



Minutes of the 2019 Agricultural Greenhouse Gas Inventory Advisory Panel Meeting

29 October 2019

10.00am – 4.00pm

Meeting room 9.03, Charles Fergusson Building, 34-38 Bowen Street, Wellington

Panel members in attendance:

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

Dr Gerald Rys – Principal Science Adviser, MPI – Chair

Dr Harry Clark – Director, New Zealand Agricultural Greenhouse Gas Research Centre

Dr Andy Reisinger – Deputy Director, New Zealand Agricultural Greenhouse Gas Research Centre
(also for The Royal Society of New Zealand)

Dr Keith Lassey - Lassey Research and Education Ltd

Dominic Thorn - Analyst, MfE

Dr Cecile de Klein – Science Impact Leader, AgResearch

Dr Surinder Saggar – Portfolio Leader, Manaaki Whenua – Landcare Research

Other attendees:

Nicki Ablitt – Manager, Climate Change Adaptation, Reporting and Evidence, MPI

Mike Rollo - AgResearch

Run Qing Tong – Policy Analyst, Climate Change Adaptation, Reporting and Evidence, MPI

Joel Gibbs – Senior Policy Analyst, Climate Change Adaptation, Reporting and Evidence, MPI

Caroline Read – Chief Executive, Overseer Limited

Maggie Tapa – Graduate Programme

Liz Clayton – Investment Manager, Sustainable Resources, MPI

Beth Hampton – Policy Analyst, Science Policy, MPI (Attended for first part of the afternoon)

The purpose of the meeting was for Panel members to discuss and consider proposed changes to the Agricultural Greenhouse Gas (GHG) Inventory. Changes which the Panel considers are scientifically robust enough to implement are recommended to the Deputy Director-General, Policy & Trade for approval

Opening and Introduction

Gerald Rys introduced the meeting at 10am, and provided health and safety information on the meeting room. The attendees at the meeting briefly introduced themselves.

Joel Gibbs gave an update on the MPI inventory team in 2019, discussing personnel changes, the 2019 Inventory submission to the UNFCCC and involvement in the in-country reviews of the National Communication and Inventory by UNFCCC expert reviewers.

Gerald Rys discussed the purpose of the Panel, and asked that Panel members make particular note of paragraph 21 of the Terms of Reference regarding the criteria that need to be considered when recommending any changes to the agricultural inventory. Gerald asked the members to declare any conflicts of interest and proposed that members with conflicts of interest could participate in the discussion, however they could not vote on that change. The panel agreed to this.

The panel members declared areas that were conflicts of interest. Cecile de Klein, Gerald Rys, and Surinder Sagggar declared conflicts of interest for the panel paper *Direct N₂O emission factors for livestock excreta (EF_{3,PRP}) based on hill slope and livestock type*

Cecile de Klein declared a conflict of interest for the panel paper *Revisions to the National Inventory Model for New Zealand Goats*.

Keith Lassey raised a potential conflict of interest relating to the panel paper *Revisions to the National Inventory Model for New Zealand Goats*.

Review of the 2018 Panel Meeting Minutes

The minutes and actions from the 2018 meeting were tabled and reviewed by the Panel.

Mike Rollo noted that one part of the minutes relating to the discussion on Improvements and corrections to inventory model (the paragraph before action 11) wasn't correct, and the gap between the Inventory and Overseer would be wider because of the change.

The actions from last year were reviewed:

1: Not done. It was suggested and endorsed that the inventory team add these procedures to their QA/QC documentation.

2: Not done. It was agreed that six-monthly meetings between Overseer and the Inventory team would be more suitable

3: Done. The report is now available online.

4 – 6: Done.

7: In progress. The Panel asked if Tony van der Weerden had identified a particular journal for publishing the meta-analysis work

8: Done

9: Partially complete, the research report has been published on the MPI website, but not as a peer-reviewed journal article. The Panel asked MPI to look into publishing this work as a peer-reviewed journal article

10 – 14: Done.

15: In progress. Joel noted that this topic was due for discussion by the Panel later in the day

16: Not necessary (no major changes were incorporated into the 2019 agriculture inventory)

17: Not done

18-19: Done

20: Not done (the review was held in October)

The minutes were accepted by the Panel, along with proposed follow up actions:

ACTION 1: MPI and Overseer to continue work on clarifying differences between Overseer and the Inventory model

ACTION 2: MPI (Inventory team) to add procedures for testing model code to their QA/QC documentation

ACTION 3: MPI (Inventory team) to follow up with Tony van der Weerden relating to the Journal he was considering for publishing the meta-analysis work

ACTION 4: MPI (Inventory team) to talk to David Pachecho about publishing his 2018 work on nitrogen partitioning between dung and urine.

Panel Paper: Direct N₂O emission factors for livestock excreta (EF_{3,PRP}) based on hill slope and livestock type

Gerald passed on to Harry to chair due to conflict of interest in this topic.

Joel gave a brief overview of the history of this work, noting in particular the recent work that Tony van der Weerden and Alasdair Noble had done following the Panel meeting last year. The Panel noted that the revised analysis and recommendations included dairy cattle and flatland studies, and that the main findings of the new analysis had been shared with Panel members in May 2019.

Cecile de Klein noted the date on the briefing paper was incorrect eg 2018 rather than 2019.

Recommendation one: Beef + Lamb NZ data and the Nutrient Transfer Model outlined by Saggar et al (2015) be used to allocate total dung and urine between low, medium, and steep slopes for non-dairy cattle, sheep, and deer.

The Panel approved this recommendation.

Keith Lassey questioned whether the importance of that model in allocating depositions to slope class had sufficient prominence, but was comfortable that the role of the model was appropriately spelled out.

Panel members noted that it would have useful if the brief had more information on the implications of the proposed changes for uncertainty calculations. Harry noted that this recommendation had been agreed by the Panel last year, and Joel advised that the recommendation had been included in the paper for completeness.

Recommendation 2: the emission factors for direct nitrous oxide (N₂O) emissions from animal excreta (EF_{3,PRP}) be disaggregated based on stock type and hill slope, using the following values recommended by van der Weerden et al (2019):

The Panel approved this recommendation.

The Panel discussed the validity of the analysis used to group some of the emissions factors, and there was a discussion of the log-transform method used to do this.

Keith Lassey questioned why the independent review from Daniel Gerhard recommended that the proposed emission factors be adopted after his review noted potential pitfalls with the statistical analysis. Cecile noted that Daniel's suggestions to apply other methods for statistical analysis could change how livestock and slope categories are grouped. Surinder discussed the rationale for pooling the values. Harry argued that there was a need for pragmatism in the analysis.

Dominic Thorn and Keith Lassey asked about the implications of the proposed changes for uncertainty calculations. The inventory team stated they were unable to speculate on this, and that a more sophisticated uncertainty analysis would be needed to address this.

The Panel agreed to the proposed new emission factors, noting that they are more likely to represent the actual farm situation than the emission factors currently in the inventory.

The discussion moved to the implications of the proposed change and potential risks to be aware of and mitigate. Andy emphasised the need for further research in this area, and identified the risks of *not* changing the emission factors in light of the current research. Joel noted the UNFCCC inventory reviewers encouraged New Zealand to continue to research and adopt country-specific methods and emission factors. Mike Rollo noted other risks associated with the change

Keith Lassey noted that the halving of the dung emission factor value was significant. The Panel agreed that it was important how the change was communicated to stakeholders, and asked MPI to share their planned communications regarding the change to the Panel for review.

The panel had no concerns using the average of the sheep and beef emission factors to calculate the emission factors for deer, noting the need for pragmatism. Cecile and other Panel members noted that there may be a need for research on deer in the future.

ACTION 5: MPI (inventory team) to share draft set of key messages relating to the EF₃ change with Panel members for comment, with Panel members to provide feedback before the end of the year

ACTION 6: MPI (inventory team) to undertake further research in this area, which could include field studies and statistical analysis

Panel Paper: Revisions to the National Inventory Model for New Zealand Goats

Gerald Rys introduced the paper and outlined the recommendations.

Recommendation one: Three subcategories of goat types in the inventory model be established for goats;

Recommendation two: New emission factors and parameters for enteric fermentation, nitrogen excretion and faecal dry matter be used; and

Recommendation three: Adopting a new methodology for calculating manure management emissions from goats, and assumptions on the proportion of manure going to different manure management systems for dairy goats.

These recommendations were not accepted by the panel, although it was agreed to use the updated dairy goat population estimates from the Burggraaf report in the current goat methodology. The Panel cited potential errors in the report, as well as lack of data in the manure management section, and a lack of information behind the N₂O calculations. The panel concluded that more justification would be needed to deviate from the IPCC default methodology for the manure management calculations.

The panel noted that the paper lacked data in parts, and much of the data in the report was used in an inappropriate way. Harry in particular remarked on errors in table 6 of the Burggraaf report (intake

and emission estimates for kids). Problems with the manure management assumptions were also discussed.

Many Panel members also observed inconsistencies between tables 4, 5 and 6 of the briefing paper

The population estimates were discussed and compared with the current methodology. Joel gave a brief outline of the assumptions the current inventory uses for estimating the population of dairy goats. The Panel questioned the data and assumptions used to split population estimates between dairy, meat and fibre goats, and questioned the use of a linear interpolation assumption for the changing proportion of dairy, meat and fibre goats over time, but acknowledged the lack of readily and directly available activity data.

ACTION 7: Panel members to send through more detailed feedback on the Burggraaf et al (2019) report and associated recommendations

Panel Paper: Minor improvements and corrections proposed for the inventory model

Mike Rollo introduced this topic and explained the justification for the change.

Recommendation one: the proposed modification to the equation used to estimate energy efficiency for maintenance be implemented for the 2020 inventory submission, from $k_m=0.02 \times \text{FeedME} + 0.5$ to $k_m=0.35 \times q_m + 0.5$

Recommendation two: the value for gross energy be modified to 18.45 MJ/kg DM for the 2020 inventory submission:

The Panel agreed in principle with both of these recommendations, although asked MPI to provide more information on the proposed deer changes before these were adopted formally.

The Panel noted that equation 1 on the briefing paper was a simplified version of equation 2

The proposed changes to the deer equations were questioned by the Panel. Mike noted that the deer equations are based on the Suttie (2012) report.

Caroline Read noted that these changes were made to Overseer in August

ACTION 8: MPI to provide the Panel with more information from the Suttie (2012) report relating to the k_m equation for deer (i.e. why the equation is specified this way).

Discussion of Recent In-country review

Joel gave an overview of the recent in-country inventory review. Overall the reviewers were very complimentary of the inventory, the agriculture chapter text and the country-specific research that has been done. The recommendations were mostly with regard to transparency with a minor query regarding manure management methane for deer. The ERT requested that we review the emission factor for this.

The panel took a break for lunch at 12.30 pm and the meeting resumed at 1.15 pm

Discussion on incorporating mitigation technologies into the inventory

After lunch, data requirements to justify the incorporation of mitigations, with a focus on inhibitor products, were discussed. Factors including level(s) of statistical significance and robustness, the representativeness of trials, longevity of effect, need to consider all trials carried out, and the need to consider the magnitude of effect on total emissions were covered.

Overview of the Greenhouse Gas Inventory Fund strategy and four year research plan

Status of current research

MPI talked the panel through the 2019/20 Greenhouse Gas Inventory fund (GHGI fund) procurement plan.

The projects

- Review and revision of the methane conversion factor (MCF) for dairy
- Improving N leaching estimates in the inventory
- Estimation of N₂O emission factors for dairy urine using soil data
- Soil carbon monitoring on agricultural land
- Evaluation of the GHG Fund

Were likely to begin in 2020 or late 2019. Projects discussed in more detail were:

Revised analysis of pasture quality data: Joel Gibbs explained that this project will begin in 2020, using recently collected data. Harry questioned the robustness of some of the values and wondered what kind of calibration had been used by the commercial testing company. Gerald noted that he had followed up with AgFirst on these questions.

Provision of feed quality lab data: Joel Gibbs explained that the beginning of this project has been delayed. It was agreed that the research proposal for this project would be shared with Harry and Caroline.

Reprogramming of inventory model: Joel explained that this project would be done internally

Projects listed in the procurement plan as standby were briefly discussed, including, background emission factors. It was noted that for this project, the consideration of nitrogen cycling would be important.

It was noted that future research priorities will need to keep in mind the feedback from the recent in-country review

ACTION 9: Harry Clark to follow up with Stefan regarding lab data on feeds

ACTION 10: MPI to share data with Overseer on feed use

ACTION 11: MPI to share draft RFP (for lab data on the energy and N content of different feeds) with Harry and Caroline

Other Business

MPI discussed dates for the 2020 Agricultural Greenhouse Gas Inventory conference with the panel, including the option of combining with the NZAGRC conference in Palmerston North in April. MPI and NZAGRC agreed to discuss this further.

Keith asked who was the NZ representative of the Emissions Factor Database (EFDB) Harry noted that Andrea Pickering is the GRA representative for this group, but there are no official NZ

representatives at the moment. A short discussion was held on adding new data to the EFDB, and the storage of data from emissions research conducted in New Zealand.

Gerald closed the meeting at 3.00pm

Summary of Actions

- ACTION 1: MPI and Overseer to continue work on clarifying differences between Overseer and the Inventory model
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- ACTION 5: MPI (inventory team) to share draft set of key messages relating to the EF₃ change with Panel members for comment, with Panel members to provide feedback before the end of the year
- ACTION 6: MPI (inventory team) to undertake further research in this area (N₂O emissions from dung and urine), which could include field studies and statistical analysis
- ACTION 7: Panel members to send through more detailed feedback on the Burggraaf et al (2019) report and associated recommendations
- ACTION 8: MPI to provide the Panel with more information from the Suttie (2012) report relating to the k_m equation for deer (i.e. why the equation is specified this way). Panel members to review this information and respond whether they are happy with the proposed change to the k_m equation (from $k_m = 0.2q_m + 0.5$ to $k_m = 0.2q_m + 0.503$)
- ACTION 9: Harry Clark to follow up with Stefan regarding lab data on feeds
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