Submission to

Government of Victoria concerning greenhouse gas emissions targets and priority actions

Be wary of meat industry claims

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Introduction

This submission responds to the Victorian government's request for input to inform its decision on targets and consideration of priority actions to reduce the state's greenhouse gas emissions.

The two areas considered by the submission are: firstly, the inadequacy of emission reduction targets given the extent of the crisis we are facing; and secondly, concern over potential reliance by the government on claims regarding climate change by the livestock sector.

The submission highlights shortcomings in research supported by livestock sector organisations and the Australian government.

It also refers to the sector's long history of land clearing and other forms of environmental degradation, along with limitations in potential climate change mitigation measures.

The submission also comments on questionable environmental information supplied by the sector to primary and secondary school students and asks why education departments and organisations permit material to be supplied in that way.

Finally, it outlines omissions from official greenhouse gas reporting, which cause the livestock sector's contribution to be understated.

The author thanks the Victorian Government for the opportunity to contribute.

1. INADEQUACY OF EMISSION REDUCTION TARGETS IN A CLIMATE EMERGENCY

The Victorian government is aiming for net zero emissions by 2050.

It has established an Independent Expert Panel, which has recommended reductions from 2005 levels of 32-39 per cent by 2025 and 45-60 per cent by 2030.

They are ambitious targets, but potentially inadequate given the extent of the crisis we are facing.

A reduction in greenhouse gas emissions of (for example) 45 per cent would mean we were still emitting 55 per cent of what we had been.

That means emissions would still be massive.

Carbon dioxide (C02) takes hundreds of years to break down.

That means that much of what we have already emitted remains in the atmosphere, with future emissions being added to it.

It is the concentration of greenhouse gases that determines how much heat is trapped.

CO2 concentrations have increased dramatically over the past 100 years.

They are now more than a third higher than at any time in the 300,000 years of human existence (and well beyond that), including the 10,000 years of human civilisation.

Concentrations of methane (CH4) and nitrous oxide (N2O) have also increased dramatically and must also be reduced.

Heating creates feedbacks in the climate system, which cause more heating.

That process continues and accelerates, potentially causing us to lose any ability we may otherwise have had to favourably influence the climate, with the potential for runaway climate change.

Many critical feedback mechanisms are not accounted for by the Intergovernmental Panel on Climate Change (IPCC), which is one of many reasons why the panel's projections, as frightening as they may be, are dangerously conservative.[1]

In order to address the existential threat of climate change, we must draw greenhouse gases from the atmosphere, meaning that a target of net zero emissions is inadequate.

2. CONCERNS WITH MEAT INDUSTRY CLAIMS

Meat & Livestock Australia (MLA) describes itself as a service provider to the red meat industry.

It is the declared industry marketing body and the industry research body under the Australian Meat and Live-stock Industry Act 1997.

As mentioned in the introduction, MLA's stated purpose is to foster the long-term prosperity of the Australian red meat and livestock industry by investing in research and marketing activities.

The Independent Panel established by the Victorian government has noted that MLA is aiming for carbon-neutral production by 2030.

Research papers funded or co-funded by MLA appear to portray its industry's greenhouse gas emissions in what is arguably a favourable light. But are the findings valid?

Emissions intensity of Australian beef

A paper funded and promoted by MLA was published in the journal Agricultural Systems in 2015.[2] Among other factors, it reported on the greenhouse gas emissions intensity of Australian beef production.

The paper was based on a life cycle assessment of specialised (non-dairy) beef production, covering processes and inputs from “cradle to farm gate”, immediately prior to “processing”.

Emissions factors considered in the study included methane (CH4) from enteric fermentation in the digestive system of ruminant animals; nitrous oxide (N2O) and methane from manure management; CO2 from fossil fuels; land clearing (deforestation) to promote pasture growth; and soil carbon losses from various sources.

The paper used a "global warming potential" (GWP) of 25 for converting methane emissions to "CO2-equivalent" or "CO2-e". GWP is a multiplier that enables us to express the warming impact of non-CO2 greenhouse gases relative to that of CO2. The figures can then be aggregated to show overall emissions.

The GWP used for the paper was already out of date when it was originally submitted to the journal for consideration in July 2014, and even further out of date when a revised version was submitted in November that year. The GWP of 25 was used by the Intergovernmental Panel on Climate Change (IPCC) in its 2007 Fourth Assessment Report. It was increased to 34 (with climate-carbon feedbacks) and 28 (without those feedbacks) in the IPCC's 2013 Fifth Assessment Report.[3]

Why would the study authors not utilise the most recent IPCC figures, which had been released two years before their study had been submitted for publication?

Relying on GWP factors used by a climate change laggard such as the government of Australia is a questionable approach for a peer-reviewed journal paper.

If updated methane and nitrous oxide figures (including climate-carbon feedbacks) had been used, beef's emissions intensity (kilograms of CO2-e per kilogram of live weight) would have been around 15.7, or 20 per cent higher than the reported figure of 13.1.

If the emissions intensity had also been based on carcass weight in accordance with the approach of the UN Food & Agriculture Organization (FAO), it would have been around 19.0, and higher still if retail weight had been utilised.

If a 20-year time horizon had then been used for measuring methane's impact (GWP20), the emissions intensity would have increased to 36.9.

As methane largely breaks down in the atmosphere in around 12 years, the more common 100-year time horizon for measuring warming potential (GWP100) understates its shorter-term impact. The IPCC has said there is no scientific argument for selecting a 100-year time horizon, and that the choice of period is a value judgement.

The shorter-term impact is critically important in the context of the current climate emergency. Over a 20-year time horizon, methane is 86 times as potent as CO2 after allowing for climate-carbon feedbacks.

Even where GWP100 was used, study authors would generally enhance the discussion if they were also to report on a GWP20 (or shorter) basis.

To add some context to the emissions intensity figures shown above, the corresponding figures for soy beans and pulses (chickpeas, lentils, dried beans and dried peas) are around 2.0 and 3.5 respectively.[4] Per kilogram of product, soy beans contain around 35 per cent more protein than beef, with all the essential amino acids.[5]

The comparison is shown in Figure 1 on the following page.

Another concern in relation to the journal paper's results was the fact that an alternative life cycle assessment by the FAO reported significantly higher emissions intensity for specialised beef production in Oceania, which is dominated by Australia. At the low end, based on a 100-year GWP, the FAO's figure was around 35 kilograms of CO2-e per kilogram of product (carcass weight).[6] At the high end, adjusted to GWP20, it increased to around 71.

Figure 1: Emissions intensity of various products

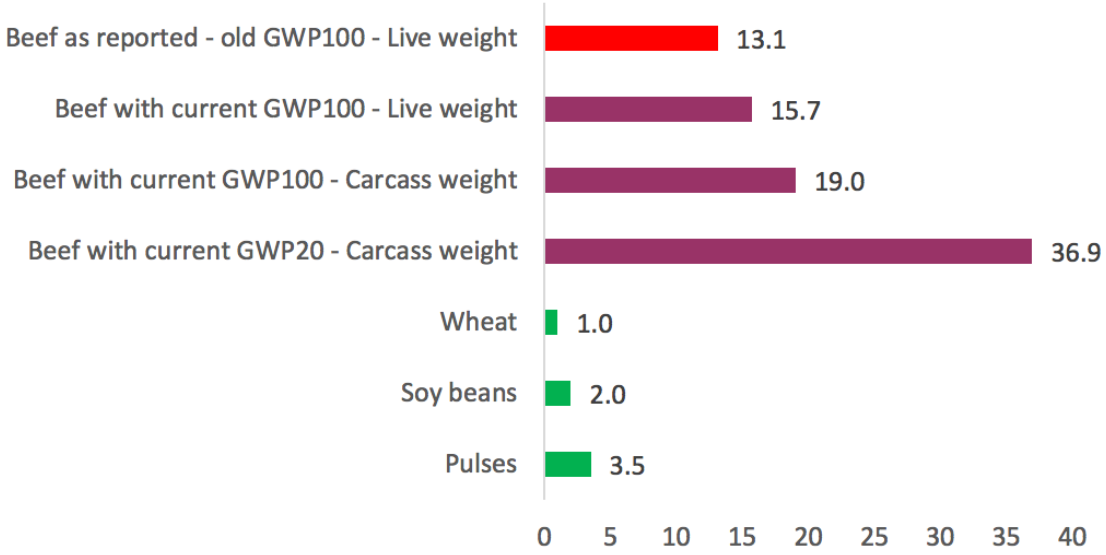

Chart: Emissions intensity of various products © Paul Mahony 2019

Carbon sequestration and greenhouse gas emissions at Talaheni, NSW

A paper published in Animal Production Science in 2016 considered carbon sequestration and greenhouse gas emissions on a New South Wales sheep and cattle farm, Talaheni, between 1980 and 2012.[7]

The study, which the authors declared had been supported by Dairy Australia, Meat & Livestock Australia, Australian Wool Innovation and the Australian Government Department of Agriculture, reported that carbon sequestered on the property far exceeded emissions.

However, as with the previous study, the authors utilised out of date GWP figures, thereby understating the emissions. In this case, they utilised figures from Australia's national greenhouse gas inventory report for 2011, which was published in 2013.[8] That report, in turn, utilised figures from the IPCC's 1995 Second Assessment Report.

Updated figures, with increased multipliers for methane, were released by the IPCC in its fourth and fifth assessment reports, released in 2007 and late 2013. Allowing for climate-carbon feedbacks, the warming impact of methane had increased by 62 per cent in the 2013 report, from a multiple of 21 (in the 1995 report) to 34. Even without those feedbacks, it had increased by 33 per cent to a multiple of 28.

The authors had also utilised the standard 100-year time horizon. Methane's updated GWP20 was four times the GWP100 figure used for the study.

Using the alternative GWP100 and GWP20 figures would have increased on-farm emissions reported in the study from 2,800 tonnes (CO2-equivalent) to around 4,200 and 9,500 tonnes respectively, as demonstrated in Figure 2.

Figure 2: Gross emissions (before sequestration) at Talaheni, NSW 2000-2014 (tonnes CO2-e)

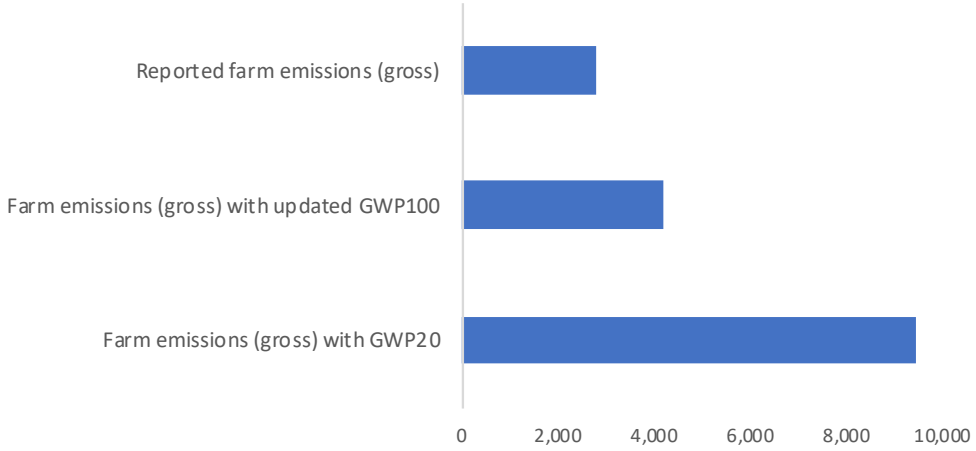

Chart: Gross emissions (before sequestration) at Talaheni, NSW © Paul Mahony 2019

19,300 tonnes of carbon were reported to have been sequestered in trees and 11,800 tonnes in soil. A higher level of sequestration would have been achieved if trees had been planted across the remaining grasslands. If the sheep and cattle had been removed, greenhouse gas emissions would have been negligible.

Carbon sequestration and greenhouse gas emissions at Jigsaw Farms, Victoria

Mark Wootton and his wife, Eve Kantor own and operate Jigsaw Farms in western Victoria, farming sheep and cattle.

Wootton and Kantor are honorary life members of Australian Conservation Foundation, and Wootton is a former board member. Companies they control with a family member gifted ACF its current headquarters in Carlton, Victoria, a few minutes' walk from Queen Victoria Market.[9, 10] Their Poola Foundation has been a major ACF donor.

Wootton co-authored a 2018 journal paper in which the changing carbon balance on a portion of Jigsaw Farms was recorded from 2000 to 2014, with a significant number of trees planted during that period.[11]

Total farm greenhouse gas emissions (comprising on-farm and pre-farm emissions) for the period were 77,800 tonnes CO2-e, with net emissions of 40,600 tonnes CO2-e after allowing for carbon sequestration.[i]

The paper had two co-authors, including the lead author, and funding partners in common with the 2016 paper referred to earlier. Like that paper, it used GWP100 figures from 1995 and ignored GWP20.

[i] In arriving at the net emissions figure, the authors appear to have only applied the carbon sequestered in trees (approximately 37,000 tonnes CO2-e). The amount sequestered in soil was approximately 4,700 tonnes of CO2-e.

Allowing for those elements, Figure 3 demonstrates how the gross emissions and emissions net of sequestration in trees would compare to the original figures.

Figure 3: Gross and net emissions on Hensley Park portion of Jigsaw Farms, Victoria 2000-2014 (tonnes CO2-e)

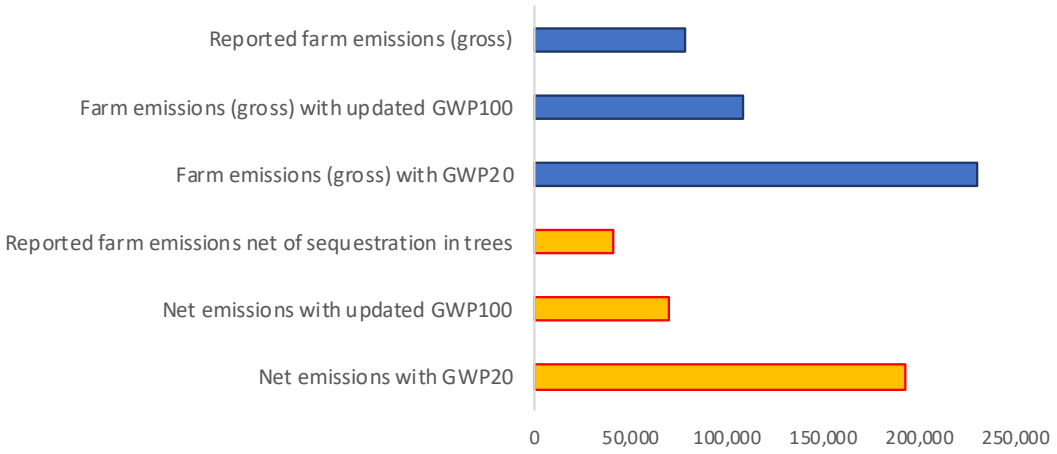

Chart: Gross and net emissions on Jigsaw Farms 2000-2014 (tonnes CO2-e) © Paul Mahony

For gross emissions, the correct GWP100 figure is 45 per cent higher than the figure reported in the MLA-funded paper. The GWP20 figure is 210 per cent higher.

Australian Beef Sustainability Annual Update 2019

In November 2015 the Red Meat Advisory Council appointed a Sustainability Steering Group (SSG), with secretarial support provided by Meat & Livestock Australia.

In its 2019 sustainability annual update, the SSG reported that the latest life cycle assessment had indicated that the emissions intensity of beef had reduced to 12.6 kg CO2-e per kg of live weight.[12]

Information on the relevant life cycle assessment was lacking in the report, with the reference information being inadequate. MLA has not responded to a request submitted by this author in early June 2019 for details.

On a positive note, the update report indicated that the current GWP100 of 34 had been used. However, the emissions intensity estimate was again based on live weight. If carcass weight had been used and emissions from processing allowed for, the figure would have been around 16.1 kg CO2-e, with retail weight producing a higher figure still.

Claiming credit for increasing tree coverage in areas originally cleared by graziers

The Jigsaw and Talaheni properties referred to in this submission had been extensively cleared for grazing by the end of 1880, resulting in carbon emissions at the time and foregone sequestration since. That foregone sequestration is not accounted for in official estimates of animal agriculture's greenhouse gas emissions.

The meat industry highlights the efforts of land holders in increasing the extent of tree coverage on their properties. However, they are simply replacing some of the tree coverage the industry had removed initially.

Although increases in tree coverage are an essential measure, the ongoing emissions from farmed animals continue to contribute to the climate crisis.

In any event, livestock-related land clearing in Queensland and New South Wales was the reason WWF included eastern Australia in a list of global deforestation fronts in 2015[13], with the categorisation re-confirmed in more recent times.

Land clearing laws depend very much on the government of the day. The Queensland Labor government introduced a partial ban on broadscale land clearing with effect from December 2016. The partial ban was overturned by the Liberal National Party government in 2013, only to be reinstated by the Labor government in May 2018.

In New South Wales, the Native Vegetation Act was repealed by the Liberal-National coalition government in late 2016, with an anticipated increase in land clearing.

From when records began in Queensland in 1988 until 2018, around 10 million hectares had been cleared for pasture, representing 91 per cent of total clearing in that state.[14] That was equivalent to 46 rugby fields per hour.

Conservatively assuming the same percentage for remnant clearing, pasture was responsible for 3.6 million hectares or 21 rugby fields per hour.

Since European settlement, animal agriculture has been responsible for the net clearing of over 70 million hectares in Australia or around 70 per cent of total clearing. That area compares to the total area applied to urban usage of around 1.4 million hectares.[15]

What many of us assume to be natural landscapes may be very different to what existed before livestock and other pressures were introduced. The problem is highlighted in the following words from David Lindenmayer of Australian National University and Mark Burgman from The University of Melbourne:[16]

> *"It was once possible to walk from Melbourne to Sydney through almost continuous woodland cover, but now much of it is gone and the remaining patches are small and highly disturbed."*

Limitations of seaweed and other potential mitigation options

The use of asparagopsis taxiformis seaweed as a feed additive to reduce ruminant animals' methane emissions may not be viable at a meaningful scale.

A key difficulty would be its application, which may be largely limited to dairy and feedlot animals, where the inclusion of dietary supplements is a straightforward process.

The emissions intensity of dairy products and beef from feedlot cattle and the dairy herd is already low compared to that of specialised beef from grazing animals, meaning that the relative benefits of the supplement may not be significant.

There would be insufficient wild seaweed, while aquaculture has its own environmental costs.

Alexander Hristov, distinguished professor of dairy nutrition at Pennsylvania State University, has raised the possibility of the active ingredient in seaweed losing its effectiveness as a result of processing and storage, along with the possibility of the methane-causing microbes adapting.[17]

A 2016 paper in Nature Climate Change, cited in a paper supported by MLA and previously referred to in this submission, highlighted severe limitations on a range of potential mitigation measures.

Referring to: improved grazing management; improved feed digestibility; feed additives; animal productivity and health; the use of legumes; and better manure management, the authors suggested their economic potential was less than 10 per cent of their technical potential due to implementation constraints and trade-offs between practice and interactions with other sectors.[18]

Questionable information for school students

For many years, MLA has produced material aimed at primary and secondary school students.

Its current effort is the "Good Meat" campaign, which includes so-called "national curriculum study guides", along with classroom posters, lesson and activity sheets, virtual excursions, virtual reality roadshows, digital lessons and online board games.[19]

An example which demonstrates concerns over MLA material was a primary school curriculum guide released in 2010 and available for several years.[20] It painted an unrealistic picture in relation to issues such as: tree coverage (only referring to land clearing as an activity of the past); the existence of wild ruminant animals (with no mention that their numbers are dwarfed by those of animals bred to be eaten); the carbon cycle (with no mention of methane's extreme potency as a greenhouse gas);

and atmospheric methane concentrations (claiming they were stable when they had been climbing steadily).

For an organisation whose stated purpose is to foster the long-term prosperity of the Australian red meat and livestock industry by investing in research and marketing activities, this author feels obliged to ask which of those categories the school-based activities fall into.

It is extremely concerning that education departments and organisations across the country permit material of this type to be used in schools.

Omission of emissions from national greenhouse gas inventory

As part of its "carbon neutral" strategy, MLA regularly refers to the livestock sector's share of Australia's greenhouse gas emissions.

However, that share is under-stated because it is based solely on enteric fermentation (the process which causes methane to be released, primarily through belching and breathing) and manure management (which releases methane and nitrous oxide).

Other critical factors are:

a) omitted entirely from official figures, e.g. tropospheric ozone from livestock-related savanna burning;

b) classified under different headings, e.g. livestock-related land clearing reported under "land use, land use change and forestry"; or

c) considered but with conservative calculations, e.g. methane's impact based on a 100-year, rather than 20-year, "global warming potential", as referred to earlier in this submission.

The basis of reporting is generally in line with international practice, but it understates the livestock sector's impact, including the shorter-term impact, which is crucial if we are to have any chance of avoiding runaway climate change.

Allowing for: tropospheric ozone; loss of soil carbon resulting from livestock-related land clearing; a 20-year global warming potential; and other factors, researchers from the Sustainable Society Institute at the University of Melbourne and climate change advocacy group Beyond Zero Emissions (BZE) have estimated that the livestock sector is responsible for around fifty per cent of Australia's greenhouse gas emissions.[21]

The findings were reinforced in a subsequent peer-reviewed journal article, which had two co-authors in common with the BZE paper.[22]

Conclusion

The “carbon neutral” approach proposed by Australian cattle, sheep and goat meat producers is insufficient, as we must reduce current concentrations of atmospheric carbon by ceasing emissions to the maximum possible extent and drawing carbon from the atmosphere.

We can feed the world’s population without relying on animal agriculture. In the global context, a paper in the journal Science from June 2018 by Joseph Poore and Thomas Nemecek indicated that a general transition to an animal-free diet would reduce food production’s land use by 3.1 billion hectares (31 million square kilometres).[23]

That is an area similar to (but slightly larger than): (a) Africa; (b) four times the contiguous United States; or (c) four times Australia, providing massive opportunities for afforestation, reforestation and rewilding.

Maintaining our reliance on a grossly and inherently inefficient sector such as animal agriculture would cause us to continue using far more resources, including land, than would otherwise be required, tragically limiting our ability to respond to the climate crisis.

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Front cover: © Steve Hiebert, Cattle grazing in the pasture at sunset in the country, Shutterstock, ID 1137434774

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