



NITROGEN RETENTION

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Main Purpose: ☒ Decide ☒ Discuss ☐ Note

Purpose of Report

1. Seek approval from the Agricultural Inventory Advisory Panel on the recommendations to adjust values for nitrogen retention in ruminants.
2. Attached to this paper are the reports:
 - Bown MD, Thomson BC and Muir PD (2013). Evaluation of the values for ruminant nitrogen retention used in the National Greenhouse Gas Inventory, MPI Technical Paper (in press)
 - The change approval forms completed by the reviewer George Cruickshank.

Summary

Background

3. New Zealand has an obligation under the United Nations Framework Convention on Climate Change (UNFCCC) and the Kyoto Protocol to report anthropogenic greenhouse gas emissions and removals every year. Emissions are estimated and reported in the annual submission of the National Inventory Report submitted to the UNFCCC. This reporting requirement is also legislated by the New Zealand Climate Change Response Act (2002).
4. Any future commitments taken by New Zealand to reduce greenhouse gas emissions may have a financial cost based on emissions reported in the National Inventory Report. 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. Reporting must meet the recommendations in the guidelines provided by the Intergovernmental Panel on Climate Change (IPCC)ⁱ. Improvements are encouraged to take account of national circumstances beyond the default methodology and emission factors that are recommended in the 2006 IPCC Guidelines, and need to be well-documented and transparent.

Current Inventory

6. The current values for nitrogen retention in the inventory are based on expert judgement at the time (Pickering and Wear, 2013)ⁱⁱ. These values form part of New Zealand's country specific inventory model, which is beyond the level required of an IPCC Tier 2 model.

Report

7. The report by Bown et al. (2013) evaluated the values for ruminant nitrogen retention by comparing them with published information relevant to New Zealand livestock classes and production systems. The report identifies specific areas for improved accuracy and the recommendations are detailed in the table below:

Table 1: Current values for nitrogen retention in ruminants in the inventory and new values recommended by Bown et al. (2013).

Variable	Current value	Recommended value
Nitrogen retained in liveweight gain (N_{lwg}) – percentage N per kg of liveweight gain		
a) N_{bt} for cattle ¹	3.26	2.13
b) N_{bt} for sheep	2.60	2.04
c) N_{bt} for deer	3.71	3.22
Nitrogen retained in milk (N_{rm}) - percentage crude protein (CP) per kg of milk		
d) N_{rm} for dairy cattle	3.77	3.71; recommended to update annually
e) N_{rm} for beef cattle	3.77	3.44
f) N_{rm} for sheep	6.00	No change
g) N_{rm} for deer	3.66	7.3
Nitrogen retained in wool (N_{wool}) – gram N per kg		
h) N_{wool} for sheep	165 (per kg clean wool)	134 (per kg total greasy fleece)
Nitrogen retained in velvet antler (N_{velvet})		
i) N_{velvet} – percentage N per kg	12.0 (per kg antler weight)	9.0 (per kg velvet dry matter)
j) Growth period of antlers	Grown over 3 months	Grown over 65 days

¹ Note that insufficient data are available to determine values for beef and dairy cattle separately

Effect of changes

8. The overall likely effect of implementing the recommended changes has not been calculated at the time of writing because they have not been programmed into the Inventory model yet, but is likely to result in an increase in estimated nitrous oxide emissions. These values should be available by the time the Panel meet to discuss these changes on 20 November 2014.

Reviewer's comments on the recommendations

9. The reviewer supported the report recommendations and noted that the paper was well researched and the data was reported and discussed thoroughly. He also noted that the limitations to the data and analysis were acknowledged and opportunities for improving predictions identified.

Uncertainty in estimates

10. The effect of the new values on the level of uncertainty in the inventory has not been quantified.

Strategic Risks

11. The changes may not be accepted by an expert review team of 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 original IPCC defaults before any penalty would be applied.

Strategic Opportunities

12. New Zealand will be meeting the UNFCCC obligations of continual improvement of the national inventory
13. The new values will update the estimates for nitrous oxide emissions for New Zealand. The changes will be well documented, and will contribute to the UNFCCC requirements of transparency and accuracy.

Recommendations

It is recommended that the Agricultural Inventory Advisory Panel:

14. **Agree** that the following changes, as described in Table 1, should be implemented in the national inventory:

Nitrogen retained in liveweight gain	
a) for cattle	Agree / not agreed
b) for sheep	Agree / not agreed
c) for deer	Agree / not agreed
Nitrogen retained in milk	
d) for dairy cattle	Agree / not agreed
e) for beef cattle	Agree / not agreed
f) for sheep	Note there is no change
g) for deer	Agree / not agreed
Nitrogen retained in wool	
h) for sheep	Agree / not agreed
Nitrogen retained in deer	
i) Nitrogen retained in velvet	Agree / not agreed
j) Growth period of antlers	Agree / not agreed

Alice Ryan and Nicki Stevens
Analyst, Ministry for the Environment

Approved/ Not Approved/ Approved as Amended

Peter Ettema
Resource Information and Analysis Manager
Chair Agricultural Inventory Panel

Date

ⁱ 2000 IPCC Good Practice guidelines and 2006 IPCC guidelines

ⁱⁱ Pickering & Wear 2013, Detailed methodologies for agricultural greenhouse gas emission calculation, version 2, MPI Technical paper 2013/27