

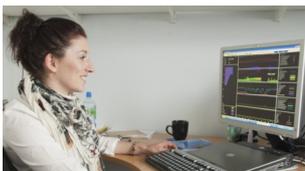
The Greenhouse Gas Platform is a 5-year research programme funded primarily by Defra, with additional support from the Devolved Administrations of Scotland, Wales and Northern Ireland to generate new country-specific measured and modelled Emission Factors for methane (CH₄) and nitrous oxide (N₂O) from agriculture. The main objective of the research is the development of an improved Agricultural Greenhouse Gas Inventory, that uses appropriate country and practice-specific emission factors and that will reflect the adoption of mitigation practices by the agricultural industry, enabling forecasting and monitoring of performance against the wider UK target emissions reductions set by the UK Climate Change Act 2008. This newsletter provides an update and more information on the work that has been carried out within the Platform projects over the last six months:

Data synthesis, modelling and management project:

Literature reviews on the effect of on-farm CH₄ and N₂O mitigation measures, such as dietary manipulation and the use of cover crops have been completed and workshops held with representatives from the Devolved Administrations to provide input on farm-activity data gaps and suggest possible GHG-related questions to add to national surveys. Work on the DNDC model has continued and a data framework has been developed for the application of the DNDC model across the UK. A formal data model has also been developed which describes the types of data, their attributes and relationships that will be used to structure the inventory evidence base. As part of this process a standard protocol and vocabulary for documenting datasets to be used within the inventory has been defined.

Sarah Buckingham at SRUC has been investigating the effect of soil-type and climate on N₂O from soils, using the DNDC model.

The participants at the workshop in Aberystwyth included representatives from the Welsh Government. The discussions focussed on the issue of activity data capture and estimates of uncertainty within the inventory.



Nitrous Oxide InveN₂Ory project:

Field experiments to measure direct and indirect N₂O emissions from fertiliser, manure and urine applications to the nine arable and grass sites are progressing well. We have now completed 14 of the 37 planned experiments. Urine volume and N content are being sampled from grazing cattle using novel technology, whilst ammonia emissions are being measured to generate ammonia emission factors. The DayCent and DNDC models have been used to assess the effects of soil type and climate on N₂O emissions, and will be used to explore the effects of specific mitigation measures. Measurements have also been taken to verify N₂O emissions at the plot and field scale to estimate the temporal and spatial uncertainty of static chamber measurements. Larger-scale verification is being planned. Controlled laboratory experiments to determine the effect of soil properties and temperature of the efficacy of the DCD nitrification inhibitor are also proceeding as planned and showing interesting differences between soils. At the larger scale, we have been quantifying dissolved N₂O in drainage water and rivers in the Defra Demonstration Test Catchments and relating them to nitrogen inputs. Measurements of N₂O emissions following a range of fertiliser treatments have continued at sites across the UK using closed-chamber methods. Selected fields from SAC Easter Bush Farms are being measured, using a 'Closed-Loop' approach.

Measurements of N₂O emissions following a range of fertiliser treatments have continued at sites across the UK using closed-chamber methods. The Closed Loop method, pictured below-right, allows for increased accuracy in N₂O flux measurements from agricultural soils.

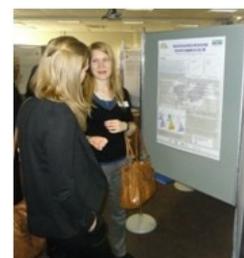


Stakeholder engagement and links with the Global Research Community:

A cross Platform workshop was held in Aberystwyth in December 2012, to encourage interaction across the projects and present early results to stakeholders. Topics covered at the workshop included the data archive for the new inventory (currently being developed by the Centre for Environmental Data Archival and the Freshwater Biological Association), and early results from the ongoing project experiments, literature reviews and data-mining activities. Over 50 posters were presented on a variety of topics. The Platform teams have also continued to engage with the Global Research Alliance on Agricultural Greenhouse Gases. In September 2012 Professors Dave Chadwick and Brian Chambers attended the inaugural meeting of the GRA Manure Management Network which was held at the FAO headquarters in Rome whilst Professor Chris Reynolds represented the UK at the first meeting of the GRA Network on Feed and Nutrition in relation to GHG's held in Zurich. Dr Jon Moorby represented the UK at the GRA workshop at ILRI, Nairobi, presenting a paper on the measurement and mitigation of GHGs in African livestock systems. The UK space agency and Defra hosted a workshop in 2012 to discuss the possibilities of satellite remote sensing (pictured below) and how it could contribute to providing activity data for the UK inventory. The UK proposal to set up an Animal Health and GHG Emissions Intensity network has been approved by the GRA Livestock Research Group.



Image source: Chelys



Methane ResearCH₄ project:

A range of experiments have been carried out using the SF₆ and chamber measurement techniques to examine levels of methane emitted by growing dairy and beef cattle, and the effect of forage sources, supplementary dietary fats and cow genotype. Differences between CH₄ emissions from lowland and hill ewes and lowland and upland cattle have also been investigated at AFBI and IBERS. Experiments examining the effect of body size on levels of methane emitted have also been completed and manures have been analysed for methane producing potential at North Wyke.

