



METHANE EMISSIONS AND NITROGEN EXCRETION RATES FOR NEW ZEALAND GOATS

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Main Purpose: ☒ Decide ☒ Discuss ☐ Note

Purpose of Report

1. Seek approval from the Agricultural Inventory Advisory panel to change the emission factor used to estimate methane emissions and the nitrogen excretion rate for goats.
2. Attached to this paper are the reports
 - a. The final report “*Methane emission and nitrogen excretion rates for New Zealand Goats*”
 - b. The review of the above report by Harry Clark.

Summary

Background

3. New Zealand has an obligation under United Nations Framework Convention on Climate Change Convention (UNFCCC) to report the anthropogenic greenhouse gas emissions and removals every year. Emissions are reported in the annual submission of the National Inventory Report submitted to the UNFCCC. New Zealand also has a responsibility under the Kyoto Protocol to reduce emissions growth and if not successful will incur a financial cost.
4. The National Inventory Report forms the base of any financial cost that the country may have under the Kyoto Protocol. Therefore reported emissions and removals need to be as accurate as possible. New Zealand has a long standing research program in estimating country specific emission factors to aid in the improvement of reported emissions and removals from the land based sectors.
5. Changes beyond the default methodology and emission factors to take account of country specific factors are encouraged and need to be well documented and transparent.

Current Inventory

6. The 1996 IPCC guidelines, Good Practice guidelines (2000) and 2006 IPCC guidelines do not recommend a value for nitrogen excretion rate (N_{ex}) for goats.
7. In both the 1996 IPCC guidelines and 2006 IPCC guidelines a value of 5 kg CH_4 /head/year is used as a default value for methane production from goats. In the 2006 IPCC guidelines it is noted that the emission factor is based on a live weight of 40 kg.
8. The country specific values currently used are not well documented with little or no documentation on how these values were determined for New Zealand.
9. The current values used in the New Zealand Inventory for estimates of methane emission and N_{ex} from goats are 9 kg CH_4 /head/year and 9.5 kg N/head/year respectively.
10. However, goats make up a very small percentage of New Zealand's Agricultural Inventory (0.06% in 2009) so are not a key category when assessed on an annual bases. Extensive work in developing country specific emission factors for goats is therefore not justifiable. Improvement in transparency is however required.

Report

11. The report was commissioned to document and recommend values for methane emissions and N_{ex} from goats in New Zealand.
12. The report investigated five different methods to estimate these values
 - a. International literature review
 - b. Scaled IPCC default values for sheep
 - c. Scaled New Zealand specific values for sheep
 - d. Use the IPCC Tier 2 methodology for sheep to estimate values with minor adjustments for goats where feasible
 - e. Use the New Zealand Tier 2 Inventory model for sheep with minor adjustments for goats where feasible.
13. Using the information from the five methods listed above the author has made an expert opinion on what values New Zealand should use for goats in the National inventory.

Proposed changes to inventory

14. The report recommends a value of 8.5 ± 0.7 kg CH_4 /head/year for 2009 and 7.4 kg CH_4 /head/year for 1990 for estimating methane emissions from goats.
15. For nitrogen excretion (N_{ex}) rates from goats the report recommends a value of 12.1 ± 1.0 kg N/head/year for 2009 and 10.6 kg N/head/year for 1990.

16. The report also recommends that for intermediate years between 1990 and 2009 that the EF and N_{ex} values could be interpolated according to total goat population.
17. The report also specifically looked at the methane emissions and N_{ex} for a milk producing (dairy) goat. These values are not suggested changes to the inventory as the goat population is not subdivided in sub classes. These values may inform the interpolation of the intermediate values between 1990 and 2009 if this method is approved. Also these values were determined to inform work on the Emission Trading Scheme which is beyond the terms of reference for this panel.

Implications to emissions estimates

18. The change to the emission factors will decrease emissions from goats in 1990 by 28.5 Gg CO₂-e (- 0.094 percent of agricultural emissions) and increase emissions from goats in 2009 by 0.5 Gg CO₂-e (+ 0.001 percent of agricultural emissions).

Reviewer comment

19. The review on the initial report was carried out by Harry Clark, the New Zealand Agricultural Greenhouse Gas Research Centre.
20. The author has addressed the reviewers concerns and the final report incorporates these changes, including changes to the original recommended values in light of further information between draft and final report.
21. The reviewer supports the recommended values.

Strategic Risks

22. The changes may not be accepted by the *United Nations Framework Convention on Climate Change* (UNFCCC) reviewers. However, if this is the case there is an extensive process which is followed in which New Zealand can state its case or change back to the IPCC default before any penalty would be applied.

Strategic Opportunities

23. New Zealand will be meeting the UNFCCC obligations of continual improvement of the National inventory
24. Although the new values will not make any noticeable difference to the total emissions estimate for New Zealand, the values used will now be well documented, therefore meeting the UNFCCC requirement for transparency.

Recommendations

It is recommended that the Agricultural Inventory Advisory Panel:

25. ***Agree** that the value for estimating methane emissions from goats in the New Zealand National Inventory Report is changed to 8.5 ± 0.7 kg CH₄/head/year for 2009 and 7.4 kg CH₄/head/year for 1990, noting the reported uncertainty is at 95 percent confidence interval.*

Agree / not agreed

26. ***Agree** that the value used to estimate nitrogen excretion from goats in the New Zealand National Inventory Report be changed to 12.1 ± 1.0 kg N/head/year for 2009 and 10.6 kg N/head/year for 1990, noting the reported uncertainty is at 95 percent confidence interval.*

Agree / not agreed

27. ***Agree** that the for intermediate years between 1990 and 2009 that the EF and N_{ex} values should be interpolated based on assumptions that the dairy goat population has remained near constant state over time.*

Agree / not agreed

Andrea Pickering
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Approved/ Not Approved/ Approved as Amended

Alice Marfell-Jones
Manager Information and Analysis
Chair Agricultural Inventory Panel

Date