FACCE ERA-GAS Gold Awards were 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 was €750.

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

2.2 FACCE ERA-GAS GHG Breakfast Clubs

As the Covid-19 pandemic took hold, subsequent training activities moved online. The FACCE ERA-GAS GHG Breakfast Clubs were webinars intended for early career researchers (PhDs and post-docs) and included either **presentations from eminent scientists on cutting-edge research** topics related to GHG monitoring and mitigation from agriculture and forestry or **Career Development** presentations. FACCE ERA-GAS ran two series of GHG Breakfast Clubs in the spring of 2021 and 2022.

The breakfast clubs were very successful with around 50 to 120 attendees per GHG Breakfast Club. A total of **464 individuals** from Europe and around the world attended the FACCE ERA-GAS GHG Breakfast Clubs.



The [2021 Edition](#) of the GHG Breakfast Clubs was organised into three separate GHG Breakfast Clubs:

| | |
|--------------------------|--|
| Breakfast Club 1: | 16th April, Friday |
| Speaker 1 | Prof. Rogier Schulte Professor of Farming Systems Ecology & Director of the Lighthouse Farm Network Wageningen University & Research |
| Title | The disruptive power of big ideas |
| Speaker 2 | Prof. Gary Lanigan Teagasc |
| Title | Latest advances in Nitrous Oxide Mitigation and Carbon Sequestration |
| Breakfast Club 2: | 23rd April, Friday |
| Speaker 1 | Dr Suzanne Miller-Delaney Research Funding Consultant & Former Marie Sklodowska Curie Programme Manager |
| Title | How to secure your own funding – special focus on Marie Sklodowska Curie Actions |
| Breakfast Club 3: | 30th April, Friday |
| Speaker 1 | Prof. Sharon Huws, Queen’s University Belfast |
| Title | Latest advances in the role of Rumen Microbiome in GHG Mitigation |
| Speaker 2 | Dr Andre Bannink Wageningen University & Research |
| Title | Latest advances in Methane Mitigation |

The [2022 Edition](#) of the GHG Breakfast Clubs was organised into four separate GHG Breakfast Clubs. Recordings and slides are available for all Breakfast Clubs except the first, which could not be recorded due to its personal nature.

| | |
|--------------------------|--|
| Breakfast Club 1: | 25th February, Friday |
| Speakers | Dr Saskia Keesstra , Senior Researcher Soil, Water and Land Use, Wageningen University and Research, The Netherlands Dr Saskia Visser , Head of Programme ‘Circular and Climate Neutral Society’, Wageningen University and Research, The Netherlands |
| Title | From sediment transport to sustainable soil management: How different choices in career paths result in impactful research |
| Breakfast Club 2: | 7th March, Monday |
| Speakers | Dr Corina van Middelaar , Assistant Professor Prof Simon Oosting , Chair Animal Production Systems Group, Wageningen University and Research, The Netherlands |
| Title | Sustainable livestock systems: the methane debate |

| | |
|--------------------------|--|
| Breakfast Club 3: | 25th March, Friday |
| Speaker 1 | Dr Hans Petersson , Senior Researcher, Department of Forest Management, Swedish University of Agricultural Sciences, Sweden |
| Title | On the role of forests and the forest sector for climate change mitigation in Sweden |
| Speaker 2 | Dr Raphaël Pélissier , Deputy Director, UMR AMAP Lab, France |
| Title | What is the actual performance of large-scale forest biomass mapping models? |
| Breakfast Club 4: | 1st April, Friday |
| Speaker 1 | Prof Göran Ståhl Professor at the Department of Forest Resource Management, Swedish University of Agricultural Sciences |
| Title | Using remote sensing data for model-based and model-assisted forest resource assessment |
| Speaker 2 | Dr David Ellison Independent Researcher and External Consultant Swedish University of Agricultural Sciences, Sweden |
| Title | Europe's Forest Sink Obsession |

3 Participation in International Conferences

To showcase the work done in FACCE ERA-GAS, contributions on agricultural greenhouse gas monitoring and mitigation to international conferences are essential. This raises awareness of the work done within the ERA-NET, increases networking opportunities and facilitates the exchange of best practices between the research community and funders, brings together actors for future projects and raises FACCE-JPI visibility.

3.1 International Conference on Agricultural GHG Emissions & Food Security

FACCE ERA-GAS collaborated with FACCE-JPI and the Global Research Alliance on Agricultural Greenhouse Gases (GRA) in the joint FACCE JPI-GRA Conference [“International Conference on Agricultural GHG Emissions and Food Security - Connecting research to policy and practice”](#), which took place between 10-13 September 2018 in Berlin. Five of the 2016 funded FACCE ERA-GAS projects presented posters and a separate poster was presented on FACCE ERA-GAS as an ERA-NET. Frank O’Mara, then coordinator of FACCE ERA-GAS, was part of the Programme Committee representing FACCE-JPI and FACCE ERA-GAS.

The conference included talks by:

- Peter Dörsch (MAGGE-pH) on *“Controlling GHG emissions by soil pH management: a kill or cure?”* in the session on *“GHG calculators for the farm level: Experiences and perspectives”*
- Søren O. Petersen (M4Models) on *“A new approach to the estimation of methane emissions from manure management”* in the session on *“Integrating new measures and regional scales in monitoring”*

And included posters by:

- CEDERS (Cecile de Klein)
- ResidueGas (Jørgen E. Olesen)
- PEATWISE (Björn Klöve)
- GHG-Manage (Bruce Osborne)
- Brenda Kuzniar-van der Zee (FACCE ERA-GAS).



A stakeholder conference followed the scientific conference, allowing for the research community and stakeholders from a variety of backgrounds (policy, innovation, farming, NGOs and civil society) to interact and learn from each other.



3.2 International Symposium on Non-CO₂ Greenhouse Gases

FACCE ERA-GAS integrated the 2nd Research Programme Meeting for 2016 funded projects into the [8th International Symposium on Non-CO₂ Greenhouse Gases \(NCGG8\)](#) that took place between 12th and 14th June 2019 in Amsterdam. This parallel organisation allowed FACCE ERA-GAS to source excellent speakers e.g. from the IPCC, increase awareness of the ERA-NET amongst the scientific community and ensure a high level of attendance from project partners. A summer school (see above) was also organised in parallel.



3.3 Circular@WUR Conference: Living within Planetary Boundaries

FACCE ERA-GAS presented the network and the nine projects funded by the 2021 Call for projects at the [Conference Circular@WUR: Living within planetary boundaries](#) on 13 April 2022 at the session on 'Governance of Transitions'. The poster presented (Figure 1) below focused on the added value of joint programming and raising awareness among the research community of the newly funded projects on circular mixed crop-livestock systems.

Harnessing joint programming for circularity and greenhouse gas reduction

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What is FACCE ERA-GAS?

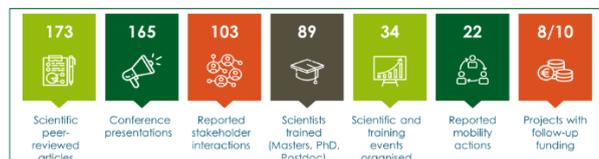
- Public to public partnership between European Commission and national funding institutions
- Initiated by the Joint Programming Initiative on Agriculture, Food Security and Climate Change (FACCE-JPI) and runs from May 2016 to April 2022
- Consortium of 19 partner organisations from 13 countries
- Funded 23 projects over a 6 year period
- 2016 Call on **monitoring & mitigation of Greenhouse gases from agri- and silvi-culture**
- 2018 Call on **Novel technologies, solutions and systems to reduce the greenhouse gas emissions of animal production systems**
- 2021 Call on **Circularity in mixed crop and livestock farming systems, with emphasis on greenhouse gas mitigation**



The added value of transnational research collaboration

- ✓ **Alignment** of research priorities across national boundaries
- ✓ **Synergies** between projects
- ✓ Allows for **funding** of research projects not possible at national level
- ✓ High-level **visibility** to policy-makers at EU level
- ✓ **Projects supported** in communication, networking, valorisation of research through ERA-GAS consortium and FACCE-JPI
- ✓ Alignment and coordination with **international** organisations such as Global Research Alliance on Greenhouse Gases

2016 Co-funded Call outcomes



Context



- 2022
- European Green Deal: Climate neutral by 2050
 - 55% reduction by 2030
 - A new greener CAP, Farm to Fork Strategy
 - Horizon 2020 → Horizon Europe
 - ERA-NETs and JPIs (smaller networks) → Larger Partnerships and Missions

2018 Co-funded Call outcomes (so far)



2021 Call on "Circularity in mixed crop and livestock farming systems, with emphasis on greenhouse gas mitigation"

Background and Scope

Mixed crop-livestock farming was once common practice in Europe.

- Since the 1960s, production has become increasingly specialised leading to
- **higher regional concentrations of animals**
 - **large-scale imports of feed**
 - **simplification** of crop rotations
 - **higher use of mineral fertilizers and pesticides**
 - **and landscape homogenisation**

This has contributed to **water contamination, loss of soil quality, climate change and decline of biodiversity.**

This proposal aims for:

- ✓ **the (re-)integration of crop and livestock farming systems to reduce emissions**
- ✓ **Being more efficient at using natural resources**
- ✓ **Reducing or abandoning external inputs (e.g., pesticides, mineral fertilizers and imported feed).**
- ✓ **being more resilient and contributing to the maintenance and restoration of biodiversity**

Proposals had to cover four points:

1. Focus on **mixed crop-livestock farming systems**.
2. Address the **monitoring and/or mitigation of GHGs** from agriculture or agroforestry.
3. Contain an **Information and Communication Technology (ICT) dimension** (for example the use of sensors, communication technologies, data analytics, modelling, robotics, precision farming or decision support systems)
4. Take a **systems approach**.

Expected Results

- ✓ Enhancing circularity between crop and livestock systems and GHG mitigation
- ✓ Potential **additional benefits** such as:
 - ✓ Improved resilience of production systems
 - ✓ increased efficiency of farm operations and animal production systems
 - ✓ enhanced use of natural resources and reduction of waste increased protein autonomy
 - ✓ more diversified landscapes

Funded Projects

CircAgric-GHG - Strategies for circular agriculture to reduce GHG emissions within and between farming systems across an agro-ecological gradient

PROENV – Balancing environment and production

ConnectFarms - Connecting sustainable agroecosystems and farming with circular bioeconomy and new technologies

ReLive - Back to the Future: reintegrating land and livestock for greenhouse gas mitigation and circularity

DairyMix - Multi-criteria assessment, decision support and management tools for sustainable circular mixed farming systems for dairy production

INTEGRITY-Integrated crop-ruminant livestock systems as a strategy to increase nutrient circularity and promote sustainability in the context of climate change

SENSE - Synergies in integrated systems: Improving resource use efficiency while mitigating GHG emissions through well-informed decisions about circularity

MI BICYCLE- Mitigation and adaptation through better biomass cycling in crop livestock systems of north and western Europe

Solutions4Farming- Solutions for GHGs emissions mitigation for the mixed farming systems across different European climates

Figure 1 Poster presented at Circular@WUR conference on 13 April 2022