Submission by Wise Response Society

on the

Action on Agricultural Emissions Report by the Interum Climate Change Committee

13 August 2019

To the Ministry for the Environment

List of main contributors to his submission

This submission has been shared and developed with a Wise Response discussion list of 50 persons, many having academic expertise in different disciplines. We wish to acknowledge in particular the assistance of the following persons. Individual contributors listed may not, however, necessarily agree with all aspects of the final submission. Contributions to this submission do not limit members making their own submissions in a private or professional capacity.

Dr Alan Mark
Dr Stephen Knight-Lenihan
Peter Fraser
Dr Cath Wallace
Dr Larry Burrows
Dr Jim Salinger
Dr Martin Manning
Ian Williamson
Dugald MacTavish
Dr Peter Barrett
Dr Robert McLachlan

The submission is structured according to the questions posed by the Ministry

1. What is the best way to incentivise farmers to reduce on-farm emissions?

Incentive with Governments current proposal

1. Many farmers demonstrate - particularly owners of dairy farmers - that they can and do adjust to financial incentives, and if they can see how to reduce stock and inputs, and maintain profits, they will. But at current prices of $5.70/kg milk solids, farms reducing emissions by 0% or 20% respectively, would be paying $0.01/kg milk solids and $0.008/kg milk solids. Both the absolute amount and the difference is so tiny that by itself this is not an incentive to reduce emissions.
2. Thus, producers or the NZ consumers could easily absorb the full ETS for meat and dairy and this is what is needed if there is to be any impact at all. Producer concerns about much higher unit prices are unfounded because the price is to be capped.

Real examples

3. Seeing how emissions reduction can occur with the likes of input reductions is important for farmers. Demonstration farms that show how peers do it such as NZ Dairy's Owl Farm[1] and Lincoln University System 2 farm experience are good examples.
4. In terms of dairy emissions reduction, anything up to 24% can be done without any drop in farm profitability (i.e. zero marginal cost of abatement).
5. This is primarily because pretty much all of the dairy farms are overstocked - the issue is degree. As Barrie Ridler showed at Lincoln, destocking, from a starting point if overstock, is profitable[2,3].
6. Their herd size was reduced by 16% and milk production actually went up - as the increase in per cow production more than offset the smaller number of cows. Profitability went up by up to 40%. Lincoln was a very high performing farm to begin with, which suggests the approach is widely replicable.
7. A 47% emissions reduction more is more challenging - but two options here before conversations.
    - Firstly, rather than profit maximise, if the goal was to simply maintain existing profitability (and ideally building resilience to pending climate change impacts), then further cuts in stocking rates are possible.
    - Secondly, we have had dairy conversions in completely unsuitable areas (e.g. McKenzie, parts of Canterbury in contrast to suitable Taranaki and Waikato). For other environmental reasons (e.g. freshwater quality), these need to be reversed over the next decade.

[1] https://www.iccc.mfe.govt.nz/assets/PDF_Library/f15921453c/FINAL-ICCC-Agriculture-Report.pdf (pp 33)
[2] The effect of dairy farm intensification on farm operation, economics and risk: a marginal analysis *W. J. Anderson and B. J. Ridler*
[3] Lincoln University, Dairy Farm, Focus Day, 10 May 2012 Peter Hancox (Farm Manager)

8. There should be no need for incentive or anything other than accurate information to have dairy farmers voluntarily achieve up to 25% reduction in emissions.

Levy

9. The one part of the governments current proposal that will actually reduce emissions is the recycling of the money to specific farm projects provided they are correctly targeted and achieved. Some sort of farm environmental score with cooperation from banks and processors would help too. Farms showing the most improvement can be rewarded directly through grants for environmental improvements.

Incentives vs regulation

10. This question is about "incentivising" but behind that there needs to be a regularity system supported by measurement and monitoring. A case may be made for effects-based when resources are in surplus and accumulative effects are minor, but that is no longer the case, certainly with climate change. In most important areas we know enough to be able to set necessary standards and establish compliance rules.

2. Do the pros of pricing emissions at farm level outweigh the cons, compared with processor level, for (a) livestock and (b) fertiliser? Why or why not?

11. Yes. The Society considers that both should be immediately implemented both at farm level and backed up at processor level so the whole sector is engaged in achieving the required reduction targets. The main reasons are that

    a. The situation is so urgent that the shortest most foolproof mechanism is required

    b. the real value of bringing agriculture into ETS is to make it clear that we all need to work together and contribute.

    c. Farmers should be helped and encouraged to develop accounting methods and identify areas where they can achieve greatest emissions reduction at least cost

3. What are the key building blocks for a workable and effective scheme that prices emissions at farm level?

12. Simple reliable equitable process that is available as a service through the farm accounting community.

13. Accordingly the Society recommends that it be mandatory for all firms to lodge a certified statement of GHG emissions with their annual tax statement that is independently audited.

14. Individual farms/farmers will need to instigate the required changes and so need to be brought into the ETS (just as individual forest owners are), and Sector interests also need to be involved as auditors/overseers.

4. What should the Government be taking into consideration when choosing between Option 1: pricing emissions at the processor level through the NZ ETS and Option 2: a formal sector-government agreement?

15. The agriculture sector's failure to accept their responsibility to reduce emissions along with other businesses and the wider community and the many examples of the failure of business to self-regulate.

16. The agricultural sector tends to have a short-term commercial focus in the process and that no other sector has been given the opportunity to propose an alternative to the ICCC recommendation for this consultation, when the success or failure affects as all.

17. The agricultural sector could still implement its own emission reduction incentives in addition to the government ETS scheme.

5. As an interim measure, would Option 1: pricing emissions at the processor level through the NZ ETS with recycling of funds raised back to the sector to incentivise emissions reduction or Option 2: a formal Government-industry agreement for reducing emissions be best? Why?

18. Option 1 is preferable for reasons already given

6. What additional steps should we be taking to protect relevant iwi/Māori interests, in line with the Treaty of Waitangi?

19. Take recommendations from iwi/Maori interests

7. What barriers or opportunities are there across the broader agriculture sector for reducing agricultural emissions? What could the Government investigate further?

Integrated approach

20. We consider that the process of achieving emissions reduction should be considered within the evolving concept of integrated landscape management (ILM or agroecology). ILM seeks multi-functional synergies at scale to achieve a diverse set of landscape objectives, offers a practical method of responding concurrently to climate change and the need to shore up rural and urban resilience.

21. At a planning level, ILM requires shifting the approach to managing the effects of human activity from a reactive "avoid-remedy-mitigate" to a systems methodology. We know what hydrological changes are in the pipeline (e.g. higher intensity but less predictable rainfall, more extreme winds, extreme high

or low temperature, increasing average temperature, generally less predictable weather etc) so now is the time to consider just how best to best future proof farms and operations.

22. For individual landowners this means a shift in focus from personal profit to community resilience and positive ecological outcomes at landscape or catchment scale.

23. Human impacts are now so significant, that we will need to use all possible opportunities to mitigate and adapt to the effects of climate change underway. Genuinely integrating our natural and physical resource management is one such opportunity.

8. What impacts do you foresee as a result of the Government's proposals in the short and the long term?

24. Very little and those that are achieved will in all likelihood be too late to help avert catastrophic climate change and associated economic and social dislocation.

9. Do you have any other comments on the Government's proposals for addressing agricultural emissions?

25. The following points concern wider aspects of how best to manage reducing emissions from agriculture that the ICCC were tasked with.

Hobbling the Climate Change Commission

26. Ensuring that the Climate Change Commission is not artificially constrained by legislation and can make the recommendations to Government/Parliament that it considers are necessary to play our part in preserving a safe climate.

Managing the politics

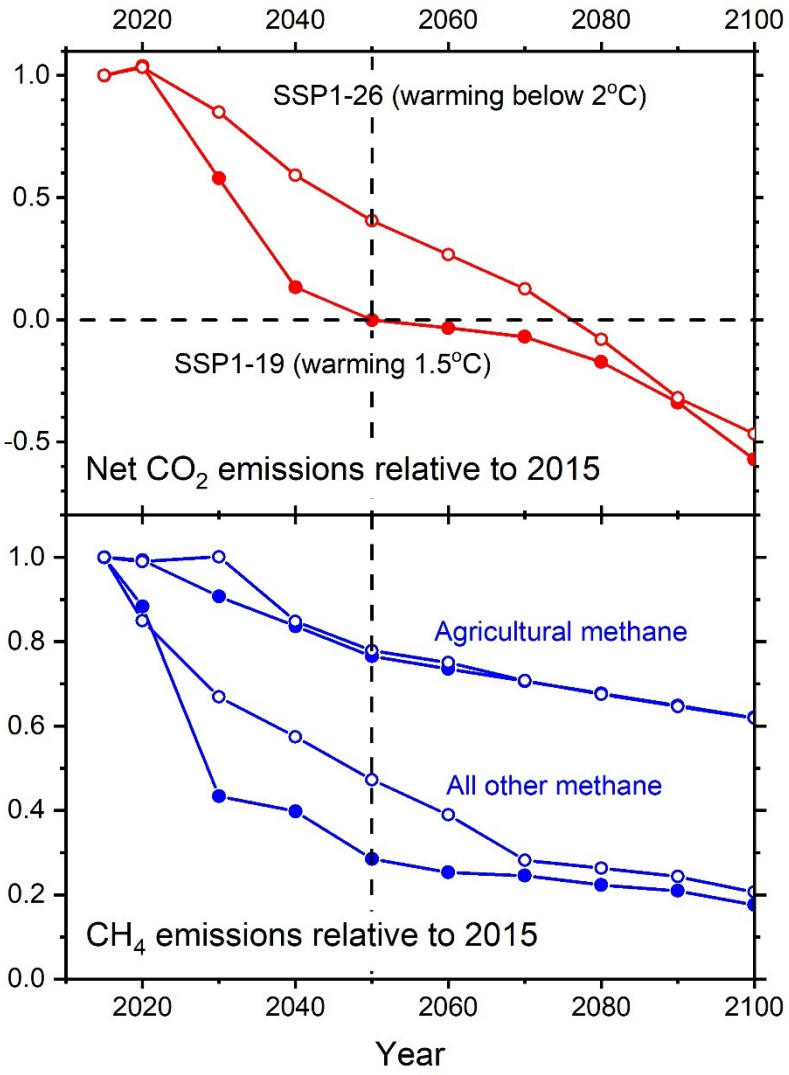
27. Ensure that the community at large understands that every sector of the economy, including farming, must contribute to emissions reductions, so when the necessary strong regulations are put in place there will be support expressed at the polls rather than a backlash.

28. The significance of methane

29. While CO_2 is the dominant greenhouse gas, keeping global warming less than 2°C or 1.5°C clearly requires control of all greenhouse gases and in particular of methane (CH_4) that is the second most significant. As noted in a recent and very detailed comparison of different pathways consistent with the 1.5°C target, "*early mitigation of CH_4 emissions would significantly increase the feasibility of stabilising global warming below 1.5 °C, alongside having co-benefits for human*

and ecosystem health"[4]. This analysis showed that the broader effects of methane, on atmospheric chemistry and ozone levels in urban areas, also need to be recognised as sensitive to the global average atmospheric CH_4 concentration.

30. The importance of CH_4 is recognised explicitly in greenhouse gas emission scenarios now being used across all climate models for the next IPCC Assessment report. The following figure shows changes in emissions, relative to those in 2015, for both CO_2 and CH_4, in the region covering New Zealand, Australia and Indonesia and consistent with keeping below 2°C (SSP1-26, hollow symbols) and 1.5°C (SSP1-19, solid symbols)[5].



[4] Collins, W. J., C. P. Webber, P. M. Cox, C. Huntingford, J. Lowe, S. Sitch, S. E. Chadburn, E. Comyn-Platt, A. B. Harper, and G. Hayman (2018), Increased importance of methane reduction for a 1.5 degree target, Environmental Research Letters, 13(5), 054003.

[5] Emissions data used here are publicly available at: https://tntcat.iiasa.ac.at/SspDb/dsd

31. For both temperature targets agriculture has been treated carefully in these scenarios because of its importance, but in both cases significant reductions in agricultural emissions are still required. Keeping to the 1.5°C target also requires that a significant reduction in agricultural CH_4 emissions occurs before 2030, rather than allowing a delay as can be feasible for the 2°C target.

32. Unfortunately, atmospheric CH_4 has been increasing since late 2006, and the importance of rectifying this to address climate targets is becoming increasingly recognised by scientists. A recent analysis of the CH_4 budget was presented as an invited talk at the American Geophysical Union conference in Washington DC in December 2018[6]; an invited paper on ways of managing methane emissions has just been completed for Reviews of Geophysics[7]; and the London Royal Society will hold an international conference on the methane problem in October 2020, with Dr Manning being an invited speaker.

Risks associated with forestry offsets

33. The wisdom of reliance on carbon offsets has been neatly summed in the New Scientist - "Enlarging planted forests by a third could lock up enough carbon to give us 20 more years to stupidly dither on tackling climate change"[8].

34. The Parliamentary Commissioner for the Environment has questioned the use of plantation forestry as a climate response and points out that "...the benefits of converting land into forest are difficult to estimate accurately."[9] For example what are the net emissions costs of soil disturbance, machinery use, transport, processing, albedo change (potentially ~17-24%[10]) and finally and most importantly, export (where most logs are destined), which effectively loses the carbon from New Zealand. In New Zealand the plantation forest industry devolves all of these emissions costs to other sectors, and so they are not seen as directly resulting from exotic forestry establishment.

35. The expectation that once exotic plantations are awarded carbon credits the expectation that they would permanently remain in that land-use appears unrealistic and potentially a liability as market demands shift.

36. And with warming, we are observing a growing risk of forest fires or destruction by disease or insects, as in the case of the coniferous forests of North America. Thus, greater reliance for GHG reduction must be placed on the more certain issues of reductions through modification of land and sea transport: land transport with substitution of rail- and sea- for current dominance of grossly emitting road-based methods.

---

[6] Dlugokencky, E., M. Manning (presenter), E. Nisbet, and S. Michel (2018), Recent Increases in the Burden of Atmospheric CH4: Implications for the Paris Agreement, in AGU Fall Meeting: Rising Atmospheric Methane: Causes and Consequences, Washington DC.

[7] Nisbet, E. G., et al. (2019), Methane mitigation: emission reduction methodologies on the path to the Paris Agreement, Reviews of Geophysics, submitted.

[8] July 2019

[9] https://www.pce.parliament.nz/media/196523/report-farms-forests-and-fossil-fuels.pdf

[10] Implications of albedo changes following afforestation on the benefits of forests as carbon sinks, Kirschbaum et al 2011

37. Equally the potential for building carbon in soils with appropriate farming methods has yet to be given due consideration in New Zealand, when France for example, has a formal programme to promote it (The "4 per 1000 climate initiative"11). We thus consider the concept whereby landowners are granted "cumulative credits" for overall carbon sequestration across their farming operation deserves closer examination.

38. Policymakers are misinterpreting the term 'forest restoration'. Few conservationists, for example, think that this should include planting a monoculture of Pinus radiata trees for regular harvest. Natural-forest restoration is the most effective approach for storing carbon over the longer term. Lewis and Wheeler for example, find that natural forests are 6 times better than agroforestry and 40 times better than plantations at storing carbon[12]. New Zealand should thus increase the proportion of land that is being regenerated to natural forest.

39. Secondly, Radiata pine plantations are significant emitters of volatile organic compounds. These compounds, monoterpenes, form as unstable liquids on the leaves which are emitted into the atmosphere. The monoterpenes then binds up the hydroxyl radicals (these decompose methane) which prolongs the life of methane in the atmosphere.

40. The recent unexpected ramping up of methane concentration in the atmosphere and the possible effects of pine plantations means that New Zealand must tackle reductions in methane emissions immediately, and at a higher rate than previously considered. Otherwise steeper cuts will be required in CO2.

41. The inescapable conclusion to all the uncertainties associated with carbon off-sets, is that the reliance on carbon offsets using, especially exotic trees is, at best, very high risk and at worst, will prove to not be positive at all i.e. instead a net source of carbon.

42. There is thus no substitute for simply and urgently cutting emissions and this should be reflected in how agriculture is required to respond to the ETS.

Mandatory emissions accounting

43. According to MOTU most farmers (>90%) now know that climate change and GHG emissions are an issue, but few farmers (<10%) have an understanding of their net emissions, what they can do about it, or where they can find information.

44. Hence farmers need more encouragement and support to assess their own net emissions so that they can make sensible landuse and planning decisions, and be able to quantify gains or improvements. This may include data-hungry GHG budgeting tools for quantification/certification such as Overseer, but also easier indicative landuse planning tools such as that at Lucus Associates[13].

[11] https://regenerationinternational.org/4p1000/
[12] https://www.nature.com/articles/d41586-019-01026-8
[13] http://www.lucas-associates.co.nz/carbon/integrated-farm-plan/

45. The overall consensus by the combined Biological Emissions Research Group (BERG - a Primary Sector group) is that NZ could achieve it's 2030 emissions reduction target by agricultural efficiencies, but to meet the 2050 targets will require landuse change. So ETS would need to be able to estimate those efficiency gains, and farmers will need to think beyond BAU[14].

46. Most agricultural emissions are directly related to enteric emissions by the animals (liquid, solids and gaseous), although soil/vegetation is significant[15]. Serious solutions will need to include reducing enteric emissions and work is going on different diets, breeding low emissions stock, changing pasture, that all will all help, but the simplest way to capture large proportions of enteric emissions will be through barns/herd homes and biodigesters.

47. However, when each day increases the risk of intractable climate change, time is of the essence, and when such scientific aids are still immature, the priority must be on fully exploring known remedies like cutting dairy cow numbers, cutting supplements such as PKE or changing enterprise.

Other pastoral farming

48. Regarding other ruminants - sheep numbers have dropped from 72 to 28million and in large part been replaced by dairy cows which has been responsible for the increase in GHG emissions. Remaining sheep and beef operations are typically not overstocked. So the greatest potential lies in removing cows from unsuitable land and eliminating overstocked (i.e. high supplement high fertilizer) operations.

Outreach

49. There is a crucial need to run a series of information forums for farmers up and down the country to explain and discuss

    a. the significant **opportunities in shifting agricultural land practice** to meet changing domestic and international consumer demand, as well as meet emission reduction obligations;

    b. how best to use existing and evolving on-farm and other **research expertise** to shift land-use practice

    c. the **climate science** and the implications for all of us failing to contain emissions

    d. the **recent trends and impacts of methane** and nitrous oxide on the rate of climate warming, and uncertainties.

    e. the economic **opportunity in regeneration of native trees** as effective means of carbon offset

    f. the emerging uncertainty and limitations surrounding conversion to **exotic reforestation** as a carbon offset under full cycle analysis

[14] <https://www.mpi.govt.nz/protection-and-response/environment-and-natural-resources/biological-emissions-reference-group/ see summary report and the 10 research reports>
[15] Schipper et al 2015, Laubach & Hunt 2018

g. the financial implications of a **47% reduction in emissions** from dairy farming on the most rational choice of farm enterprise today

h. the consistently upward **trend in official assessments of the risk** posed by climate change and the probability that this trend will continue

i. the implications of a decline in the quality (diminishing returns) of **intensive petroleum-dependent farming practice** and the potential benefits of ecological/regenerative farming as an alternative[16]

j. the implications for sustainable farm enterprise of the calls to **reduce meat and milk in our diets** as well as the environmental advantages of synthetic protein

k. in addition to being a major contributor to the heating of the planet the **extent to which industrial agriculture generally** is undermining soil and soil fertility, water supplies, remaining forests, species survival, nutrient reserves, public health (e.g. antibiotic resistance), traditional rural communities, exceeding "planetary boundaries" (e.g. nutrient flow), accentuating financial and resource inequity and therefore our capacity to effectively function within a "safe operating space".

50. On completion of such a series of forums we anticipate there would be widespread recognition that the best course of action for most dairy farmers was to at least destock, diversify and adopt more regenerative practices of farming, if not to switch entirely out of dairy to some other enterprise, especially on more marginal lands.

51. Done this way, all parties would be pushing in the same direction and it would be a case of simply making the transition process easier with any additional provisions or incentives.

If the opportunity is provided we would like to be heard on this submission.

Sir Alan Mark,

Chair, Wise Response Society Inc.,

Dunedin.
Ph. ; Mob.

[16] World Food Institute Berlin Agriculture at a tipping point