



An Roinn Talmhaíochta,  
Bia agus Mara  
Department of Agriculture,  
Food and the Marine

# 2021R474 - Towards an Agricultural Greenhouse Gas Research & Innovation Centre Final Report

This project was funded under the Department of Agriculture,  
Food and the Marine Competitive Funding Programme.

## **SUMMARY**

The agriculture and land-use sector faces considerable challenges to significantly reduce greenhouse gas (GHG) emissions and enhance carbon sinks by 2030 and to achieve the 2050 goal of reaching net zero emissions. Transformative, multi-actor actions and policies will be required, with state-of-art science underpinning all aspects of these strategies. As a result, there is an urgent need to establish a National GHG Centre of Excellence, whose mission should be to 'Develop a World Class Centre for scientific research, development and communication of agriculture greenhouse gas mitigation and climate change adaptation strategies'. This Centre should provide independent science-based solutions and outreach in order to deliver a climate-neutral and climate adaptable agri-food sector. In terms of funding, the Centre should for the most part, be publicly funded, especially for research with lower technology readiness levels (TRL). Promising strategies could subsequently be funded by a public/private funding stream once they had achieved a higher TRL.

This desk study objectives were to: a) assess current methane mitigation measures b) horizon scan for future avenues of GHG mitigation research, c) compare the research coordination and funding approaches of other countries d) make recommendations in terms of the structure, focus and funding of an Irish Centre of Excellence.

The Centre should build on existing research infrastructure and human capital, working with existing organisations to create an effective, trusted partnership. The Centre should also provide and deliver a coherent vision in terms of a short, medium and long-term strategy for a low GHG agriculture and strive to become a World Class Centre for Agricultural Climate Science that enhances Ireland's reputation as a global leader in this area.

## **KEYWORDS**

Greenhouse Gases, Excellence, Mitigation

## **ACRONYM**

AGGRIC

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## **PUBLICATION DATE**

11/11/2021

# Section 1 - Research Approach & Results

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## Start Date

01 April 2020

## End Date

31 July 2021

## Select Research Programme

Research Stimulus Fund

## Please select the appropriate TRL Scale

TRL 1: Basic Principles Observed

## NRPE Priority area

Sustainable Food Production and Processing

## Total DAFM Award

€70,988.88

## Total Project Expenditure

€60,439.35

## Rationale for undertaking the Research

Improving the sustainability of Irish Agriculture is at the heart of FoodWise 2025 and Food Vision 2030. Achieving

production targets will be challenging in the context of Climate targets to reduce GHG emissions by 51% by 2030 and climate neutrality by 2050. Agriculture comprises one-third of national emissions and almost half of non-Emission Trading Sector (ETS) emissions (Duffy et al. 2018) and there is a longer-term target of net GHG neutrality in agriculture by 2050.

In order to achieve these targets, de-coupling production from greenhouse gas emissions is an urgent priority for the sector. As such this proposal directly addresses the NRPE priority of Energy, Climate Action and Sustainability. Achievement of these targets will require a co-ordinated and rapid research, outreach and implementation effort on the part of scientists, advisors, policymakers and farming/industry stakeholders.

The proposed study also aligns with all the research priorities of the JPI on Food Security, Agriculture and Climate Change (FACCE). This proposal aligns with Topic 1: Mitigation of Livestock Emissions and both Themes 1 and 2 which deal with Inventory Refinement and Abatement of emissions. It directly relates to currently funded GRA research investigating the a) the reduction of methane emissions, b) the reduction of nitrous oxide emissions and c) role of C sequestration in offsetting livestock emissions. This proposal will build on the national capacity established by DAFM under the Greenhouse Gas network (AGRI-I).

## Methodology

The desk study research assessed the current scientific research and adoption initiatives being undertaken in terms of GHG mitigation and adaptation. It took advantage of the knowledge and experience of the partners in identifying and collating available knowledge databases and identifying the key research gaps. For example, partners are associated with EU/global GHG databases such as GLOBAL NETWORKS, a Global Research Alliance database of methane mitigation research, as well as DATAMAN (a similar network for manure management) and CEDERS (an ERA-NET-funded project seeing to establish GHG database associated with the management of nitrogen (N) emissions).

The study assessed the potential design and funding structures required to co-ordinate and optimise national agricultural GHG research by assessing and tailoring the approach taken in other countries (New Zealand, Australia, US, UK, etc.) both in terms of the establishment of Centres or research platforms (UK Sustainability Platform). It drew on the experience of current Centres of Excellence in Ireland (for example SFI Centres such as VistaMilk, iCrag), particularly in terms of structures and models of public/private funding. A survey of GHG extension services and outreach (demonstration farms etc.) both national and international (Teagasc, EMBRAPA, SRUC, ADAS, etc.) was undertaken. Workshops and stocktakes of research projects/ research/extension capacity were carried out with a range of stakeholders including industry, farming organisations, policymakers (DAFM, DCCA, Bord Bia), state bodies (EPA, Bord na Mona, SFI, EI), advisors, and academic/research institutions (Universities and Institutes of Technology). This allowed for an assessment of the national current research/extension capacity to be undertaken, as well as the prioritisation of the research/extension /implementation needs of the sector. An assessment of the potential funding streams available, both in terms of magnitude and modality for future research was conducted.

### Project Results

The agriculture and land-use sector faces considerable challenges to significantly reduce greenhouse gas (GHG) emissions and enhance carbon sinks by 2030 and to achieve the 2050 goal of reaching net zero emissions. Transformative, multi-actor actions and policies will be required, with state-of-art science underpinning all aspects of these strategies. As a result, there is an urgent need to establish a National GHG Centre of Excellence, whose mission should be to ‘Develop a World Class Centre for scientific research, development and communication of agriculture greenhouse gas mitigation and climate change adaptation strategies’. This Centre should provide independent science-based solutions and outreach in order to deliver a climate-neutral and climate adaptable agri-food sector. In terms of funding, the Centre should for the most part, be publicly funded, especially for research with lower technology readiness levels (TRL). Promising strategies could subsequently be funded by a public/private funding stream once they had achieved a higher TRL.

The Centre should build on existing research infrastructure and human capital, working with existing organisations to create an effective, trusted partnership. The Centre should also provide and deliver a coherent vision in terms of a short, medium and long-term strategy for a low GHG agriculture and strive to become a World Class Centre for Agricultural Climate Science that enhances Ireland’s reputation as a global leader in this area.

## Section 2 - Research Outputs

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This section is confined to outputs that have tangible links to the project.

### Summary of Benefits / Improvements of Project Findings

The desk study has clearly highlighted the need for an agricultural greenhouse gas centre of excellence to coordinate systematic investments in research to meet the challenges that the agricultural industry face to meet the climate challenges in 2030 and 2050. The study has recommended a clear mandated and funding model that could be used to establish the center.

### Summary of Staff Outputs

Research Output	Male	Female	Total Number
Research Technicians/ Assistants	0	1	1

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### Summary of Academic Outputs

Research Outputs	Total Number	Details
Publications in Peer Reviewed Scientific Journals	1	Saoirse Cummins, Gary Lanigan, Karl Richards, Tommy Boland, Stuart Kirwan, Paul Smith, Sinead Waters. Solutions to enteric methane abatement in Ireland. Irish Journal of Agriculture and Food Research In Review

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## Potential Impact related to Policy, Practice and Other Impacts

Impact	Details
Environmental	The establishment of an agricultural greenhouse gas center of excellence will provide Sustainability for farmers, policy makers, regulators and the food industry with new technologies to contribute to agriculture meeting the current and future challenges of reducing greenhouse gas emissions.

## Section 3 - Leveraging, Future Strategies & Reference

### Future Strategies

The desk study has clearly identified the need for a center of excellence.

### Project Publications

1. Saoirse Cummins, Gary Lanigan, Karl Richards, Tommy Boland, Stuart Kirwan, Paul Smith, Sinead Waters. (????) Solutionsto enteric methane abatement in Ireland. Irish Journal of Agriculture and Food Research In Review
2. Gary Lanigan, Karl Richards, Sinead Waters and Saoirse Cummins (2021) Towards an Agricultural Greenhouse GasResearch & Innovation Centre, Project Final Report.

### Supporting documents

[📄 CoE REPORT DAFM](#)

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