



MPI POLICY AND TRADE
Agricultural Inventory Advisory Panel Meeting
20 November 2014

CHANGES TO ANNUAL NATIONAL GREENHOUSE GAS INVENTORY REPORTING FROM 2015 ONWARDS

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Main Purpose: ☐ Decide ☒ Discuss ☒ Note

Purpose of Report

1. To inform the Agricultural Inventory Advisory Panel about changes being made to the national inventory of agriculture emissions. These changes are in response to new reporting requirements that have been introduced by the Conference of the Parties (COP) to the United Nations Framework Convention on Climate Change (UNFCCC).
2. The following documents are attached to this information paper:
 - UNFCCC decision 24/CP.19 and Annex III
 - van der Weerden TJ, FM de Klein, FM Kelliher and KR Lassey (2011) Review of the IPCC 2006 guidelines to determine NZ inventory requirements from 2010. *MAF Technical paper no: 2011/77*
 - van der Weerden TJ, FM de Klein, FM Kelliher and M Rollo (2014) Reporting to 2006 IPCC Guidelines for N₂O emissions from additional sources of organic N: final report. *MPI Technical report* (in press)
 - Thomas S, D Wallace and M Beare (2014) Pasture renewal activity and factors for New Zealand, *MPI Technical report* (in press)
 - Completed Inventory change approval forms from Professor Tim Clough and Dr Tony van der Weerden

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 IPCC Guidelines, and need to be well-documented and transparent.

Current Inventory

6. The current inventory reporting is based on the requirements in the revised 1996 IPCC guidelines and 2000 IPCC Good Practice guidance. These are the IPCC guidelines mandated by decisions under the Conference of the Parties (CP) serving the UNFCCC and the Meeting of the Parties serving the Kyoto Protocol for annual inventory reporting before 2015.

New reporting guidelines and requirements

7. Under UNFCCC decision 24/CP.19, the greenhouse gas inventory reporting of all Annex I parties will be based on the requirements in the 2006 IPCC guidelines and 2000 IPCC Good Practice guidance.
8. The 2006 IPCC guidelines provide revised default emission factors, corrections to the existing methodology, and new areas of reporting under the Agriculture sector.
9. New reporting tables were agreed by the Subsidiary Body for Scientific and Technological Advice (SBSTA) during SBSTA 39. They are available to sector experts via a new Internet application and can also be downloaded from:

http://unfccc.int/national_reports/annex_i_ghg_inventories/reporting_requirements/items/5333.php
10. The reporting units for gases have changed from Gigagrams (Gg) equivalent to 10⁹ grams to kilotonnes (Kt). The change reflects that kilotonnes are more user friendly and more easily converted to million tonnes or higher for policy analysts.
11. Under UNFCCC decision 24/CP.19 (Annex III), the global warming potentials of methane and nitrous oxide (as well as other greenhouse gases) have been updated to be aligned with the IPCC Fourth Assessment Report. The global warming potential for methane increases from 21 to 25, while the global warming potential for nitrous oxide decreasing from 310 to 298.

Specific methodology and reporting changes

12. Advice on implementing was sought from scientific experts and during a bilateral meeting with Agriculture Inventory counterparts in Australia.
13. An overview of the coming changes was provided by van der Weerden et al. (2011). The report identifies specific areas for improved accuracy and the recommendations (table1).

Commented [MPI1]: Text left over from Simon:
"Carbon dioxide equivalent estimates"

Not sure what was need here? Calc of CO-e?

Table 1 Changes to reporting due to the adoption of the 2006 IPCC guidelines, as identified by van der Weerden et al. (2011)

Identified change in reporting	Source
Remove biological fixation as a source of N ₂ O	
Disaggregation by animal type (sheep versus cattle) of the default N ₂ O emission factor for animal excreta deposited by grazing (EF3PRP)	
Removal of adjustments of the amounts of N applied as mineral and organic fertilisers for ammonia (NH ₃) and NOX volatilization.	
Inclusion of N from below-ground crop residue as a direct source of N ₂ O	
Inclusion of N release from pasture renewal as a direct source of N ₂ O	
Inclusion of N mineralization associated with C loss due to land-use change and management practices as a direct source of N ₂ O	
Inclusion of N from crop residues and mineralisation associated with C loss as a source of N leaching and thus an indirect N ₂ O source	
Reduction of the emission factor for N leaching or runoff (EF ₅)	
Changes to CH ₄ emission factors from manure management	As above

Changes to default tier 1 emission factors

14. New Zealand only uses default emission factors for a few sources of emissions from livestock species that contribute minor magnitude of emissions and only these need to be updated to the 2006 guidelines (table 2).

Table 2 Tier 1 default emission factors for livestock used by the New Zealand Agriculture Inventory

Emission source	Livestock category	Emission factor in 1996 IPCC guidelines	Emission factor in 2006 IPCC Guidelines*
Enteric fermentation	Horses	18	18
	Mules and asses	1.14	10
	Alpaca	8	8
Manure management	Goats	0.18	0.20
	Horses	2.1	2.34
	Mules and asses	10	1.10
	Other poultry	0.117	No value provided

* Values for enteric fermentation from Table 10.10 (IPCC, 2006). Values for manure management are taken from the Temperate average annual temperature column of table 10.15 (IPCC, 2006).

15. There is no nitrogen excretion rate for other poultry in the IPCC 2006 guidelines therefore the default from IPCC 1996 will be retained.
16. The total effect of changing emission factors for the species where default emission factors are used is an increase in emissions of 12.4 Kt CO₂-e compared to 2012 estimates.

Corrections to emission factors

17. Previously nitrous oxide emissions from anaerobic lagoons used a default emission factor of 0.1 %. This has been corrected and changed to zero because nitrous oxide cannot form in anaerobic conditions. In 2012, nitrous oxide emissions from anaerobic lagoons were estimated as 17.97 KtCO₂-e, and will be reported as zero in future.
18. The methodology to estimate Direct Nitrous Oxide emissions from synthetic fertiliser and animal waste applied to soils has been corrected in the 2006 guidelines. The IPCC1996 and IPCC 2000 previously adjusted both fertiliser and animal waste for ammonia and nitrous oxide volatilisation after application to soils however the N₂O emission factors were based on non-adjusted values. Relative to the estimates reported in the 2014 annual submission direct nitrous oxide emissions from synthetic fertiliser will increase by 165.20 KtCO₂-e while direct N₂O emissions will increase by 21.32 KtCO₂-e.

Commented [MPI2]: Would be good to put 1996 and 2006 values in here, maybe all three in a table.

New reporting requirements

- (i) Pasture renewal

19. The complete destruction and renewal of pasture causes some nitrogen mineralisation and therefore emissions of nitrous oxide. 186.82 Kt CO₂-e.
 - (ii) Additional source of nitrogen
20. Policy decision
 - (iii) FSOM
21. Nicki
 - (iv) Biological fixation of N and Below Ground Crop Residue
22. This change was implemented in the 2012 submission following approval of a new crops methodology at the 2011 Panel meeting. During an in-country review of New Zealand's national inventory the ERT recommended
 - (v) Carbon dioxide emissions
23. Carbon dioxide emissions from application of urea, lime, dolomite and other carbon containing fertiliser are now reported under agriculture. Emissions of carbon dioxide and lime were previously reported under Land Use, Land-Use Change and Forestry but these are now reported under agriculture (by decision 17/CP15). In 2012 CO₂ emissions from lime and dolomite were estimated to be 667.11 KtCO₂-e.
24. Carbon dioxide emissions from urea application are a new source in the IPCC 2006 guidelines. Previously the carbon balance in estimating net carbon dioxide in the manufacture and use of urea accounted for the eventual application under the industrial processes sector. The carbon balance in estimating net carbon dioxide from urea manufacture has changed and now carbon dioxide emissions from urea use are reported under transport (where used in the manufacture of brake fluid) and agriculture where applied to agricultural soils.
25. Emissions from other carbon containing fertiliser are a new source for agriculture. There is no guidance in the IPCC 2006 guidelines on estimating carbon dioxide from other carbon containing fertilisers, and we are not aware of other carbon containing fertilisers being used, therefore these emissions will be reported as not estimated. We have discussed with our Australian counterparts and are both taking this approach.
 - (vi) Prescribed burning of savanna
- 26.

Uncertainty in estimates

27. Although an assessment of the effect of the new requirements on the level of uncertainty in the inventory was quantified in van der Weerden et al. (2011), and more up-to-date assessment has not been completed at the time of writing.

Recommendations

It is recommended that the Agricultural Inventory Advisory Panel:

28. **Note** the changes to the Agriculture Inventory reporting from 2015 onwards.

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Date

¹ 2000 IPCC Good Practice guidelines and 2006 IPCC guidelines