



Review:

Review of population models within the National Methane Inventory (2010)

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Review of population models within the National Methane Inventory (2010)

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Purpose of the report being reviewed

The report addresses the purpose for which it was prepared namely –

‘Review of population models within the National Methane Inventory (2010)’

Methodology, assumptions and sources used to estimate the data

Methodology

The report applied an objective and scientific approach wherever possible and also generally came to logical and sensible conclusions in relation to the quality of information available.

Assumptions

Assumptions were generally well reasoned and founded on best available information.

Information Sources

The information was sourced from recognised industry agencies such as Meat & Wool Economic Service, Livestock Improvement Corporation, Statistics NZ and Landcorp Farming all of which have credible reputations within the sector. Other information sources were also considered such as peer reviewed research papers.

It should be recognised that gaining high quality data on the subject paper is difficult with current methods for data collection by recognised agencies such as Statistics NZ and Meat & Wool NZ Economic Service.

Accuracy of the reported data

Data reported by Meat & Wool Economic Service, Livestock Improvement Corporation and research trials cited in the report can be considered high quality in terms of accuracy as with all these agencies professionally trained people are responsible for the data collection. In terms of Statistics NZ data it is suggested that this data is of lower quality as the raw farmer data collected through the census may lack in accuracy as farmers sometimes struggle with maintaining good animal records and also get confused with age classes (forgetting that an age class prevails for a whole financial year).

However, the authors, in reaching their conclusions, have been cognisant of the quality of the data and highlighted how the data could be affected by factors such as animal age, seasonal variation effects on liveweight and the quality of data in terms of how it was collected.

Feasibility/practicality/logic of any options presented

In all cases a reasoned approach was used to arrive at a conclusion.

This report should be read in conjunction with the *‘Review of Liveweights’* paper where recommended changes impact on this paper too.

Options of other data sources that have not been identified in the reports but may be of use in the future

It is difficult to fault the logic used in the conclusions reached however some observations noted in reviewing the report were:

- As with the 'sister' paper on 'ewe and cow liveweight' recommendations the introduction of a compulsory EID system for cattle through NAIT would result in more comprehensive and accurate data being collected on farm and at time of slaughter. Provided this data can be accessed, assessed for accuracy and then analysed by an appropriate agency (such as represented by the authors of the subject paper) then this data should be of good value. Looking to the future there needs to be encouragement for farmers and meat processors to invest in systems to collect such data. Currently most beef processing plants have equipment which enables a pre-kill liveweight to be associated with carcase weight and grade. Unfortunately many beef processing plants have been frustrated with difficulty in reading barcodes on tags and therefore good quality information is not routinely collected and reported.
- With the introduction of compulsory EID tagging in 2012 through NAIT the accuracy of data collection and recording on farm and at time of slaughter should all improve. The pre-kill liveweight taken immediately before the animal is slaughtered can be referenced to the time taken off feed on farm. There is considerable research data on this subject area which is relevant in being able to effectively calculate dressing percentages. (the Reviewer has prepared a reference paper on this subject area so feels reasonably well equipped to comment).
- With Beef + Lamb NZ already collecting data through their wide range of ~550 survey farms covering sheep, beef, deer and goats from throughout NZ there would appear to be a possible opportunity to add value to that survey by including some of the requirements of the Greenhouse Gas Emissions Model to their data collection, namely:
 - Associating sale and purchase numbers, weights and dates with age, breed and stock class.
 - Recording liveweights of livestock by stock class at opening and closing denoting whether weights are estimated or actual (to differentiate the quality of data)
 - Liveweights of livestock by stock class immediately before sending to be processed denoting whether weights are estimated or actual.
 - Recording on the ASD form the actual time taken off feed on farm and then correlating this data to kill sheet data with actual time of kill and associated liveweight and carcase weight details (to differentiate the quality of data).
- Landcorp are NZ's largest pastoral farmer with 105 sheep, beef, deer and dairy farms on 374,905 hectares with 1.5 million stock units (ref. Chris Kelly CEO; Presentation at Kaeo on 19 May 2011). The quality of farm data from Landcorp is high compared to the private sector (Reviewers opinion as a result of contract work with Landcorp through Beef Cows 4 Profit program compared to Reviewers involvement with Beef + Lamb NZ Monitor Farm programmes which he has facilitated) so there could also be an

opportunity to engage with them in collecting information to the requirements of MAF and in a similar way to that proposed for Beef + Lamb survey farms.

Assessment of Author's recommendations

Recommendations

Sheep

1. Change mean lambing date from 1st September to 11th September.
 - Agree
2. Have two lamb kills with 84% of the slaughter lambs killed at the end of February at a carcass weight of 16.8 kg and 16% killed at the end of August (called hoggets in the model) at a weight of 18.4 kg.
 - Agree; Reviewer comment as follows:
 - i. It is common practice for surplus 2-tooths to be sold during the ewe fairs in January and some of the sales noted will fall into this category.
 - ii. It should be noted that ewe hoggets are called 2-tooths post Christmas further adding confusion to age class descriptors.
3. Change average date of cull ewe slaughter from the 31st March to 20th January.
 - Agree
4. Kill all ewes in the dry ewe category at the end of July rather than farming for a further 12 months.
 - Agree
5. Increase death rates to 4.5% in weaned lambs, 3.6% in hoggets and 5.6% in the ewes.
 - Agree
6. Change ewe deaths so that 40% of the ewe deaths occur in August and September to reflect deaths around lambing. Remaining ewe losses spread throughout the year.
 - Agree
7. Calculate ewe liveweights from carcass weights using a figure of 40.0% instead of 43% currently in the model. This will result in ewe liveweights increasing from 55.9 kg to 60.0 kg in 2009/10.
 - Agree
8. Adjust ram numbers at the end of February.
 - Agree
9. Reduce ram liveweight gains to 0 g/d with a base ram liveweight of 84 kg (40% heavier than ewes).
 - Disagree; but will make little difference to model outcomes – Reviewer comment:

- i. Although no actual additional data can be presented by Reviewer to support this claim it is suggested that rams (like ewes) increase in weight with age.

10. Adjust wether numbers in October when wether hoggets enter the wether flock.

- Agree; as this is the time when teeth erupt on lambs which means at works they are graded as hoggets with an associated and major depreciation in value.

Beef

11. The current model appears to underestimate beef cow liveweight. Cow liveweights should be altered to 402 kg in 1990/91, increasing by 8.5 kg/year to 457 kg in 2009/10. Future beef cow liveweights could be calculated using annual carcass weight data from approximately 16,000 cows obtained from Landcorp and M&WNZ.

- Agree

12. Change the mean calving date for beef cows from 1st September to 20th of September.

- Agree

13. Cull beef cows at the end of March instead of the end of February.

- Agree

14. Retain 25% of beef heifers as replacements, with a 2% annual death rate. Add dry heifers to the slaughter group in March/April (as rising 2 year olds after pregnancy testing) so that after allowing for deaths between March and October, 17% of heifers enter the beef breeding herd as calving heifers.

- Agree; comments as follows:
 - i. Landcorp data and MAF Farm Survey data reviewed by Reviewer suggests that local trade weights for heifers of 180-270kg carcass weights are typically not achieved until May-June rather than March April when the heifers would be scanned for pregnancy.
 - ii. Pushing the kill date even later is not considered to have a significant effect on the model so have agreed with Authors.

15. Increase cow death rates to 2.7 % with 50% of cow deaths occurring in the month of calving (September).

- Agree

16. Cull surplus bulls in January and February. Any increases in bull numbers occur through increasing the number of bull calves kept for replacements and which are introduced into the herd prior to mating.

- Disagree; with comments as follows:
 - i. There needs to be a distinction between breeding bulls and revenue bulls. A strong suggestion that dairy-beef revenue bulls (which make up the bulk of bulls killed) are likely to be purchased rather than kept from natural increase.

- ii. Certainly breeding bulls are not kept from natural increase.
- iii. There are ~1.1m breeding cows in NZ and assuming that a 1:25 bull ratio is maintained (actual mating ratios maybe more like 1:30) on farms then there are likely to be around 44,000 breeding bulls on farms in NZ. The death rate on breeding bulls is very low but the life of bulls may be only 5 years or less (R&D Brief 142) due to disease and bull breakdown. Assuming 20% of bulls are sold to works per annum and culling takes place in the 3-4months post mating then over 2000 breeding bulls per month could be contributing to bull slaughter numbers from February to May.
- iv. Having made all these comments any changes to breeding bulls whether related to numbers, weights or dates are unlikely to significantly affect the model.

17. Change average slaughter age of heifers to 24 month of age (end of October).

- Agree that calendar month should change to match later calving date.

18. Change average slaughter age of bulls from 24 months to 18 months of age

- Disagree; leave slaughter age at 24-months of age
 - i. The Reviewer believes that there has been a classic misinterpretation of age classes with this recommendation. To explain; a rising 1-year bull (R1 Bull) born in August is 11-months of age at opening on 1st July and 23-months at closing 12-months later on 30 June. And likewise a rising 2-year old bull (R2 Bull) is 24-months at opening and 36-months of age at closing.
 - ii. To achieve the average slaughter weight of 306.4kgCW (viz Table 11 page 20) then the daily gain would need to be >1kgLW/day. On the other hand if the bulls were in fact killed 12-months later at 30-months of age then the average daily gain would be more realistic at ~0.65kgLW/day.
 - iii. Typically bulls are grown at modest winter liveweight gain and then grown rapidly in the spring (and summer) to help match feed demand with feed supply.
 - iv. In reality it is likely that bulls are killed somewhere between 18-months of age and 30+months of age so 24-months is arguably a good midway point based on current knowledge.

19. Change average slaughter age of steers from 24 months (1st September) to 28 months (1st February).

- Agree

Deer

20. Change calving date from 1st December to 17th of November in 2007/08 and adjust previous dates to fit the changes occurring since 1990/91.

- Disagree

- On checking with Landcorp data the Reviewer found that while stags are introduced for mating on dates as shown in the B+L survey data, in practice hinds do not cycle immediately and calving (fawning) is in fact later.
- Landcorp data (pers. comm. Gordon Williams indicates that NI fawning dates are 5th December and SI dates later).
- Based on Landcorp data and the fact that it is commonly accepted that there is a gap between stag introduction and actual start of mating then it is suggested that the fawning date should remain the same.
- More evidence needed in this area.

21. Reduce the base liveweight of hinds from 110 kg to 95 kg.

- Agree

Dairy

22. Evaluate dairy cow liveweight pattern to determine if the single weight currently used represents the average dairy cow liveweight.

- Agree

23. Incorporate a death rate of 21% – half of which occurs in August. Data on death rates to be improved using data from other sources e.g. MINDA.

- Agree

24. Add 107 litres of milk to each lactation to allow for the milk fed to calves.

- Agree

25. Change average calving date to 13th August. The separation of the dairy model into regions will then be able to account for changes in each region over time.

- Agree

Overall there is a much higher level of data quality in the dairy system as a consequence of the MINDA system coupled with better on-farm recording and a high frequency of animal observation in a milking system.