



Minutes of the 2014 Agricultural Greenhouse Gas Inventory Advisory Panel Meeting

20 November 2014

9.00 am – 1.50pm

Room 8.2, Pastoral House, Wellington

Attendees:

The Agricultural Greenhouse Gas Inventory Advisory Panel ('the Panel') comprises:

Peter Ettema - Manager, Resource Information & Analysis, MPI - Chair

Dr Andrea Brandon - Senior Analyst, MfE

Dr Tony van der Weerden - AgResearch, (N2Onet)

Dr Harry Clark - New Zealand Agricultural Greenhouse Gas Research Centre, (NZMethanet)

Dr Keith Lassey - Lassey Research and Education Ltd, (NZMethanet)

Dr Andy Reisinger - New Zealand Agricultural Greenhouse Gas Research Centre (also for The Royal Society of New Zealand)

NB: Dr Tony van der Weerden replaced Prof Frank Kelliher on the panel this year as Prof Kelliher was not available.

In Attendance:

Simon Wear - Resource Information & Analysis, MPI

Dr Nicki Stevens - Resource Information & Analysis, MPI

Alice Ryan - MfE (attended only part of the meeting)

Mike Rollo - AgResearch

Andrea Kapoutsos – Resource Policy, MPI - Minute taker

The purpose of the meeting was for Panel members to discuss and consider approving proposed changes to the Agricultural Greenhouse Gas (GHG) Inventory. Changes that the Panel considers are scientifically robust enough to implement, are recommended to the Deputy Director-General, Policy. The 2015 inventory report for 1990-2013 is the first year of reporting which will be required to meet the 2006 IPCC guidelines.

Opening and Introduction

The Chair noted that there were two changes to the agenda, because two papers would not be considered by the panel. Those two papers were:

- Nitrogen and metabolisable energy for dairy pasture
- Information paper: meeting the new requirements for the 2006 IPCC guidelines

A paper on the first topic was not being put forward for consideration as MPI was currently looking at establishing a pasture quality sampling programme. A Pasture Quality Workshop to discuss this proposal had been held on 3 November. Simon Wear would speak about meeting the new requirements for the 2006 IPCC guidelines in lieu of an information paper being considered.

Three proposed changes were presented for an amended emission factor for urea fertiliser, for a new methodology to calculate excreta emissions from hill country with updated emission factors, and for values for nitrogen retention in livestock. An information paper on a revision to the existing dairy shed effluent emissions equation was also provided. A briefing paper, the report and a review were all submitted for each paper. Summaries of reports are found in the briefing papers.

Action

Peter Ettema to send out the minutes from the Pasture Quality Workshop held on 3 November to Panel members.

Review of the 2013 Panel Meeting Minutes

The minutes from the 2013 meeting were tabled and reviewed by the Panel.

In response to a question, it was confirmed that Ballance is providing yearly activity data for urease inhibitors. It was noted that a dairy shed effluent management workshop had been held in June 2014 and that it had reached a successful end point. It was also mentioned that the Methanet/NzOnet meeting will be held in early 2015. In response to a question about the review that had been commissioned last year on all sources of indirect N₂O emissions (EF₅), it was confirmed that the study had been completed by Tim Clough and Frank Kelliher, and that no change to the emission factors was recommended, and under the IPCC 2006 guidelines, to be implemented in the 2015 submission, the default value for EF₅ drops from 0.025 kgN/kg N_{leached} to 0.0075 kgN/kg N_{leached}.

Decision

The Panel decided that the following amendment was required to the minutes from the 2013 meeting: Under the 'Next year's projects' heading add in the words 'to soils' at the end of the last bullet point so that it reads 'Direct N₂O emissions from dairy shed effluent to soils.'

Apart from the need for the above amendment, the Panel agreed that the minutes were true and correct.

Actions

- Nicki Stevens to send out the report on indirect sources of N₂O emissions by Tim Clough and Frank Kelliher to Panel members.
- Simon Wear to amend the minutes of the 2013 Panel meeting as outlined above.

Paper 1: Hill Country – Direct N₂O From Excreta (EF₃)

This paper covered recommendations regarding new EF3 emission factors and a developed methodology to take account the effect of slope on emissions from animal excreta deposited directly to pasture. The Panel considered that the paper's recommendation to incorporate new values for the EF3 emission factor was not clear in terms of specifying the exact emission factors that would be used.

It was also pointed out there was an error in point 9 as Giltrap et al (2014) does not deal with N₂O emissions from dairy cattle, and that one option for dealing with this is to alter Recommendation point 17 to indicate that dairy is excluded.

Specific comments made about the Giltrap and Saggar methodology:

- p.10, paragraph 2: The Panel was concerned that there was no data available on the allocation of urine across slope classes, and considered that it was unclear how the authors had worked out where to allocate the urine.
A clear paragraph on urine deposition and the uncertainties is required.
- p.17, 5.1, paragraph 2: The phrasing 'calculated using appropriate EFs (Table 5)' is incorrect.

General comments:

- Mean values for flat land and low slopes should be used, but a single value for medium and steep classes should be used. In response to a question, Peter Ettema confirmed that further work is underway to collect more data for steep slopes, so medium and steep slopes could be reported separately in future (rather than being amalgamated completely in future reporting).
- A member of the Panel stated that the means quoted in Kelliher et al. (2014) were based on statistical analysis but the exact methodology should be checked with Prof Kelliher.
- If using mean values for flat and low land, the dairy values won't be representative from Kelliher et al. (2014) because of the sampling.
- It would be good to obtain Keith Betteridge's data, if possible.

Decisions

The Panel were unable to support Recommendations point 17 (emission factors) and point 18 (methodology) at this time as they required further clarification of the values and methodology proposed for this hill country improvement to the Inventory. The Panel indicated that after some further clarification the hill country improvement could be resubmitted to the Panel at the 2015 meeting, after the Giltrap et al (2014) paper is published.

Actions

- Before this recommendation can be presented to the Panel in future:
 - MPI to clarify the values proposed for each slope class and stock type and then present these values clearly in a table, and also explain why these values are proposed.

- MPI to obtain clarification of the assumptions for urine deposition that are part of the Giltrap et al. (2014) methodology.
- MPI to obtain clarification from Frank Kelliher on data analysis methodology, and data treatment should be applied consistently across all livestock and slope classes.
- MPI to ensure that future reports are not only peer-reviewed for their scientific robustness, but also for their suitability for inclusion in the Inventory.

Paper 2: Direct Nitrous Oxide Emission Factor for Urea ($EF_{1(UREA)}$)

It was mentioned in relation to point 11 that the units for 0.2 need to be specified. The correct units are tonne of C /tonne of urea 11.4.1 (IPCC 2006 guidelines).

Action

MPI to alter Recommendation point 19 to read: 'Agree that the value of 0.48% for the $EF_{1(UREA)}$ emission factor for nitrous oxide emissions from urea derived by Kelliher et al. (2014) be incorporated into future Inventory calculations.'

Decision

The Panel agreed to the altered Recommendation point 19.

Paper 3: Nitrogen Retention

Specific comments made about the Nitrogen Retention paper:

- p.2, Table 1: 'percentage N per kg of liveweight gain' needs to be changed to 'percentage N of liveweight gain'. 'Percentage crude protein (CP) per kg of milk' needs to be changed to 'percentage crude protein (CP) of milk'.

Comments made about the Bown et al. (2013) report:

A number of concerns were raised regarding the content of the Bown et al. (2013) report, including the lack of units in places, possible typographic errors in some of the equations, the clarity of the approach taken for some of the calculations, the inclusion of values for breeds not found in New Zealand being included in the calculation of means, the selective exclusion of high values from one of the calculations, and the precision of the language used.

Decisions

The Panel did not agree with the recommended updates to these values: **(a) and (b) N retained in liveweight gain: cattle and sheep**, as they were not well-backed by the reporting in Bown et al. (2013). The Panel suggested that the CSIRO (2007) methodology should be applied directly on a monthly time step. It was felt that using the CSIRO model would provide consistency. Presently the Bown et al. (2013) paper has two values for the change conversion factor of 6.25 and 6.38. For cattle and sheep it was agreed that 6.38 is the correct value (confirmed in CSIRO 2007, ACTION: MPI to check consistency with CSIRO 1990 (MPI confirmed this after the meeting)).

On **(c) N retained in liveweight gain: deer**, it was accepted that there is a general lack of data for deer, but the Panel were concerned that table 12 in Bown et al. (2013) is not suitable as it includes deer species not prevalent in New Zealand.

The Panel suggested that rather than using mean values for **(d) dairy cattle % crude protein of milk**, instead in future plug the CSIRO 2007 equation (for crude protein conversion to nitrogen) straight into the Inventory model, as the model produces the necessary data on a monthly time step anyway. Use the 6.38 conversion factor for crude protein and recalculate yearly. The value of 3.71 was accepted for update (as the model already uses it internally) and in the Inventory reporting/methodology document, MPI needs to change reporting of crude protein as it is 1/1.03 within the model.

The Panel was concerned about the justification for the mean value proposed for **(e) beef cattle % crude protein of milk** as it included data from breeds not found in NZ. They recommended that the mean be recalculated based on breeds found in NZ only, so that good justification for values was used (either calculate in house or ask authors to revise report). In future, it was recommended that the Inventory not tie beef milk to dairy milk changes because there have been genetic gains in dairy during the past 25 years which means there is and will be a difference. Use 6.38 for the crude protein conversion.

[Following the meeting, MPI circulated a spreadsheet with a calculation of the mean value from the data presented in Bown et al. (2013) using NZ cattle breeds only, and noted that the authors state: "The mean milk crude protein % from all these studies, excluding Bos indicus, purebred dairy breeds and those breeds not normally found in New Zealand is 3.44%. Excluding the high 4.24% value from Simmental from Masilo et al. (1992), the mean is 3.38%." It was recommended to the Panel that the quoted Bown et al. (2013) value of 3.44 % (including the high Simmental value) is used instead of the recommended 3.38% (as they made the calculation with a knowledge of the literature). The Panel have accepted this proposal.]

The panel agreed to the recommendation **(f) sheep % crude protein of milk**, which was that the value is not changed, but asked that the crude protein mean for NZ breeds of sheep be examined and see if it differs from the value we already use – to be in line with the approach taken for beef.

The Panel cautioned that for **(g) deer % crude protein of milk** the calculation needs to be treated slightly differently because the milk values are driven by a high dry matter content. They recommended that the value be calculated from breeds in NZ for CP content and adjustment factor. AgResearch may have data to support this calculation.

One member of the Panel raised a query about the conversion factor used for **(h) N retention in wool**, but another Panel member could follow the justification used and suggested that as it involves a small amount of N he'd be happy to accept. It was agreed that if the figure is quoted from the ARC report then the Panel would be happy to accept.

The Panel agreed that a good case was put forward for the recommendation **(i) N velvet %**, but noted the need to take account of the conversion factor for dry matter.

The panel agreed that the length of **(j) deer growth period** would have no difference on emissions calculations, and the recommendation was accepted.

Action

MPI to obtain from Bown et al. a revision of Table 12 based on New Zealand species, and then submit this to the Panel for approval at a later date.

Paper 4: Updated Equation for Methane Emissions from Anaerobic Effluent Ponds

Action

Dr Harry Clark to send MPI some data relating to ash in order for MPI to send this out to the Panel.

Specific comments made about the Updated Equation for Methane Emissions from Anaerobic Effluent Ponds

- p.2, point 6: there is repetition here of what Pratt calls errors; 'proportion of faecal material deposited on pasture' should be changed to 'proportion of faecal material not deposited on pasture'; in the explanation of Y_m 'g' should be changed to 'kg'.

The Panel noted Recommendation point 12.

2014 Review

Simon Wear indicated that the 2014 review was the last review under the first commitment period of the Kyoto Protocol (2008-2012). No issues were identified so the emission estimates for the Kyoto Protocol first commitment period have been finalised. The 2014 review was more reasonable; the 2013 review was exceedingly detailed and went beyond the scope of the review requirements in some aspects.

Comments on including the IPCC 2006 Guidelines into the Inventory

Mineralised of nitrogen from carbon losses in LULUCF (FSOM) have been added into the agriculture inventory, the emissions are small. Direct and indirect (leaching only) emissions are 0.21 kt CO₂-e.

Other organic inputs (inc sewerage sludge on agricultural land) included in model (with "on/off switch") because the emissions from this source are tiny and well below the threshold. The inventory submission for April 2015 will not report emissions from other organic inputs and sewerage sludge on land. If the ERT overrule New Zealand's decision not to report these emissions then these emissions can be included by simply turning on.

Nitrogen excretion rates, and emission factors for minor species (horses and mules) updated to IPCC 2006 guidelines. Most NZ livestock are already Country Specific so the new IPCC default emission factors do not apply.

Emissions of carbon dioxide from urea, dolomite and lime added into the inventory. These together add approximately 1 million tonnes CO₂ at 2012. Dolomite and lime were previously reported under LULUCF but were not accounted for in the Kyoto Protocol accounting. CO₂ from urea was previously accounted for under Industrial Processes through the carbon balance in the manufacture of fertiliser but the emissions from urea fertiliser are now accounted under agriculture.

Savanna burning has been in agriculture since before the 2003 LULUCF-GPG was published. Technically savanna burning in agriculture was to apply to tropical countries to report and therefore would exclude Southland tussock burning. Australia is in a similar situation. Emissions from tussock burning will be reported under LULUCF biomass burning by the LUCAS team at MfE in the 2015 submission.

Emissions of N₂O from pasture renewal have been added in with crop residues (with help from Plant and Food) this new source adds around 0.5 Mt CO₂-e to agriculture emissions.

The default EF for N₂O from Anaerobic lagoons is now zero because N₂O cannot form in anaerobic conditions. The 2006 IPCC guidelines now report some N₂O under manure management from volatilisation and leaching, although the leaching fraction is assumed zero, therefore all the emissions from leaching are under agricultural soils.

As previously noted the emission factor for indirect emissions of N₂O from leaching and run-off has decreased from 0.025 (kg N/kgN_{leached}) (1996 guidelines) to 0.0075 (kg N/kgN_{leached}) IPCC 2006 guidelines.

In the 1996 IPCC guidelines and 2006 IPCC good practice direct N₂O from fertiliser and manure previously incorrectly adjusted for FracGASM and FracGASF before applying the emission factor for direct N₂O. This has been corrected in the 2006 IPCC guidelines and will be included in the 2015 submission.

Global Warming potentials are updated to the fourth Assessment report (N₂O=298 & CH₄ =25).

General Comments

- Simon Wear indicated that he would like to keep the equations from the CSIRO (1990) report pending an assessment of the CSIRO (2007) equations.
- Thought should be given to whether it is difficult to change the equations and if this will really make a substantial difference.

Other Matters

- Conversations might be had on what to do with the sheep methane research. Have looked at ages and whether there is a split between emissions for young and old sheep.
- Dr Harry Clark indicated that he was employing a researcher in December to collect some data. He will ask her to pull together the data on the dairy trials.
- Work is being done on higher lactating cow intake, steep hill country work, and emissions from dairy shed effluent.
- An NZMethanet meeting will take place in late February/Early March to look at agriculture inventory research priorities for the future.
- There is recognition that there is under investment in Overseer and MPI may need to better align the research funds for the Inventory and Overseer and other related funds.
- There is increasing pressure for research to be relevant to other areas rather than just to the Inventory. The level of detail in terms of information that is needed by the sectors and for the Inventory is quite different.
- It was mentioned that Simon Wear will soon be taking up a new role with the Secretariat to the United Nations Framework Convention on Climate Change. Dr Nicki Stevens will take over the compiling of the agricultural inventory. It is hoped that a new staff member for the Resource Information & Analysis team will be recruited by Christmas. In the meantime Alice Ryan from MfE will provide some assistance. Alice has also passed her exams as an agriculture review expert.
- Dr Harry Clark indicated that the Australian and UK Advisory Panels are dealing with similar issues to New Zealand.

The meeting closed at 1.50pm.