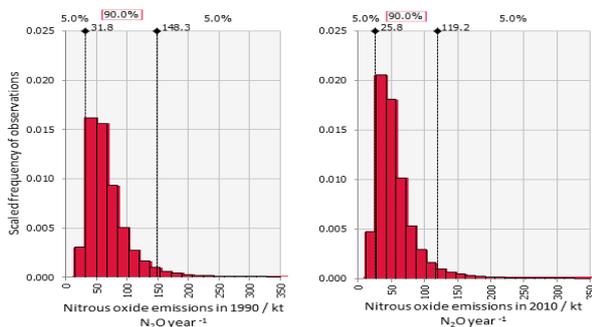


The Greenhouse Gas Platform is a 5-year research programme funded primarily by Defra, with additional support from the Devolved Administrations of Scotland, Wales and Northern Ireland to generate new country-specific measured and modelled Emission Factors for methane (CH₄) and nitrous oxide (N₂O) from 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:

A knowledge exchange workshop was held on the 23rd May in Birmingham, this provided an update on the Platform’s activities and an opportunity for stakeholders to ask questions of the delivery teams. Early results from the reviews of baseline nitrous oxide emissions from fertiliser and enteric methane emissions were also presented, these reviews are now complete and the results will soon be made publicly available. Proceedings and copies of presentations from the workshop are now available online at www.ghgplatform.org.uk/Downloads.aspx. Work at Rothamsted has focused on developing a protocol for describing the uncertainty associated with variables used in the GHG inventory calculations, and revising the estimates of uncertainty with up to date data. At present effort is focussed on the uncertainties associated with the current inventory. Preliminary Results for N₂O in England show a reduction in the 95% confidence interval from between 30 and 198 Kt N₂O per year in 1990 to 24 and 157 Kt N₂O per year in 2010. For CH₄ the reduction in the 95% confidence interval is from between 556 and 740 Kt CH₄ yr⁻¹ to between 415 to 544 Kt CH₄ yr⁻¹. Total greenhouse emissions from the England agriculture sector in 2010 were calculated to be 28.7 -40% / +105% Mt of CO₂ equivalent.



The estimated emissions of nitrous oxide from agricultural soils are calculated using Monte Carlo simulation. Each iteration in the simulation results in a separate estimate. We can use the distribution of these values to calculate the expected emissions and the associated uncertainty. The figure above shows scaled histograms of the calculated values of the total nitrous oxide emissions in England.

Methane ResearCH₄ project:

Experimental work at all sites across the UK has continued despite the wet summer. The SF₆ technique for measuring methane emissions has been employed to investigate the effect of emissions from growing dairy cattle and beef cattle and sheep of different breeds on a range of pasture types and diets. Respiration chambers have also been used to investigate methane emissions from both cattle and sheep on a range of diets, including both fresh (zero-grazed) and conserved forages. A range of novel methane emission measurement techniques continue to be developed, including on-line collection of breath in milking machines and feed hoppers. Manures from housed cattle have been collected and are being measured for volatile solids and methane producing potential.



Nitrous Oxide InveN₂Ory project:

There are now five completed 12-month N₂O flux datasets from fertiliser applications (ammonium nitrate and urea), with and without a nitrification inhibitor to both arable crops and grassland. Data are currently being quality controlled before sign-off. In addition, experiments are continuing to quantify N₂O fluxes from contrasting timings of manure application, and different seasons of urine/dung deposition to grassland. Measurements of ammonia emissions are being made in all experiments where manures are applied, with ADAS providing equipment and measurement support at the Scottish and Northern Irish sites. The controlled laboratory experiment to determine the effect of soil properties and temperature on the efficacy of the nitrification inhibitor dicyandiamide (DCD) is proceeding as planned and is showing interesting differences between soils. UEA continue to investigate dissolved N₂O in drainage water and river water within the Defra DTCs (see <http://www.lwec.org.uk/activities/demonstration-test-catchments>). Site modelling is also continuing using historical data sets, and a sensitivity analysis is being conducted using the DayCent model. CEH have been quantifying N₂O emissions following the ploughing and reseeded of pasture using their quantum cascade laser. Finally, work has started to quantify urinary N loading by grazing cattle, using urine sensors developed in New Zealand.

Slurry spreading with the ADAS small plot applicator:



Stacked chambers over a growing arable crop:



Links with Global Research Community:

Dave Chadwick and Brian Chambers attended a workshop of the Manure Management Group within the GRA at the FAO headquarters in Rome on 3-5th September 2012. The objectives of the workshop were to: share information between the participants about the state of research, policy and communication on manure management and GHG emissions; to define the strategy for the Manure Management Group and its added value; and to discuss how it will interact with the Reduced Discharge agenda of the Global Livestock Dialogue. The InveN₂Ory team are active participants in the FACCE-JPI MACSUR knowledge hub (<http://www.macsur.eu/>), and several of the team attended the kick-off meeting in Berlin on the 15th and 16th October. There are clear synergies with aspects of the modelling between the two activities. The methane ResearCH₄ project also represented the UK at a capacity-building workshop on GHG inventories for sub-Saharan Africa organised by ILRI and the GRA, which was held in Nairobi in September.

