Greenpeace NZ submission on "Action on Agriculture" proposals

Overview

Agriculture, in particular intensive dairying, is one of New Zealand's largest environmental problems causing freshwater pollution, biodiversity loss, soil degradation and of course, climate change. However, if done differently, agriculture has the potential to be one of our greatest solutions to the multiple environmental crises before us.

Unfortunately, the proposals set out in the Ministry for the Environment's (**MFE**) 'Action on agricultural emissions' discussion document are consistent with the failure of successive Governments to substantially challenge the industrial agricultural status quo and drive down emissions from our largest emitter.

Incremental and weak measures like those outlined in this proposal protect the short term-profits of the dairy, livestock, agri-chemical and fertiliser industries at the expense of millions of present and future generations of New Zealanders.

These proposals do not reflect the gravity or urgency of the climate crisis. Nor do they reflect the scale of change that the agricultural sector must undergo. The IPCC has stated that: "Limiting warming to 1.5°C implies reaching net zero CO2 emissions globally around 2050 and **concurrent deep reductions in emissions of non-CO2 forcers, particularly methane**."[1]

[1] Intergovernmental Panel on Climate Change, 2018. Mitigation Pathways Compatible with 1.5°C in the Context of Sustainable Development. In: Global Warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C.

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The IPCC has also found that what we grow and how we choose to grow it has an immense impact on the climate. It has found that Agriculture, Forestry and Other Land Use (AFOLU) is responsible for 23% of total net global emissions. Of the total net global emissions AFOLU accounts for 44% of the methane **(CH_4),** 13% of the carbon dioxide **(CO_2),** and 82% of the nitrous oxide (**N_2O).** When emissions associated with pre- and post-production in the global food system are included, the food system accounts for up to 37% of total net emissions.[2]

The climate science is clear. To avoid the catastrophic and deadly impacts of a climate warmed above 1.5 degrees requires nothing less than a rapid and transformational shift in land-use and agricultural practices.

Globally and here in NZ, we must shift away from industrial livestock farming and into diversified, primarily plant-based, regenerative farming. This land-use change must be accompanied by a shift in farming practices. We must move away from agri-chemical and synthetic fertiliser dependent monocultures towards diversification and regenerative farming methods that both protect biodiversity and lock up carbon.

Climate change is already taking lives. It is already harming health, homes, communities, food security, culture and livelihoods. It is already accelerating the extinction of the remaining wildlife and wild places with which we share this Earth. Poor and marginalised communities are already suffering the most, despite being the least responsible for causing the issue.

We have known about this looming catastrophe for decades. We have known who and what has been causing it, and we have had access to the solutions to prevent it getting to this point. This global disaster is not a result of a failure of science or a lack of solutions. It is a direct result of Governments around the world failing to stand up to those polluting industries insistent on maintaining profits no matter the consequences.

The Government must finally hold the dairy, livestock and agri-chemical industries to account for their prominent role in driving the climate crisis and their decades long history of evading and delaying the reduction of their emissions. Now is the time to reject the self-interest of these industries determined to slow, delay or avoid change. NZ can and must lead the world in the urgent transition away from intensive livestock farming and into predominantly plant-based regenerative farming.

Reducing emissions from agriculture

The stated purpose of the 'Action on Agricultural emissions' consultation is for Government to seek *"views on how we can best take the necessary steps to address agricultural emissions.* "The first question submitters are asked is: "*What is the best way to incentivise farmers to reduce on-farm emissions?*" [3]

[2] Intergovernmental Panel on Climate Change, 2019. Climate Change and Land - Summary for Policymakers.
[3] MFE. 2019. Action on agricultural emissions: A discussion document on proposals to address greenhouse gas emissions from agriculture.

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Greenpeace believes the proposals presented in the discussion document are insufficient to address agricultural emissions. We propose the following recommendations that we believe would address agricultural emissions with the effectiveness and the urgency that's required.

Before laying out our recommendations we include a summary on methane and nitrous oxide, which have been the subject of "public debate" driven by the agricultural industry.

Understanding methane and nitrous oxide

The IPCC says that we must reduce agricultural methane emissions by **24-48% by 2030,** relative to 2010 levels, in order to limit warming to 1.5 degrees.

There is only one scenario which does not require this level of reduction and that scenario requires extremely fast and substantial cuts in emissions from other sources, including a 75% reduction in primary energy from coal by 2030 and an 81% reduction in primary energy from oil by 2050. This scenario also relies heavily on the substantial use of Carbon Capture and Storage technologies[4], which we cannot guarantee will keep carbon dioxide in the ground long-term, nor be safe from leaks and blow-outs which have already occurred with some CCS projects. *See appendix 1.*

These early and substantial cuts in methane are critical to our success in averting the worst impacts of climate change. This is particularly important for NZ due to our emissions portfolio.

Agriculture is NZ's largest emitter, contributing at least 48% of domestic emissions.[5] However, it should be noted that the actual climate pollution of the agriculture sector is much higher than this. The 48% statistic does not include the pre and post production emissions. For example, emissions from the dairy industry's use of coal, the manufacture of fertilisers, transport of export products,the loss of carbon sinks due to the industry's use of Palm Kernel Expeller (**PKE**) and the conversion of forest and forestry land into livestock farming.

Current arguments that methane is "not as important' to tackle as carbon dioxide and arguments around stock and flow gases, suit an agenda of continuing privileges for the dairy and agriculture sector. In fact, methane has a Global warming potential (**GWP**) of 28 over 100 years, and 84 over 20 years, according to the IPCC.[6] GWP is used as the standard metric in IPCC assessments. It measures the cumulative warming effect of the emission of 1kg of a non-CO_2 GHG, over a given time period relative to the cumulative warming effect of 1kg of CO_2 over the same time period (CO_2 is given a GWP of 1).[7]

Put simply, methane is a strong GHG – on a per-weight basis. An emission of methane is 84 times as potent as an emission of CO_2 over the first 20 years after the emission,

[4] IPCC 2018. Global warming of 1.5°C - Summary for Policymakers.
[5] MFE 2017: New Zealand's Greenhouse Gas Inventory 1990-2016, Snapshot.
[6] IPCC, 2013: Anthropogenic and Natural Radiative Forcing. In: Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change
[7] Ibid

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and 28 times as potent over the first 100 years after the emission.[8] Therefore, any growth in methane emissions has disproportionate impacts on the atmosphere.

Annual methane emissions make up 42.7% of NZ's gross emissions.[9] Per capita, NZ has the largest methane emissions in the world, six times the global average.[10]

Current industry claims that CH_4 and N_2O are more 'difficult' to deal with than other emissions are scientifically incorrect. Reducing ruminant numbers and eliminating synthetic nitrogen fertiliser are proven solutions to cutting agricultural emissions.

This solution does not suit an industry that would like to continue with the business as usual model of intensive livestock farming, however this is what the science tells us.

The Parliamentary Commissioner for the Environment (**PCE**) reviewed potential technological fixes to the current intensive livestock farming model and found that nothing in existence could reduce emissions significantly. It made the point that fewer livestock would mean fewer emissions, stating that:

> *"It is axiomatic that the fewer sheep and cattle there are on a farm, the lower the biological emissions will generally be."*[11]

Current claims that methane and nitrous oxide emissions that come from ruminant livestock are "natural" are also scientifically incorrect. The number of cows being farmed in NZ and therefore the amount of emissions they are creating is unnatural. Six and a half million dairy cows are only able to be farmed in NZ due to the application of hundreds of thousands of tonnes of synthetic nitrogen fertiliser, use of agrichemicals, large-scale irrigation, and 2.4 million tonnes of imported feed.

According to the PCE:

> *"The increased use of urea fertiliser has, along with irrigation and supplementary feed, enabled higher stocking rates."*[12]

Summary of key recommendations to reduce agricultural emissions

1. **Halve the herd**:
    a. Immediately end further intensification by banning new dairy conversions
    b. Set a clear regulatory pathway to halve the number of dairy cows in NZ by 2030, including through:
        - Introducing a national maximum stocking rate limit
        - Introducing further and stricter maximum stocking rate limits in catchments with higher soil porosity.

[8] Hollis, M., de Klein, C., Frame, D., Harvey, M., Manning, M., Reisinger, A., Kerr, S. and Robinson, A., 2016. *Cows, sheep and science: A scientific perspective on biological emissions from agriculture* (No. 16_17).
[9] MFE 2017: New Zealand's Greenhouse Gas Inventory 1990-2016, Snapshot.
[10] landcareresearch.co.nz/science/greenhouse-gases/agricultural-greenhouse-gases/methane-emissions
[11] PCE, 2016, Climate Change and Agriculture, Parliamentary Commissioner for the Environment available at: https://www.pce.parliament.nz/media/1678/climate-change-and-agriculture-web.pdf
[12] PCE 2013: Water quality in New Zealand: Land use and nutrient pollution. Available at: https://www.pce.parliament.nz/media/1275/pce-water-quality-land-use-web-amended.pdf

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2. **Ban synthetic nitrogen fertiliser**
3. **Stop the import of animal feed**
4. **Invest significantly in plant-based regenerative farming**

1. Halve the Herd

According to MFE, NZ has experienced one of the world's highest rates of agricultural land intensification over recent decades.[13] Dairy cattle numbers have nearly doubled since the early 1990's from 3.84 million in 1994 to 6.49 million in 2015. [14] Land in dairying increased by 46% between 1993 - 2012.[15]

Since the 1990's the average herd size has more than doubled,[16] the use of PKE has gone from virtually nothing to nearly 2 and a half million tonnes in 2018[17] and the use of nitrogen fertiliser has increased six-fold. [18]

This caused a concurrent increase in agricultural emissions. Between 1990 and 2016, agricultural emissions increased by 12% and MFE states the cause of this increase*:*

> *"This is primarily due to the* ***national dairy herd nearly doubling in size*** *since 1990 and an* ***increase of over 600 per cent in the application of nitrogen-containing fertiliser*** *during the same period."* [19]

Supported by synthetic fertiliser, PKE, and a lack of Government regulation, the dairy herd has now swollen far above environmental and climate limits. The herd is so large now that emissions from just the dairy cows alone have surpassed the volume of emissions created by our entire transport fleet.[20] *See Appendix 2.*

The number of cows largely determines the amount of biological emissions produced. However, the size of the herd is also directly linked to the amount of coal used by Fonterra to dry the large volumes of milk produced and to the demand for PKE which is associated with ongoing deforestation of critical carbon sinks in Indonesia.

There are still dairy conversions and intensification occurring in parts of NZ. In Canterbury, the herd increased 3% between 2016-2017.[21] In the Mackenzie Basin a conversion of ecologically fragile land into a 15,000 cow farm is ongoing. Greenpeace recommends that the Government immediately ban any new dairy conversions.

Based on the IPCC's advice to make early and substantial cuts to methane, and on the substantive evidence that the number of ruminant livestock is directly linked to the volume of emissions, Greenpeace believes that NZ should halve the herd by 2030. This

[13] MFE & Stats NZ. "New Zealand's Environmental Reporting Series: Our fresh water 2017." Retrieved from www.mfe.govt.nz and www.stats.govt.nz.
[14] Stats NZ livestock numbers tables retrieved from http://archive.stats.govt.nz/browse_for_stats/environment/environmental-reporting-series/environmental-indicators/Home/Land/livestock-numbers.aspx
[15] Kyleisha J. Foote, Michael K. Joy, Russell G. Death (2015) "New Zealand Dairy Farming: Milking Our Environment for All Its Worth".
[16] Dairy NZ 2017, NZ Dairy Statistics retreived from https://www.dairynz.co.nz/media/5788533/nz-dairy-statistics-2016-17-web.pdf
[17] Indexmundi, Palm Kernel Import graphs. Available at: https://www.indexmundi.com/agriculture/?country=nz&commodity=palm-kernel-meal&graph=imports
[18] MFE 2017: New Zealand's Greenhouse Gas Inventory 1990-2016, Snapshot.
[19] ibid.
[20] Ibid
[21] Stats NZ https://www.stats.govt.nz/news/canterbury-dairy-herd-rises-as-new-zealand-total-steadies

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would have concurrent benefits to freshwater and ecosystem health, biodiversity and animal welfare, as well as allowing space for NZ to create a more diversified and therefore more resilient economy.

We recommend the Government sends a clear signal to the agricultural sector that the climate crisis requires us to transition land-use away from intensive livestock farming. It should do this by setting a regulatory pathway to halving the number of dairy cows in NZ by 2030. This pathway should include the implementation of a nationwide maximum stocking rate limit. This maximum stocking rate limit should be lowered in catchments with more porous soil.

The remaining herd must be farmed regeneratively, without the use of damaging inputs like synthetic nitrogen fertiliser, imported animal feed, big irrigation and agri-chemicals.

Despite industry rhetoric, reducing cow numbers does not equal economic ruin for farmers or for the nation. Ian Proudfoot, KPMG's global head of agribusiness is recently quoted saying

> *"If we produce half as much milk, the huge increase in optionality around how we would use that milk would allow us to create a significantly higher amount of value from those products."* [22]

Studies showing farmers can reduce stocking rates and remain profitable are discussed in a later section.

2. Ban synthetic N fertiliser

Synthetic nitrogen fertiliser is an artificial product produced using fossil fuel gas and a chemical process which artificially takes inert nitrogen out of the atmosphere and converts it into a reactive form that plants can use for growth. In NZ over 600,000 tonnes of synthetic nitrogen fertiliser is applied onto farmland annually[23] According to the OECD, NZ has had the highest percentage increase in its use out of all of the OECD countries since 1990.[24]

The main plant growth it artificially enables in NZ is grass. This provides more food for cows, enabling the number of cows farmed per hectare of land to increase above what the land would naturally be able to sustain.[25] Dairy is the biggest user applying 70% of all urea used in NZ.[26]

The use of synthetic nitrogen fertiliser emits dangerous nitrous oxide in two ways, commonly known as its “indirect” and “direct” emissions. Indirect emissions are those that occur from the intensification of farming that happens as a result of the application

[22] https://www.stuff.co.nz/business/farming/agribusiness/89511293/dairy-industry-should-dump-mass-milk-production-and-dira-to-add-value
[23] Stats NZ, Infoshare LookUp tables. Retrieved from http://archive.stats.govt.nz/infoshare/ViewTable.aspx?pxID=e4b2f308-e80b-4157-931a-810effedd3a0
[24] OECD 2008 Environment Performance of Agriculture in OECD countries
[25] PCE 2013: Water quality in New Zealand: Land use and nutrient pollution
[26] Stats NZ 2017 Agricultural Census Tables https://www.stats.govt.nz/information-releases/agricultural-production-statistics-june-2017-final Note: The NZ Government does not specifically measure all the use of all synthetic N fertilisers, only Urea.

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of synthetic nitrogen. Direct emissions are those that occur from the production and application of the fertiliser itself.[27]

Direct nitrous oxide (N_2O) emissions from synthetic nitrogen fertiliser have increased **478.4%** since 1990.[28] The increase in agricultural emissions that has occurred due to intensification have already been discussed and evidenced.

It should also be noted that synthetic nitrogen fertiliser is the leading cause in the breach of the safe planetary boundary for nitrogen, which scientists warn, like climate change, threatens the survival of humanity.[29]

Nitrous oxide is a very potent and dangerous greenhouse gas. It has 289 times more warming potential than CO_2.[30] It is the worst GHG for depleting the ozone.[31]

The Government admits in the discussion document itself that:

> "*For fertiliser, the only currently recognised way to reduce greenhouse gas emissions is to use less of it"* [32]

Greenpeace recommends the Government ban the use of synthetic nitrogen fertiliser. This would eliminate direct nitrous oxide emissions and significantly reduce methane emissions by causing a reduction in livestock intensity. Ending the use of synthetic nitrogen fertiliser would have concurrent benefits for freshwater and human health.

3. Stop the import of animal feed

NZ imported 2.4 million tonnes of Palm Kernel Expeller (**PKE**) in 2018 to be used as additional feed on dairy farms.[33] PKE is one of the products produced as part of the palm oil industry, which is the leading cause of rainforest destruction in Indonesia.

Like synthetic fertiliser, the use of PKE causes climate pollution in two distinct ways:

1) Through the loss of critical carbon sinks and the emissions from burning forest and peatland that are associated with deforestation for palm products.
2) The emissions that occur from the intensification of livestock farming that happen as a result of the use of PKE.

Over one and a half million hectares of Indonesian rainforest were destroyed between 2015 and 2017. This was just one of the statistics included in an investigative report released last year by Greenpeace International, which documented extensive deforestation and human rights abuses by 25 major palm producers. Of the producers investigated, Fonterra's sole supplier of PKE - Wilmar, was found to be buying from 18

[27] Shepherd, M. and Lucci, G., 2011. Fertiliser advice–what progress can we make?. *Adding to the knowledge base for the nutrient manager. Occasional Report*, (24).
[28] MFE & Stats NZ. "New Zealand's Greenhouse Gas Inventory 1990–2016"
[29] Fields,S. 2004. Global nitrogen: cycling out of control. *Environmental Health Perspectives*, *112*
[30] Intergovernmental Panel on Climate Change 2014 Climate Change Synthesis Report AR5 https://www.ipcc.ch/site/assets/uploads/2018/02/SYR_AR5_FINAL_full.pdf
[31] https://www.sciencenews.org/blog/science-public/nitrous-oxide-fingered-monster-ozone-slayer
[32] MFE 2019. Action on agricultural emissions: A discussion document on proposals to address greenhouse gas emissions from agriculture.
[33] Indexmundi, Palm Kernel Import graphs. Available at: https://www.indexmundi.com/agriculture/?country=nz&commodity=palm-kernel-meal&graph=imports

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of them.[34] This makes the NZ dairy industry's use of PKE inextricably linked to deforestation and human rights abuses.

PKE is used by farmers to artificially increase stocking rates by providing more food for the cows than can be naturally grown on the farm. This intensification effect is not specific to the type of imported animal feed used. The increase in agricultural emissions that have occured due to intensification have already been discussed and evidenced.

Based on substantive evidence that imported feed drives intensification and that PKE is linked to deforestation, Greenpeace recommends the Government stop the import of animal feed. This would have the concurrent benefit of lowering biosecurity risks.

4. Invest significantly in plant-based regenerative farming

Regenerative farming is an environmentally sound and economically viable approach to farming that goes beyond organics. Instead of producing vast quantities of milk powder, NZ could be producing a variety of clean, green and high-value food and fibre products that the world is increasingly demanding. This can only be achieved through regenerative farming that looks after our climate, our land, our rivers, and our international reputation.

Industrial agriculture differs from regenerative farming in that it uses huge amounts of 'inputs', among them; Synthetic nitrogen, imported animal feed, pesticides and large-scale irrigation. These inputs then allow environmentally damaging practices to flourish, such as; overstocking, monocultures, tilling, winter-cropping, and 'Spray and Pray'.

Where industrial agriculture treats a farm like a factory, with inputs poured in and pollution poured out, regenerative farming treats a farm like an ecosystem. Regenerative farmers replace damaging inputs with innovative ecological practices. Instead of using synthetic nitrogen they use natural nitrogen-fixing plants and put their effort into building healthy soil. Instead of using pesticides they foster natural predator-prey relationships. Instead of farming monocultures they farm a diverse mix of crop and animal varieties, and use methods like cover cropping, inter-cropping, agro-forestry, no-till and many more.

There are a growing number of studies proving that through regenerative farming it is possible to farm fewer cows, remain profitable and viable, while growing enough food to feed the world. It is proven to have multiple co-benefits for freshwater quality, biodiversity, and carbon sequestration. Regenerative farming is also proving to be one of the best tools to safeguard food production against the adverse impacts of climate change; such as drought, heavy rainfall and increased pest movement. A selection of supporting evidence is provided below.

<u>Supporting evidence (emphasis added)</u>:

Profitability:

[34] Greenpeace International, 2018. The Final Countdown: Now or never to reform the palm oil industry retrived from https://www.greenpeace.org/international/publication/18455/the-final-countdown-forests-indonesia-palm-oil/

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- A 10 year study by DairyNZ compared a farm with no synthetic N application and a farm using 181/kg/ha/yr. The study "**confirmed that profitable milk production systems can be achieved without N fertiliser applications**".[35]
- A study by Agresearch proved that the low-input dairying model is **less financially risky and more profitable when milk prices are low,** more environmentally sustainable, and means that cows produce more milk [36]

Feeding the world:

- A meta-analysis by the University of Michigan using data from 77 published studies show that using nitrogen (**N**) fixing plants like clover and lucerne can provide enough biologically fixed N to replace the entire amount of synthetic N fertiliser currently in use, **without reducing the amount of food produced.**[37]
- A study in the US compared amount of corn produced on a monoculture farm vs. a diverse farm and found the diverse farm produced ***twice as much*** **corn.**[38]
- Studies show that a farm can do away with 100 kg of nitrogen fertiliser per ha by increasing in the varieties of pasture crops used in the field from 1 to 16 species, and still produce **the same amount of food.**[39]

Climate-resilience:

- Costanzo et al. found that mixing different crops in one field is now a scientifically proven and reliable method that **reduces the risk of crop failure during drought**, stating that :
    - *"An increasing body of literature addresses cropping system diversification as an innovation pathway to improve wheat production, especially in the perspective of organic and low external input systems, of production in marginal areas and of adaptation to climate change".*[40]
- Another study published in *Nature*, the prestigious multidisciplinary scientific journal, have found that soils managed with organic methods have shown better water holding capacity and water infiltration rates, and have **produced higher yields** than industrial systems under drought and flooding conditions.[41]

Co-benefits:

- A long-term meta-analysis showed that organic farms support **34% more plant, insect and animal species** than industrial farms. For pollinators, the number of different species was **50% higher on organic farms.** [42]

[35]Glassey, C.B., Roach, C.G., Lee, J.M. and Clark, D.A., 2013. The impact of farming without nitrogen fertiliser for ten years on pasture yield and composition, milksolids production and profitability; a research farmlet comparison. In *Proceedings of the New Zealand Grasslands Association* (Vol. 75, pp. 71-78).

[36]Basset-Mens, Claudine, Stewart Ledgard, and Mark Boyes. "Eco-efficiency of intensification scenarios for milk production in New Zealand." *Ecological economics* 68.6 (2009): 1615-1625.

[37]Badgley, Catherine, et al. "Organic agriculture and the global food supply." *Renewable agriculture and food systems* 22.2 (2007): 86-108.

[38] Smith, R.G., Gross, K.L. and Robertson, G.P., 2008. Effects of crop diversity on agroecosystem function: crop yield response. *Ecosystems*, *11*(3), pp.355-366.

[39] Tilman, David, Peter B. Reich, and Forest Isbell. "Biodiversity impacts ecosystem productivity as much as resources, disturbance, or herbivory." *Proceedings of the National Academy of Sciences* 109.26 (2012): 10394-10397.

[40]Ambrogio Costanzo, Paolo Bàrberi, 2014. Functional agrobiodiversity and agroecosystem services in sustainable wheat production. A review. Agronomy for Sustainable Development, Springer Verlag/EDP Sciences/INRA, 34 (2), pp.327-348. ff10.1007/s13593-013-0178-1ff. ffhal-01234799f

[41] Seufert, Verena, Navin Ramankutty, and Jonathan A. Foley. "Comparing the yields of organic and conventional agriculture." *Nature* 485.7397 (2012): 229. http://serenoregis.org/wp-content/uploads/2012/06/nature11069.pdf

[42] Tuck, S. L., Winqvist, C., Mota, F., Ahnström, J., Turnbull, L. A. & Bengtsson, J. 2014. Land-use intensity and the effects of organic farming on biodiversity: a hierarchical meta-analysis. Journal of Applied Ecology: in press.

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- Another study analysing years of global research on N uptake by crops shows that diversified farming can enhance the uptake of N by the crop and reduce its losses and subsequent pollution. This study shows that diverse rotations in a farm system can **reduce losses of nitrogen from the system by 30%.**[43]
- A study comparing fertilisation with manure instead of with chemical fertilisers in apple orchards in the US, found that **increased the amount of carbon stored in the soil,** increased the diversity and activity of soil microbes, and decreased the losses of nitrates to water bodies, while keeping nitrous oxide losses to the atmosphere at similar levels. [44]

There are some farmers in NZ already farming regeneratively. These farms and the innovative practices they use offer a genuine solution to the climate crisis. To mainstream this revolutionary way of farming Greenpeace recommends the Government hugely increase its support, subsidies and investment in regenerative agriculture.

Just as the Government once poured millions of subsidies into building the Kapuni synthetic nitrogen fertiliser factory[45] and building large-scale irrigation schemes, it must now direct millions into supporting farmers to transition to regenerative farming.

Summary of key recommendations to specific proposals

As stated, Greenpeace believes the "Action on Agriculture" proposals are insufficient on their own to address agricultural emissions. However, below are our recommendations in regards to the specific options laid out in the discussion document:

1. **Dismiss option 2 - The formal sector-government agreement.**
2. **Adopt option 1 - Bring agriculture into the ETS.**
3. **Remove the 95% free allocation**
4. **Bring all timeframes forward;**
    a. Price livestock and fertiliser emissions at the processor level by 2019.
    b. Price livestock emissions at the farm from 2021.
5. **Place strict controls on the recycling of funds back to industry**
    i. The bulk of funds should go to assisting farmers to de-intensify and transition to a primarily plant-based regenerative farming model.
6. **Reduce the agricultural industry's involvement in setting and enforcing of climate regulations**

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1. Dismiss option 2 - The formal sector-government agreement.

Greenpeace is alarmed that the Government has proposed the option of a sector-government agreement, which carries no regulatory or financial onus for the industry to

[43] Gardner, J.B. and Drinkwater, L.E., 2009. The fate of nitrogen in grain cropping systems: a meta-analysis of 15N field experiments. *Ecological Applications*, *19*(8), pp.2167-2184.
[44] Kramer, S. B., Reganold, J. P., Glover, J. D., Bohannan, B. J. M. & Mooney, H. A. 2006. Reduced nitrate leaching and enhanced denitrifier activity and efficiency in organically fertilized soils. Proceedings of the National Academy of Sciences, 103: 4522-4527
[45] Stephen Levine, 2006. New Zealand as it Might Have Been, Volume 1. Victoria University Press

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reduce its emissions, until 2025. That this option has even been proposed suggests that there is already an unacceptably close relationship between our Government and the industry which is causing the largest amount of domestic climate pollution.

The public and civil society cannot be expected to have faith that companies and lobby groups currently profiting from climate-polluting intensive livestock farming will voluntarily reduce their emissions. Not only because these companies and lobby groups have a vested interest in maintaining the status quo but also because of their long history of denying, avoiding and delaying action on climate change.

Specifically, in the early 2000's this sector fought against the proposed tax on methane emissions from livestock, dubbed the 'fart tax'.[46] It then fought over decades to continue to be excluded from the ETS.[47] More recently, industry lobby groups have worked tirelessly to muddy the national conversation about the need to reduce methane emissions. For example, a Federated Farmers spokesperson stated, in direct contradiction to the IPCC's recommended cuts to methane by 2050, that:

> *"The Zero Carbon Bill sets a gross biogenic methane reduction of 10% by 2030. The science is clear that this level of methane emission reduction is only needed by 2050 to have no additional impact on global warming, but farmers are being expected to shoulder their share of tackling climate change 20 years earlier than anyone else."*[48]

The IPCC states clearly, evidenced in Appendix 1 of this submission, that by 2050 agricultural methane must be cut by no less than 23% and up to 69%.

These lobbying actions have caused an absence of financial or regulatory measures to drive investment decisions of farmers and processors towards more low emission land-uses. Instead, investment decisions have been made that have led to livestock intensification and subsequent increased climate emissions.

These investment decisions were not the fault of the farmers. They were the fault and complete failure of the farming leadership and lobby groups, who for the last 20 years the chose to pour their considerable resources into delaying action. As a direct result of that choice, this sector must now face much deeper and more rapid changes than they would have had to if they had chosen to support climate regulation and begun easing into the ETS as soon as it was created.

Furthermore, we have seen time and again that voluntary efforts to reduce emissions do not work. The Government states itself in the discussion document that:

> *"Voluntary efforts to reduce these (agricultural) emissions have so far not been enough to achieve emissions reduction at the scale and pace that New Zealand needs to meet its climate change targets."*

Greenpeace is strongly opposed to option two. We urge the Government to recognise the vested interest that this sector has in doing the bare minimum and act on this knowledge by dismissing option two in its entirety.

[46] https://www.nzherald.co.nz/nz/news/article.cfm?c_id=1&objectid=3521713
[47] http://www.scoop.co.nz/stories/BU0911/S00811.htm
[48] https://www.fedfarm.org.nz/FFPublic/Media-Releases/2019/Zero_Carbon_Bill_-_right_direction__wrong_methane_targets.aspx

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2. Adopt option 1 - Bring agriculture into the ETS.

Allowing the agriculture industry to continue to operate outside of the ETS any longer would continue the unjust and heavily distorted history of climate policy in NZ. Greenpeace NZ supports option 1, the pricing of livestock and fertiliser emissions at processor level via the ETS.

We also support the ICCC's recommendation that livestock emissions be priced at the farm level, in future but this is no reason to delay the entry of agriculture into the ETS immediately at a processor level. We believe farm-level pricing will be more likely to drive change towards lower emitting land-uses and that this needs to be prioritised regardless of the marginally higher cost of this model.

We would also like to add that OVERSEER should not be used for on-farm emissions calculations. OVERSEER has been part-developed by and is still part-owned by industrial fertiliser companies who have a vested interest in maintaining the status quo. They, and any other agricultural sector groups or lobbyists, should be wholly excluded from any involvement in the development of the tools used by the government to calculate farm emissions. This should be developed by Government with support from academia and Crown Research Institutes.

3. Remove the 95% free allocation

As discussed, this sector has had an extraordinarily long lead in time to start paying for its fair share of climate emissions, and make subsequent changes to lower emitting land-uses and practices. The climate crisis is worsening and it is too late to continue to give this sector continued privileges within NZ's climate regulation.

The ICCC says that "emissions pricing will encourage farmers to change behaviour by altering the economics of activities that reduce emissions".[49] The extent to which pricing can achieve behaviour change depends on how much farmers or processors actually have to pay for emissions.

The ICCC calculates that with a 95% free allocation; Dairy farmers will pay 1 cent per kg of milksolids, cattle farmers 1 cent per kg of beef, and sheep farmers 3 cents per kg of meat. That translates into just $14 per ha per year for the average dairy farmer and just $6 per ha per year for the average sheep and beef farmer.[50] *See Appendix 3*.

Clearly, these completely insufficient prices will be unlikely to drive any kind of on-farm or industry behaviour change towards lower emissions. Greenpeace NZ recommends that the 95% free allocation be removed immediately.

4. Bring all timeframes forward;

a. Price livestock and fertiliser emissions at the processor level by 2019.

There are no technological challenges to pricing biological emissions, or direct emissions from fertiliser, at the processor level. There is no rationale given in the

[49] Interim Climate Change Committee (2019). Action on Agricultural Emissions. Available from www.iccc.mfe.govt.nz.
[50] MFE. 2019. Action on agricultural emissions: A discussion document on proposals to address greenhouse gas emissions from agriculture.

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discussion document to justify delaying this pricing yet another year. It should happen immediately and not later than the end of 2019.

b. Price livestock emissions at the farm from 2021.

We disagree that it should take until 2025 to develop all the tools and systems needed to implement farm-level emissions pricing. We accept that current technology and methodologies are not ready to immediately implement this model but we recommend the Government sets aside sufficient budget and resource to speed up this process and aim to complete it by 2021.

5. Place strict controls on the recycling of funds back to industry

a. The bulk of funds should go to assisting farmers to de-intensify and transition to a primarily plant-based regenerative farming model.

Greenpeace would like to see strict controls put on the recycling of funds from emissions pricing back into the industry to ensure that the bulk of funds go to assisting farmers to de-intensify and transition to a primarily plant-based regenerative farming model.

We are concerned that funds will be funneled into further attempts to find a technological silver bullet to try and allow intensive livestock farming to continue. While we don't oppose money being spent investigating technological developments to reduce emissions it must be noted that despite years of research and funding no technological silver bullets are on the horizon.[51]

We believe this money would be better spent supporting the lower emissions land-use solutions that we know already exist.

Furthermore, agricultural companies and lobby groups such as Fonterra, Ravensdown, Agri-Ballance, DairyNZ, Beef and Lamb and Federated Farmers, should have no decision making power of the allocation of these funds or the direction of research. They should not be the recipients of the funding, this should be directed to universities and CRI's.

6. Reduce the agricultural industry's involvement in setting and enforcing climate regulations

We are highly concerned at the amount of input given to the agriculture industry in developing these proposals prior to public consultation. The discussion document states that:

> *"The ICCC engaged broadly – with farmers and growers from around the country, Māori land owners, primary sector organisations, foresters, NGOs and bankers"*

[51] PCE, 2016, Climate Change and Agriculture, Parliamentary Commissioner for the Environment (PCE) available at: https://www.pce.parliament.nz/media/1678/climate-change-and-agriculture-web.pdf

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"We have used ICCC's recommendations, as well as conversations with leaders in the agriculture sector" [52]

We see this is as an unacceptable level of involvement of the very industry that are the subject of regulations which they have a long history of opposing. Greenpeace would like to see industry involvement in the setting of climate and wider environmental regulations reduced in future. We would like to see the involvement of non-vested and independent stakeholders, such as NGOs and other experts increased.

ENDS

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[52] Ministry for the Environment. 2019. Action on agricultural emissions: A discussion document on proposals to address greenhouse gas emissions from agriculture.

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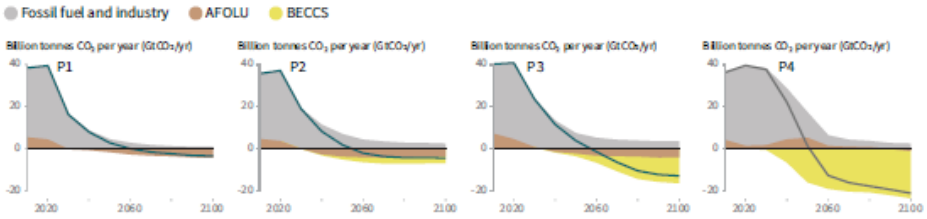
Appendix 1 - Limiting global warming to 1.5 degrees, illustrative pathways.[53]

SPM

Characteristics of four illustrative model pathways

Different mitigation strategies can achieve the net emissions reductions that would be required to follow a pathway that limits global warming to 1.5°C with no or limited overshoot. All pathways use Carbon Dioxide Removal (CDR), but the amount varies across pathways, as do the relative contributions of Bioenergy with Carbon Capture and Storage (BECCS) and removals in the Agriculture, Forestry and Other Land Use (AFOLU) sector. This has implications for emissions and several other pathway characteristics.

Breakdown of contributions to global net CO_2 emissions in four illustrative model pathways



P1: A scenario in which social, business and technological innovations result in lower energy demand up to 2050 while living standards rise, especially in the global South. A downsized energy system enables rapid decarbonization of energy supply. Afforestation is the only CDR option considered; neither fossil fuels with CCS nor BECCS are used.

P2: A scenario with a broad focus on sustainability including energy intensity, human development, economic convergence and international cooperation, as well as shifts towards sustainable and healthy consumption patterns, low-carbon technology innovation, and well-managed land systems with limited societal acceptability for BECCS.

P3: A middle-of-the-road scenario in which societal as well as technological development follows historical patterns. Emissions reductions are mainly achieved by changing the way in which energy and products are produced, and to a lesser degree by reductions in demand.

P4: A resource- and energy-intensive scenario in which economic growth and globalization lead to widespread adoption of greenhouse-gas-intensive lifestyles, including high demand for transportation fuels and livestock products. Emissions reductions are mainly achieved through technological means, making strong use of CDR through the deployment of BECCS.

Global indicators	P1	P2	P3	P4	Interquartile range
Pathway classification	No or limited overshoot	No or limited overshoot	No or limited overshoot	Higher overshoot	No or limited overshoot
CO_2 emission change in 2030 (% rel to 2010)	-58	-47	-41	4	(-58,-40)
↳ in 2050 (% rel to 2010)	-93	-95	-91	-97	(-107,-84)
Kyoto-GHG emissions in 2030 (% rel to 2010)*	-50	-49	-35	-2	(-51,-39)
↳ in 2050 (% rel to 2010)	-82	-89	-78	-80	(-93,-81)
*Final energy demand** in 2030 (% rel to 2010)*	-15	-5	17	39	(-12,7)
↳ in 2050 (% rel to 2010)	-32	2	21	44	(-11,22)
Renewable share in electricity in 2030 (%)	60	58	48	25	(47,65)
↳ in 2050 (%)	77	81	63	70	(69,86)
Primary energy from coal in 2030 (% rel to 2010)	-78	-61	-75	-59	(-78,-59)
↳ in 2050 (% rel to 2010)	-97	-77	-73	-97	(-95,-74)
from oil in 2030 (% rel to 2010)	-37	-13	-3	86	(-34,3)
↳ in 2050 (% rel to 2010)	-87	-50	-81	-32	(-78,-31)
from gas in 2030 (% rel to 2010)	-25	-20	33	37	(-26,21)
↳ in 2050 (% rel to 2010)	-74	-53	21	-48	(-56,6)
from nuclear in 2030 (% rel to 2010)	59	83	98	106	(44,102)
↳ in 2050 (% rel to 2010)	150	98	501	468	(91,190)
from biomass in 2030 (% rel to 2010)	-11	0	36	-1	(29,80)
↳ in 2050 (% rel to 2010)	-16	49	121	418	(123,261)
from non-biomass renewables in 2030 (% rel to 2010)	430	470	315	110	(245,436)
↳ in 2050 (% rel to 2010)	833	1327	878	1137	(576,1299)
Cumulative CCS until 2100 ($GtCO_2$)	0	348	687	1218	(550,1017)
↳ of which BECCS ($GtCO_2$)	0	151	414	1191	(364,662)
Land area of bioenergy crops in 2050 (million km²)	0.2	0.9	2.8	7.2	(1.5,3.2)
Agricultural CH_4 emissions in 2030 (% rel to 2010)	-24	-48	1	14	(-30,-11)
in 2050 (% rel to 2010)	-33	-69	-23	2	(-47,-24)
Agricultural N_2O emissions in 2030 (% rel to 2010)	5	-26	15	3	(-21,3)
in 2050 (% rel to 2010)	6	-26	0	39	(-26,1)

NOTE: Indicators have been selected to show global trends identified by the Chapter 2 assessment. National and sectoral characteristics can differ substantially from the global trends shown above.

**Kyoto-gas emissions are based on IPCC Second Assessment Report GWP-100*
***Changes in energy demand are associated with improvements in energy efficiency and behaviour change*

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[53] IPCC, 2018. Global warming of 1.5°C - Summary for Policymakers.

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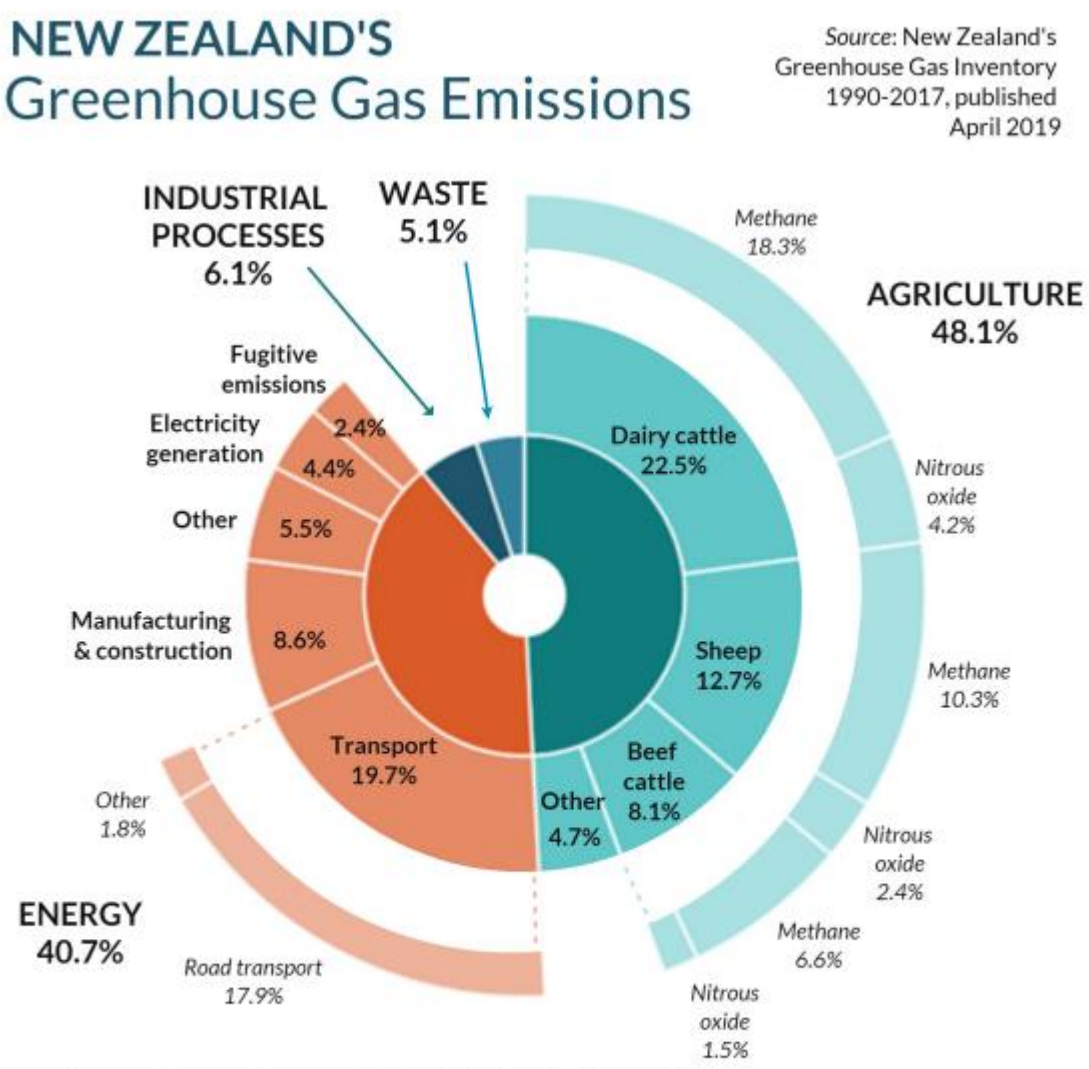
Appendix 2 - NZ's GHG emissions[54]



[54] MFE, 2017: New Zealand's Greenhouse Gas Inventory 1990-2016, Snapshot.

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Appendix 3 - ICCC's estimated averages costs to farmers of a price on emissions with 95% free allocation [55]

Table 1: Estimated average costs of a price on emissions at farm level

Product (unit)	Emissions cost[9]	Product price[10]
Milk solids (kg)	$0.01	$5.73
Beef (kg)	$0.01	$5.31 (prime) $3.85 (manufacturing)
Sheep meat (kg)	$0.03	$6.11 (lamb) $3.28 (mutton)
Venison (kg)	$0.04	$8.20
Urea (tonne)	$2.92	$555 (ex works)

Table 2: Estimated average costs to farms, compared with farm operating profits, of a farm-level emissions price

Farm type	Cost/year/hectare	Profit/ year/ hectare[12]
Dairy farm	$14	$1,937
Sheep and beef (North Island intensive finishing farms)	$6	$391
Sheep and beef (North Island hard hill country farms)	$6	$242

[55] #

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