



Llywodraeth Cymru  
Welsh Government

## Agricultural Greenhouse Gas Inventory Research Platform

As the UK moves towards tackling climate change, increasing our understanding of how agriculture contributes to this area is becoming increasingly important. Current estimates are that agriculture is responsible for about eight per cent of all UK greenhouse gas (GHG) emissions, however the way agricultural emissions are calculated fails to take into account the differences between farming practices or the effects of innovative approaches and policies. The Agricultural Greenhouse Gas Research Platform, funded by Defra (Department for Environment, Food and Rural Affairs) and the devolved administration governments, seeks to improve the accuracy and resolution of our reporting system by providing the necessary evidence.

The projects will focus on emissions in the form of methane (CH<sub>4</sub>) and nitrous oxide (N<sub>2</sub>O) which are 25 and 298 times stronger greenhouse gases than carbon dioxide (CO<sub>2</sub>). UK agriculture is a major contributor for both of these gases, but current measurements and reporting are based largely on generic assumptions about farm practice ('Tier 1') and default emission factors, taken from guidelines provided by the Intergovernmental Panel on Climate Change (IPCC). This level of reporting had been acceptable until the Climate Change Act (2008) introduced carbon budgets for all Government departments and sectors. A more detailed methodology (IPCC 'Tier 2' or 'Tier 3') is now key to strengthening our understanding of on-farm emissions; allowing better targeting of actions and full capture of the positive actions that farmers are already taking. This requires an approach that better reflects the range in livestock systems (livestock breed etc), crops, soils and climate throughout the UK and reflects measures such as increased fertiliser efficiency and improvements in livestock feeding to reduce emissions.

The agricultural greenhouse gas research platform will therefore aim to improve the accuracy and temporal and spatial resolution of data through three closely linked projects:

1. **Data management and modelling: project AC0114** – bringing existing data together to create a new inventory model and a set of revised emission factors with an assessment of uncertainty.

2. **Methane (CH<sub>4</sub>) emissions: project AC0115** – discrimination between CH<sub>4</sub> emissions from different livestock species and breeds/genotypes under different farming systems and representative farm business structures.
3. **Nitrous Oxide (N<sub>2</sub>O) emissions: project AC0116** – understanding N<sub>2</sub>O emissions as a function of nitrogen inputs through time, influence of climate, crop, soil types and conditions, and land management under different farming systems and representative farm business structures.

The results will be a revised set of UK specific inventory emission factors for N<sub>2</sub>O and CH<sub>4</sub> derived from a synthesis of literature and experimental work across the UK. These emission factors will be supported by model-based interpolation of measured data to representative geo-climate zones and verification at a range of scales. The benefit will be a set of country specific emission factors approved for use in reporting and an improved understanding of which mitigation measures can realistically achieve the biggest reductions.

The involvement of and contributions from the agricultural Industry is an essential part of this project. This will help to make reporting of emissions match end-user requirements and make sure that farming systems and mitigation measures are well represented. Outputs from the three projects will also be closely coordinated with concurrent Defra project AC0112 (Inventories of ammonia and greenhouse gases from UK agriculture), which delivers an annual UK GHG reporting mechanism fit for submission to the United Nation Framework Convention on Climate Change (UNFCCC).

The research programme will be undertaken by a consortium of the UK's leading research groups, giving access to organisations and facilities that cover the range of skills and expertise required to fulfil the projects. Members of the consortium include key research institutions based within all of the devolved authorities in the UK, and which have unparalleled experience of relevant regional considerations.

**Projects consortia include the following:**

- Aberdeen University
- Aberystwyth University - Institute of Biological, Environmental and Rural Sciences (IBERS) (leading the methane project)
- ADAS (leading the data management / modelling project)
- Agri-Food and Biosciences Institute (AFBI) Northern Ireland
- Centre for Ecology and Hydrology (CEH)
- Cranfield University
- Macaulay Land Use Research Institute (MLURI)

- National Physical Laboratory (NPL)
- Prof Keith Smith (University of Edinburgh)
- Rothamsted Research (leading the nitrous oxide project)
- Scottish Agricultural College (SAC)
- The Centre for Environmental Data Archival (CEDA)
- The Met Office (Exeter)
- The Organic Research Centre (ORC)
- University of East Anglia
- University of Nottingham
- University of Reading

