OFFICIAL

Wai 3325, #A76(b)

IN THE WAITANGI TRIBUNAL
KEI MUA I TE TARAIPIUNARA

WAI 3325
WAI 3279

UNDER	**The Treaty of Waitangi Act 1975**
CONCERNING	**The Climate Change Priority Inquiry**
AND	**Claims brought by Te Waimate Taiamai ki Kaikohe Claims Alliance (Wai 421, Wai 593, Wai 869, Wai 1247, Wai 1383)**
AND	**The Ngāti Ruapani ki Waikaremoana Climate Change Claim (Wai 3278)**
AND	**Te Upokorehe Future Generations Climate Change Claim (Wai 3279)**
AND	**The Ngāti Porou ki Hauraki Climate Change Claim (Wai 3288)**

SPEAKING NOTES OF ALEXANDRA MACMILLAN

Dated: 17 October 2025

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1. Hei tangata Tiriti au, hei Norse Gael ahau, nō Te Whenua Moemoeā, nō Kotirani ahau. Ko Alexandra Kathryn Macmillan toku ingoa. I have been asked to give an opinion on the impacts of climate change within my field of expertise. I am a vocationally registered public health medicine specialist, and a Fellow of the NZ College of Public Health Medicine (NZCPHM). The remainder of my credentials are outlined in my brief at paragraphs [2] – [6], and I will not repeat them here. I have read the Code of Conduct for Expert Witnesses at Schedule 4 of the High Court Rules and I confirm that I agree to comply with it.

2. In my evidence, I will contextualise climate change as one symptom of an ecological polycrisis that demands a more integrative and deeper response; I will provide a synthesis of international and national effects of climate change on hauora Māori and health equity; and then provide evidence to demonstrate healthy, equitable, Tiriti-based adaptation and mitigation; and compare this evidence against Crown policies and actions to date.

3. Before I begin, I note that in approaching this submission of evidence on climate change and health, I am applying a holistic understanding of health, which acknowledges that health is not just the absence of disease, but complete physical, mental, spiritual and cultural wellbeing. The influences on health, especially health inequalities, lie largely outside individual control and the health system, and include social, economic, environmental, political and commercial determinants. This was also acknowledged in the Crown Evidence on climate change and health of Andrew Old.

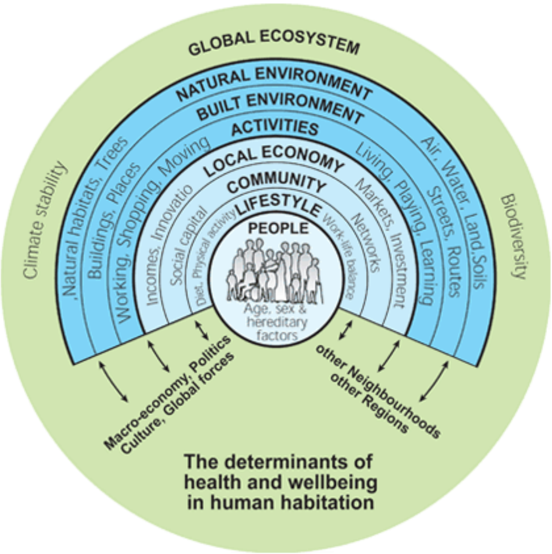

Figure 1 Barton, H 2006. A health map for the local human habitat

4. In particular, human health rests fundamentally on the good functioning of intertwined ecosystems that sustain the web of life. These holistic understandings of health align with recent re-expressions of holistic Māori models of health and health promotion, such as Te Whare Tapa Whā and Te Pae Mahutonga. Recent global Indigenous re-articulations of planetary health also emphasise these interconnections which is illustrated by figure 2 on page 4 of my brief. I endorse the description provided to you yesterday of these determinants by A/Prof Rhys Jones.

***Panel:* The determinants of planetary health identified by the consensus process**

Mother Earth-level determinants
- Respect of the feminine
- Ancestral legal personhood designation

Interconnecting determinants
- Human interconnectedness within Nature
- Self and community relationships
- The modern scientific paradigm
- Governance and law

Indigenous Peoples' level determinants
- Indigenous land tenure rights
- Indigenous languages
- Indigenous Peoples' health
- Indigenous Elders and children

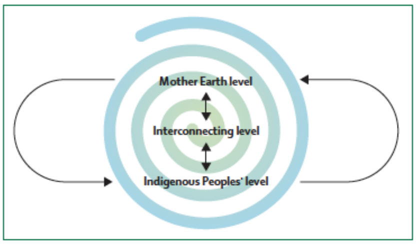

Figure 2 Redvers, N, et al 2022. The interconnectedness of the determinants of planetary health

5. Climate change is just one manifestation of the un-sustainability of dominant processes of human development through exploitation and colonisation. For example, the global planetary boundaries work, first published in 2009,[1] demonstrates that of nine Earth system boundaries, we are beyond six. These are deeply interconnected.

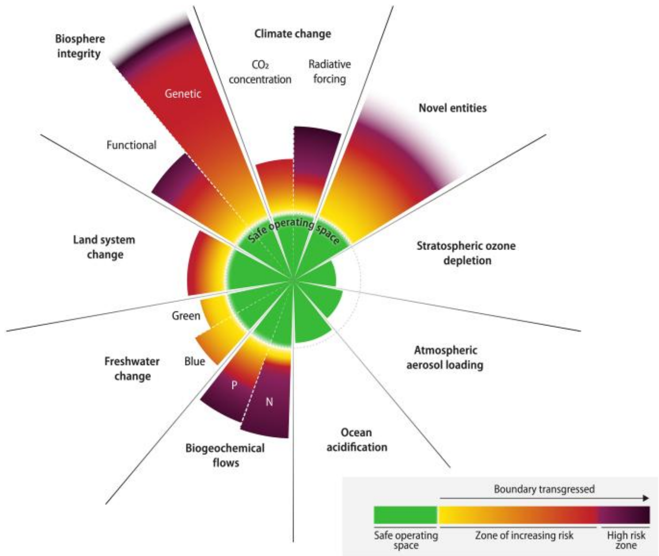

Figure 3 Richardson, K et al 2023. Earth beyond six of nine planetary boundaries

6. Putting climate change in the context of planetary boundaries demonstrates that the issues go deeper than a technical issue that could be solved by tweaking current modes of economic thinking such as through technological fixes. Rather, we have some fundamental issues with the way that Western neoliberal colonial capitalism sets up an exploitative model. The moving beyond a safe operating space needs to be seen as a major threat to health and wellbeing that requires us to re-think and re-orient now dominant patterns of human "development" and macroeconomic policy towards relationality, circularity, and balance.

[1] Johan Rockström and others "A safe operating space for humanity" (2009) 461 Nature 472 at 472-475.

Climate change and health globally

7. A quick note on methodology before I begin - As a public health academic, my role is to take the evidence from climate scientists and apply it to health matters. In drawing public health conclusions, we therefore rely on consensus statements by global climate scientists and evidence generated specifically for Aotearoa.

8. It's worth noting that public health, and medicine more generally, relies heavily on probabilistic evidence at a population scale to make good decisions at individual and population scales, because health outcomes are often driven by multiple risks and exposures. Epidemiology is a probabilistic science, and the case for widespread policy change on many accepted health risks are made based on probability-based risk assessments from population level studies. A similar approach to epidemiology is taken to attribution of particular weather events to climate change, and attribution of health effects to climate change.

9. Since many of the health effects are exacerbations of existing disease, or changes in the geography and spread of these diseases, we can use existing knowledge about risk factors, population burdens of disease, and health inequalities, alongside attribution studies to provide reliable evidence-based statements about cause and effect.[2]

10. The effects of climate change on health are also complex, resulting from both direct and indirect pathways. Figure four on page 7 of my brief provides an internationally relevant summary of these pathways, based on the synthesis of evidence from epidemiological studies.

[2] Kristie Ebi and others, "Using Detection And Attribution To Quantify How Climate Change Is Affecting Health" (2020) 39 Health Affairs 2168 at 2168-2174.

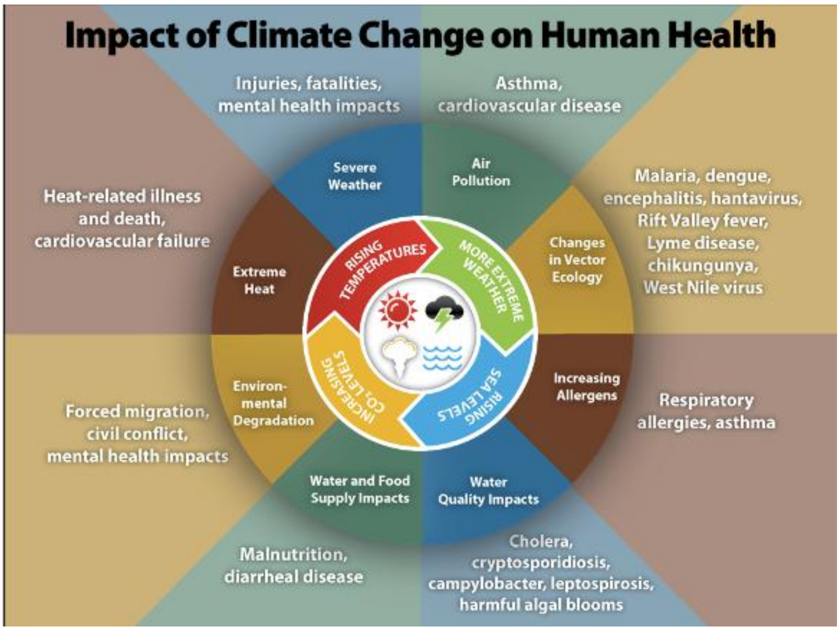

Figure 4 USCDC nd, pathways from climate change to human health (no longer available online)

11. Because of the complexity of these pathways, and the additional mediating effects of societal responses, even global burdens of disease are difficult to estimate. For example, the World Health Organization (**WHO**) estimated in 2004 that climate change had already caused more than 140,000 excess deaths per year, since the 1970s, based on a very limited set of outcomes (malaria, malnutrition, unintentional injuries due to flooding, and diarrhoeal diseases).[3] This estimate was not able to be applied at a national level in Aotearoa, yet it demonstrates that by 2004, health effects were well known and measurable internationally.

Moving to my next section - Climate change and health in Aotearoa NZ

12. Potential health effects of climate change in Aotearoa have been identified by the Ministry for the Environment at least since 2001.[4] We published a public health argument for climate change action in Aotearoa in 2009,[5] and an evidence-based summary of health effects in Aotearoa

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[3] World Health Organization "Mortality and burden of disease attributable to climate change" <www.who.int>.
[4] Alistair Woodward and others *Climate Change: Potential Effects on Human Health in New Zealand* (Ministry for the Environment Manatū Mō Te Taiao, ME 413, September 2001).
[5] Scott Metcalfe and others "Why New Zealand must rapidly halve its greenhouse gas emissions" (2009) 122 NZMJ 72.

in 2014,[6] with the expected direct effects summarised in the figure below paragraph 18 of my brief. In sum, these effects are:

a. Increased food insecurity;

b. Increased stress and mental health issues;

c. Healthiness and availability of housing;

d. Injury and illness from extreme weather events;

e. Increased likelihood of vector-borne and zoonotic disease;

f. Increased likelihood of food and water borne disease;

g. Impacts from increased UV radiation;

h. Decreases in physical activity, an important determiner of health;

i. Increased cardio-respiratory diseases from air pollution;

j. Increase in allergic diseases including asthma;

k. Impacts on the healthiness of indoor environments.

13. The risks to Māori health and health equity were highlighted, too. Māori are at increased risk for greater health harm because of existing health inequities in infectious diseases, cardio-respiratory disease, other chronic conditions like diabetes, and mental health. In addition, inequities in the social foundations of health, such as access to clean drinking water, add to these health inequities to further increase risk. Even further increases in risk come from greater exposure to climate-related food borne illness through customary practices such as collection of kaimoana, as well as greater exposure to outdoor heat through over-representation in outdoor occupations like construction, farming and forestry.

[6] Hayley Bennet and others "Health and equity impacts of climate change in Aotearoa-New Zealand, and health gains from climate action" (2014) 127 NZMJ 16.

14. These conclusions are supported by a 2017 the Royal Society of New Zealand Te Apārangi evidence summary of the human health impacts of climate change. I was the public health co-author of this paper.

15. I want to provide three interacting examples that are already unfolding, to demonstrate the complex and cascading dynamics between existing structural injustices, including those that have already been demonstrated as Tiriti breaches by the Tribunal, system specific trends, and climate change

16. The Lancet Countdown on climate change and health provides a global assessment of the effects climate change is already having on health, much of it through food insecurity: From 1981 to 2019, the truly essential land foods **crop yield** potential for maize, winter wheat, soybean, and rice has followed a consistently downward trend, with reductions relative to baseline of 5·6% for maize, 2·1% for winter wheat, 4·8% for soybean, and 1·8% for rice The yield potential of maize, winter wheat, soybean, and rice continues to decline globally and for most individual countries. This reduction compounds the current negative impacts of weather and climate shocks, exacerbating undernutrition and food price rises. Prices of these essentials are already really high in Aotearoa, resulting in huge nutritional inequities by income and ethnicity, and food insecurity for 1 in 5 children (NZ Health Survey 2019) with structural injustices by income and ethnicity.

17. NZ has made international commitments to the Sustainable Development Goals, including SDG2. We summarise the interconnected issues for NZ meeting its commitments to SDG2 Zero Hunger alongside Te Tiriti obligations, in our recently published paper, which puts together a range of existing evidence and policy analysis, concluding that food production systems and policy directions substantially undermine that commitment. Not for the first time, we

called for an integrated food system strategy, and a Ministry of Food, responsible for strategy, planning and action across the food lifecycle.[7]

18. Since then, there has been a measurement gap, with piecemeal research assessing the impacts that have already occurred. The studies summarised in the evidence of my colleague, Prof Simon Hales, provide an excellent overview of the state of our quantitative understanding of health effects in Aotearoa including explaining the way that these effects will act as risk multipliers of existing Māori health inequities, in areas such as waterborne illness, heat and air pollution.

19. In addition to these studies, direct connections can be made between climate change, food price rises, and household food insecurity in Aotearoa. The flow-on child health and social inequities of this are substantial, long-term and intergenerational.

20. The NZ Health Survey annual update 2023/24 found more than one in four children now live in food insecure households, a jump of more than 20% on the previous year.[8] For Māori, the rate is now more than a third, compared with one in five European children. A recent data synthesis by the Carbon Brief shows five ways in which global food price rises and fluctuations are tied to changing temperatures, extremes of rainfall and severe weather events[9]. These include staple foods like rice, for which NZ relies heavily on imports.

21. Food production within Aotearoa, and food prices for those foods produced here, are also affected by climate change. For example, following Cyclone Gabrielle, the price of some vegetables like kūmara and broccoli doubled, as the cyclone and associated land use impacts caused extensive damage in "food bowl" regions. The Minister of

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[7] Alex Macmillan and others "SDG2 Zero Hunger and the need to re-think food production in Aotearoa: viewpoint" (2025) 55 Journal of the Royal Society of New Zealand 2415.
[8] Ministry of Health Manatū Hauora "Annual update of key results 2023/24: New Zealand Health Survey" (19 November 2024) <www.health.govt.nz>.
[9] Orla Dwyer "Five charts: How climate change is driving up food prices around the world" (23 August 2024) <www.carbonbrief.org>.

Finance at the time estimated an almost 8.5% increase in vegetable prices overall following the Cyclone.[10]

22. In a currently unpublished study of flooding effects on health in South Dunedin by Ra Baillie and others, we examined hospitalisation data in flooded areas of South Dunedin alongside those from similar non-flooded small areas in the South Island. We found increases in injury, gastrointestinal infections, skin diseases, respiratory illness, and heart disease and stroke that were not seen or were much smaller and seasonal, in the non-flooded areas. Because of the data used, we were not able to look at ethnicity. However, given existing inequities in for Māori in all these causes of hospitalisation, and that the health effects were mostly mediated by contaminated, damp and mouldy housing, we would expect that these hospitalisations were inequitably distributed by ethnicity. These findings are consistent with international evidence. The most recent census also found reductions in dampness and mould in all regions of Aotearoa except Gisborne Tairāwhiti, which had an increase to 1 in 3 households being damp and mouldy as a result of Cyclone Gabrielle in early 2023. Over half of this region's population whakapapa Māori.

23. Housing injustice is already a driver of Māori health inequities, particularly for Māori children. For example, Te Pā Harakeke: Māori housing and wellbeing report showed that 40% of Māori reported living in a damp or mouldy house compared with 21% of Europeans. Substantially more Māori rated their housing as unaffordable and were six times more likely to live in a severely crowded house than those with European ethnicity.

24. While much burden of disease from climate change knowledge rests on epidemiological studies, there are limits to epidemiology. For example, epidemiology is a poor tool for understanding indirect pathways, complex dynamics, non-linear change, and contextual meaning.

[10] Hon Grant Robertson "Inflation lower than expected but Cyclone Gabrielle keeps prices elevated" (The Beehive, 20 April 2023).

Mātauranga Māori, pūrakau, qualitative research, and different kinds of modelling are all critically important in constructing a comprehensive understanding of climate change and hauora Māori.

25. This project, and our other participatory research in South Dunedin highlight that measurement and understanding of the effects of climate change on mental health in Aotearoa is a major gap.

I will now explore the adequacy of mitigation actions to protect Māori health, address health inequities, and meet criteria of Indigenous climate justice

26. This evidence demonstrates that the Crown has known about the risks of climate change for hauora Māori and health inequities for at least 15 years, since a range of health professionals, including myself, have been bringing the evidence to the attention of Crown officials and politicians since at least 2001 including through OraTaiao: NZ Climate & Health Council.

27. That we are now able to measure health effects that are worsening inequities for Māori, is strong evidence that the collective international response to climate change has been inadequate for protecting health, including hauora Māori.

28. Our experiences with other major threats to public health and the lack of progress to reduce NZ's greenhouse gas emissions, have amply demonstrated that neither the market, nor individual focused behaviour change, are adequate approaches to addressing the public health threat of climate change. Transformative action is needed to protect health, and the government has a responsibility to take adequate and timely action.

29. This leads to the question of what is adequate. That global climate action so far is inadequate is very clear. In 2024 we reached 1.5°C of global average warming for the first time, and when put together, country level policies and commitments have the world on track for up to 3.5°C of warming by 2100.

30. NZ as a nation plays a high income and high per capita emissions role in this collective action. As such, Aotearoa bears a responsibility well beyond our size or the percentage annual contribution we currently make to global emissions. This is the justification behind "common but differentiated responsibilities" in the 2015 Paris Agreement.

31. The Intergovernmental Panel on Climate Change most recent assessment included an illustration of fair sustainable development pathways for different indicative countries, accounting for per capita greenhouse gas emissions and development level.[11] Aotearoa NZ's fair pathway to a place of sustainable development requires an almost vertical drop in emissions.

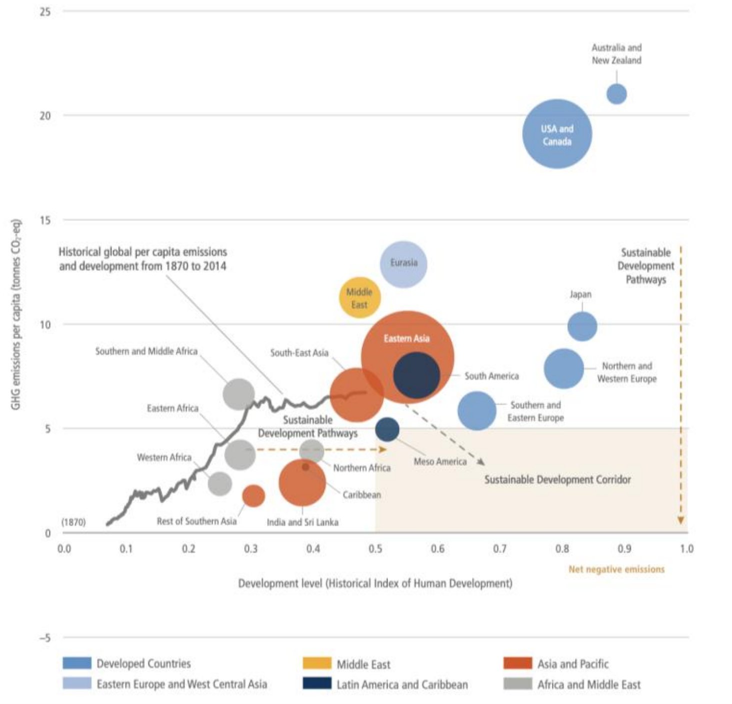

Figure 5 Differential sustainable development pathways for indicative countries and regions based on per capita greenhouse gas emissions and development level

32. A fair shares approach has been defined and long-emphasised by the public health community in Aotearoa, for example in the NZ College of

[11] Minal Pathak and others *Climate Change 2022 Mitigation of Climate Change Working Group III Contribution to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change: Technical Summary* (Intergovernmental Panel on Climate, 2022).

Public Health Medicine's policy statement on climate change and health.[12]

33. Within the framework we now have, He Pou a Rangi, the NZ Climate Change Commission's first monitoring report in July 2024 suggests with high uncertainty that the country will meet the first carbon budget set by the Commission.[13] However, beyond 2025 the country is increasingly off track, with substantial policy strengthening needed. The report suggests a well-designed policy package that would have the country meet the targets in the Climate Change Act is missing.

34. Most assessments of NZ's fair share of responsibility for meeting Paris Agreement targets of keeping average warming below 2°C and aiming for below 1.5°C suggest that there is a substantial mismatch between government legislated targets, the government's intended Nationally Determined Contribution and our global responsibilities. For instance, Climate Action Tracker (an independent, science-based programme to synthesise government action and assess it against Paris Agreement targets and their "fair share"), has consistently rated our actions and commitments as "highly insufficient".

35. Nationally Determined Contributions are required under the Paris Agreement, and under the agreement are required to represent a country's "highest possible ambition". NZ's current target was set in 2021, for a 50 percent reduction compared with 2005 climate pollution levels, by 2030. The government has recently updated its NDC targets, following advice by He Pou a Rangi in October 2024. Their report suggested the most ambitious feasible target was reductions of up to 75% in net emissions by 2035 compared with gross 2005 emissions levels.[14] Instead, the new target announced by government promises 51-55 percent reductions by 2035. This is barely an increase in ambition and is

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[12] New Zealand College of Public Health Medicine "Climate Change Substantive Policy Statement - Supplement One: Background to the NZCPHM's Stance on Setting National GHG Emissions Targets" (policy statement, October 2018).
[13] He Pou a Rangi Climate Change Commission *Monitoring report: Emissions reduction – Assessing progress towards meeting Aotearoa New Zealand's emissions budgets and the 2050 target* (July 2024).
[14] He Pou a Rangi Climate Change Commission *Report on the potential domestic contribution to Aotearoa New Zealand's second nationally determined contribution* (October 2024).

unlikely to improve our "highly insufficient" rated contribution to global efforts.[15]

36. In November 2024, He Pou a Rangi also released a legislated review of the greenhouse gas emissions targets in the CCRA.[16] This report also recommended the targets be strengthened. Since then, the Crown's commitment has been further weakened by the recent reductions in methane targets.

37. In addition to reducing emissions domestically, NZ has a responsibility to contribute to phasing out global fossil fuel use.

38. In contrast to this consistent advice and scientific evidence requiring the government to strengthen ambition and integrated policy implementation, the current government has moved in the opposite direction. The accompanying rhetoric has also made the issue of climate change more politically polarised, and damaged much-needed cross-party consensus for long-term policy signals that are needed for businesses and society to plan and respond.[17]

39. As a result of inaction, health effects are already measurable, and are expected to worsen with each fraction of a degree of global temperature rise. These effects are worse for hauora Māori and are already exacerbating Māori health inequities.

Best practice adaptation for health equity – flooding and sea-level rise

40. Mitigation remains our best adaptation. Each tonne of emissions we reduce, translates into fewer deaths, hospitalisations and illnesses.

41. There are limits to adaptation from a public health perspective. These are physiological, as well as a result of our reliance on a well-functioning

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[15] Climate Action Tracker "New Zealand" <www.climateactiontracker.org>.
[16] He Pou a Rangi Climate Change Commission *Review of the 2050 emissions target including whether emissions from international shipping and aviation should be included* (November 2024).
[17] See: "Minister Shane Jones on climate change, regional development and bringing back oil and gas – The Front Page" *The New Zealand Herald* (online ed, New Zealand, 22 November 2024).

web of life for health and survival, and to the resilience of national and international social and governance systems.

42. Notwithstanding these points, collective and well-designed adaptation actions are now needed to protect hauora Māori and avoid further exacerbating health inequities.

43. I have been part of a project to understand the complex connections between flooding and sea-level rise, and health equity in South Dunedin, the largest urban area in Aotearoa already grappling with these issues.

44. From this project we learnt the following about best practice adaptation decision-making, and made these recommendations to the 2024 Finance and Select Committee Inquiry on Climate Change Adaptation. My full submission is included in Appendix B. A summary of these recommendations is that:

   a. Community must be meaningfully and consistently involved in adaptation planning and decision-making to ensure outcomes that best support community agency and wellbeing;

   b. A health, wellbeing and health equity (fair and just distribution of the building blocks of health) framing for participatory planning processes can assist with buy in and ensuring that decisions contribute positively to community goals. Health professionals may be seen as trusted brokers between the science and decision-makers;

   c. The development of equitable high quality, climate resilient housing is necessary to address existing issues around poor housing quality and availability, but measures need to be taken to avoid gentrification and the exacerbation of inequities in access to housing. Provision of social housing is likely to be an important aspect of this, to avoid exacerbating existing housing inequities, particularly by ethnicity;

d. There is a need to carefully manage land use for new housing developments, and for blue-green space to reduce flood risk and benefit health and wellbeing by bringing more nature into the area;

e. Government investment that increases the appeal of the area to live and do business in needs to factor in residual risk, in which more people are exposed to a greater risk of harm when engineering solutions fail over the long-term;

f. Targeted relocation and retreat from high-risk areas may be necessary, but require extensive and ongoing consultation with the community to best support their wellbeing aspirations and equitable outcomes;

g. Collaboration is required across sectors, government departments, and between community, policymakers, and technical experts to share knowledge and build the relationships necessary for effective adaptation.

45. Improved land use governance was highlighted as a major finding of the research. Responding to sea level rise and flood risk in both urban and rural areas brings to the fore a critical tension between market-led private land use decisions and healthy, equitable climate change responses. An ethical response to these risks will require a fundamental shift in governance, and a reorienting of our relationship with land and water that puts te Tiriti and climate justice at the centre.

Is the Crown's adaptation response adequate to protect health?

46. These findings were only partly reflected in the recommendations of the Finance and Select Committee Inquiry. The recommendations failed to grapple with the central tensions between private land ownership and the need for changing land use governance. The first recommendation was to minimise costs the Crown, despite the problem being a result of the Crown's failure to tackle climate change in a timely way.

47. The Ministry of Health recognised a need for better health focused adaptation planning in 2018, when the ESR Climate Change and Health

Report it commissioned was released.[18] While a specific Heat Health Action Plan was released in 2019, the first more comprehensive Health National Adaptation Plan (**HNAP**) was not released until October 2024 (six years later).[19]

48. The HNAP recognizes the threat of climate change to pae ora, and the risk of exacerbating health inequities for Māori. The HNAP includes 26 specific actions, almost all of which require broadening public health roles in local and regional planning; strengthening public health functions within Te Whatu Ora; and increased capacity within the Ministry of Health.

49. Many of the actions in the HNAP would be carried out by staff in the National Public Health Service. However, during the period of the plan's development and after, funding to public health has been repeatedly cut. For example, in November 2024, with 300 positions already left vacant, the National Public Health Service were asked to find over $30M of further savings, and lose 55 more staff. Having disestablished Te Aka Whai Ora in February 2024, which included job losses, the most recent NPHS cuts included "restructuring" the Māori Health team within Te Whatu Ora. This calls into question the capacity of National Public Health Service to fulfil an expanded climate change adaptation role, and that any action would effectively meet Tiriti obligations.

50. Further, the current government has made public attacks in the media about public health roles in partnership with local government, including specifically about climate change, and political constraints have recently been placed on the way that public health professionals within the National Public Health Service are allowed to engage with local government.[20]

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[18] Annette Bolton *Climate Change and Environmental Health* (The Institute of Environmental Science and Research Limited, FW17059, May 2018).
[19] Ministry of Health Manatū Hauora *Health National Adaptation Plan 2024-2027* (October 2024).
[20] Glenn McConnell "'It's censorship': Public health leaders slam 'Trumpian' edict" *Stuff NZ* (online ed, New Zealand, 20 March 2025).

51. There is a single kaimahi within the Ministry of Health whose specific role is climate change and health (Kaeden Watts). A further 1-1.5FTE is shared among other kaimahi to work on HNAP alongside their other roles. A total of $500,000 has been allocated to implementing the HNAP, all of which is being used to deliver action KRA1 – a health vulnerability and adaptation assessment. No further budget has yet been allocated for any other actions.

52. Perhaps here is a good place to respond to the Crown's evidence about climate change and health, provided by Dr Andrew Old:

a. It is worth noting that the Pae Ora Amendment Bill would remove climate change mention in the Principles of the Pae Ora Act.

b. At paragraph [13] of Dr Old's evidence, he talks about the Public Health Agency's role in Māori health equity is "reducing inequities", which is out of keeping with a general public health understanding, which is that achieving equity requires the elimination of unjust and preventable outcome inequalities.

c. Paragraph [13] begins a discussion on the GPS health, which does not identify climate change as a major threat to health or the health system, instead prioritizing timely access to healthcare services, emphasizing this to "drive the biggest improvements" in health outcomes, but failing to recognise climate change as a threat to access. There are no specific actions to address climate change related Māori health inequities, and nor does the GPS recognize that climate change is and will continue to worsen those inequities.

d. Paragraph [35] refers to climate change being included in action on the social determinants of health, yet it is not mentioned in the action.

e. Paragraph [37] mentions a climate resilience plan to be developed, but not by whom and with what resources.

f. Paragraph [38] implies a clear and coordinated direction on climate change, yet the strategies do not provide this. Rather, the strategies provide a general coordinated direction, but not about climate change

g. Dr Old's evidence then goes on to describe the HNAP, but does not provide an explanation of why the Ministry took 2.5 years to respond to its responsibility to develop an HNAP; nor does it explain what FTE and resourcing has been allocated to achieve the actions, especially in the context of repeated cuts.

h. In particular, it is unclear what the status of Action HSR2 of the HNAP (as referred to in paragraph [55]) could be currently, when at this critical time in adaptation planning, Medical Officers of Health need national sign off for much of their advice to local government, and have limited local or regional intelligence and data. Currently it relies on a very small number of highly committed people working against the tide, when full system commitment is needed.

i. In response to paragraph [57], it would be helpful to have detail about how the Ministry if responding to the recommendations of Te Weu me te Wai, and how public health expertise is feeding into the Principal Economics V&A Assessment.

Implications of climate change mitigation policy design on hauora Māori and Māori health equity

53. Because the sources of greenhouse gas emissions also come with substantial other harms to human health, hauora Māori and health equity, there are major opportunities for improving health and health equity through well-designed climate mitigation policies. Much of the focus of my own research has been on supporting policy-makers and the public to understand the most healthy equitable policy levers for reducing emissions in housing, transport, energy, and the food system.

54. Co-benefits for health in well-designed improvements in **housing** insulation, energy efficient heating plus ventilation are well known. These same improvements, if applied across the housing sector, would reduce greenhouse gas emissions from housing by eliminating coal and gas burning for heat; substantially reduce wood burning; and reduce the amount of energy overall needed to heat people's homes. The work of colleagues at He Kainga Oranga, Ōtākou Whakaihu Waka, has shown over a number of decades that for every dollar spent on these interventions, a roughly five dollar return in health savings is estimated.[21] This has led to ongoing funding since 2004 by the Energy Efficiency and Conservation Authority to support low income people living in their own homes to improve their insulation and switch heating sources, particularly to heat pumps (now called Warmer Kiwi Homes). The programme eligibility criteria were expanded in 2023 to cover a higher percentage of insulation costs and extend eligibility to those living in NZDep Level 7 areas. However, since Māori are less likely to own their own home, this programme has always been inequitable, since private rental housing is not eligible for the subsidies.

55. In the **transport** sector, substantial international and national evidence suggests that policies to equitably improve safe and convenient active travel and public transport come with substantial co-benefits to health and health equity, such as increased daily physical activity, improved air pollution, reduced road traffic crash deaths and serious injuries, and increased social connection.[22] As a result of this evidence, the IPCC suggests the most effective and co-beneficial approaches to light transport decarbonisation combine car use taxes and disincentives with systemic active and public transport investment alongside decarbonisation of the private vehicle fleet.[23]

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[21] Arthur Grimes and others *Cost Benefit Analysis of the Warm Up New Zealand: Heat Smart Programme* (Motu Research, October 2011).
[22] Alexandra Macmillan and others "Suburb-level changes for active transport to meet the SDGs: Causal theory and a New Zealand case study" (2020) 714 Science of the Total Environment 1.
[23] Paulina Jaramillo and others *Climate Change 2022 Mitigation of Climate Change Working Group III Contribution to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change: Transport* (Intergovernmental Panel on Climate Change, 2022).

56. Equitable investment in active travel is also an important way to reduce social inequities. In the context of car dominant design of a transport system, not owning a car, being able to afford petrol, WOF, registration or maintenance, or not being able to drive due to age or disability, all lead to a risk of social exclusion. In our 2013 research we found that Māori are sometimes compelled to travel by car in order to participate.[24] This is especially true when there are also inequities in the distribution of public transport services. For example, in the 2023/24 NZ Health Survey, lack of transport was a barrier to accessing GP services for more than 5% of Māori, while Māori children were more than four times as likely as non-Māori children to miss a GP visit because of lack of transport.[25]

57. In February this year, Jones, et al published an analysis of these inequities using the NZ Household Travel Survey.[26] Findings included that Māori participants were more likely to live in a household without a car, and less likely to hold a driving license, and a pattern of travelling fewer kilometers each week across all modes of travel. They emphasised the need for policies that reduce car dependence for Māori, including improving lower speed, safer, and walkable neighbourhoods, and improved public transport designed specifically to meet Māori needs through greater self-determination in transport investment and planning.

58. In Aotearoa, several studies have modelled the costs and benefits of shifting from car trips to more active travel, including effects on health equity, since 2011, when we found that the health benefits of even a 5% shift in vehicle kilometres travelled to bikes would be double for Māori compared with the overall population.[27]

59. In 2014, we elucidated the specific policies that were most likely to result in a shift to cycling, which contributed to a national increase in investment

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[24] K Raerino and others "Indigenous Māori perspectives on urban transport patterns linked to health and wellbeing" (2013) 23 Health & Place 54.
[25] Environmental Health Intelligence New Zealand Rapu Mātauranga Hauora mo te Taiao – Aotearoa *Surveillance Report: Unmet need for GP services due to a lack of transport* (February 2025).
[26] Rhys Jones and others "Inequities in patterns and determinants of travel for Māori in Aotearoa/New Zealand" (2025) 40 Journal of Transport & Health 1.
[27] Graeme Lindsay, Alexandra Macmillan and Alistair Woodward "Moving urban trips from cars to bicycles: impact on health and emissions" (2011) 35 Australian and New Zealand Journal of Public Health 54.

in urban cycleways – though this investment was far from the amount needed for substantive mode shift to equitably occur.[28]

60. In 2022, Randal and colleagues estimated that the health burden of car dependence in Aotearoa is equivalent to that of smoking, and that if motor vehicle injuries and air pollution were eliminated, and car trips were replaced with active travel, the gap in life expectancy between non-Māori and Māori would reduce by 2-3%.[29] Shaw and colleagues have since compared two specific policy approaches to decarbonising the transport sector used by He Pou a Rangi: a behaviour pathway that emphasised active and public transport as well as vehicle electrification, and a technology approach focusing on electrification of private vehicles only.[30] The outcomes are summarized in Figure 6, and suggest that decarbonising transport, when designed well, can be important to health equity for Māori:

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28 Alexandra Macmillan and others "The Societal Costs and Benefits of Commuter Bicycling: Simulating the Effects of Specific Policies Using System Dynamics Modeling" (2014) 122 Environmental Health Perspectives 335.

29 Edward Randal and others "The Impact of Transport on Population Health and Health Equity for Māori in Aotearoa New Zealand: A Prospective Burden of Disease Study" (2022) 19 Int J Environ Res Public Health 2032.

30 Caroline Shaw and others "Policy approaches to decarbonising the transport sector in Aotearoa New Zealand: modelling equity, population health, and health-system effects" (2024) 8 The Lancet 647.

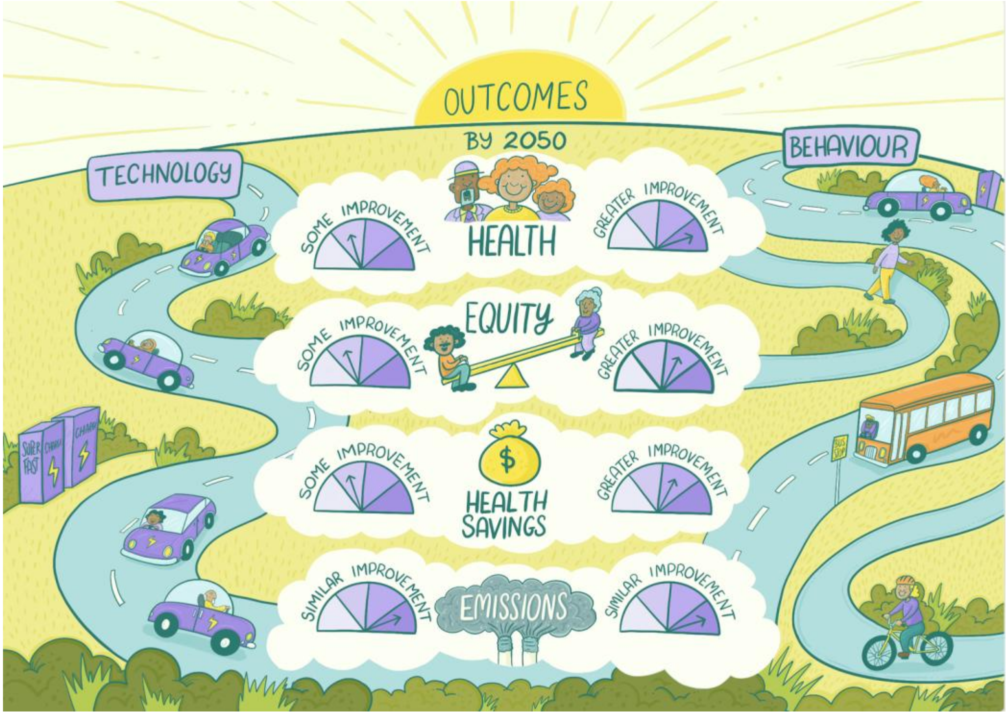

Figure 6 Shaw, C and El-Orfi Y 2024 Health and equity impacts of decarbonising transport in Aotearoa NZ https://www.yasmineelorfi.com/decarbonising-transport

61. In contrast to costly electric vehicles, e-bikes are emerging as an important tool in the equitable decarbonisation of transport, and yet, like electric vehicles, are still priced out of reach for many low-income households, especially in the context of high levels of vehicle finance debt. Several equity focused e-bike trials have now been completed. Two are worthy of particular note. As part of Te Ara Mua Future Streets in Ngā Hau Māngere, other members of my research team worked in partnership with the existing Māngere Bike Hub to deliver a 3-stage e-bike trial, resulting in a community e-bike library. Participants were largely Pacific and Māori and found the e-bikes beneficial for physical and mental health, as well the reduction in weekly fuel costs. The trials demonstrated that with the right transport and community infrastructure in place, and adequate resourcing, community organisations can be supported to deliver a local just transition. Similar findings emerged from the 2022 Kōkiri marae e-bike trial (HIKO) led by Caroline Shaw, where 25 participants were loaned an e-bike for 6 months. The participants' own words about the HIKO trial can be found at the following link: https://www.youtube.com/watch?v=afun_BcjMU0&ab_channel=Univ

ersityofOtago%2CWellington . These experiences powerfully demonstrate the benefits of access to e-bikes.

62. Substantial accumulated international and national evidence now points consistently to benefits to health, health equity and hauora Māori from well-designed changes to the **food system,** which support a shift away from shop bought meat, dairy, and highly processed foods, towards more plant-based diets, while upholding kai rangatiratanga, particularly over mahinga kai.[31] Because they are short-lived, reducing methane emissions provides much needed rapid progress on climate change, as we tackle longer-lived CO2 emissions.[32] Epidemiological and modelling evidence suggests that every step towards a plant-based diet comes with greenhouse gas reductions and substantial health benefits. In 2019 we showed that dietary emissions could be reduced by up to a third through healthier diets, accompanied by health savings worth between $13 and $20 billion over the lifetime of the current adult population.[33] Our equity analysis suggested per capita health savings would be nearly 1.8 times greater for Māori than non-Māori. More recent similar modelling has shown similar benefits, while also demonstrating that it is possible to make shifts towards more equitably healthy, climate-friendly diets in ways that are cost neutral.[34]

Adequacy of the Crown's design of mitigation policies

63. In contrast to the evident need outlined at the start for a deep economic transition, and the well-disseminated evidence about policy design for health equity and hauora Māori co-benefits described above, the Crown's response has relied heavily on technological tweaks to the status quo across all the main emissions sectors, and has largely ignored equity impacts beyond some limited direct economic impacts on particular kinds

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[31] Walter Willet and others "Food in the Anthropocene: the EAT–Lancet Commission on healthy diets from sustainable food systems" (2019) 393 The Lancet 447.
[32] Drew Shindell and others "The methane imperative" (2024) 2 Frontiers in Science 1.
[33] Jonathan Drew "Healthy and Climate-Friendly Eating Patterns in the New Zealand Context" (2020) 128 Environmental Health Perspectives 017007-1.
[34] Christine Cleghorn "Assessing the Health and Environmental Benefits of a New Zealand Diet Optimised for Health and Climate Protection" (2022) 14 Sustainability 1.

of Māori businesses – most notably, Māori-owned livestock farming and forestry.

64. **Housing** energy efficiency policies have largely side-stepped the major issue of private rental housing, where Māori are more likely to live, and which now house about 30% of households.[35] While the Healthy Housing Standard was introduced in 2019, landlords have been given until July 2025 to comply. Although the standards provide a framework for landlords, enforcement rests heavily on tenants themselves. The power differential between tenants and landlords, the chilling effect of a likely increase in rent to pay for improvements, no-cause evictions legislation, and blacklisting behaviours of landlords in smaller centres, together discourage tenants from any enforcement. Because of institutional racism in the housing sector, this lack of enforcement is highly likely to be unevenly distributed by tenant ethnicity.

65. These issues were brought to the attention of policy-makers during design by healthy housing researchers, and meant that a substantial proportion of the housing stock will not contribute to reducing greenhouse gas emissions or health equity.[36]

66. In the **transport** sector, the status quo of investing in new roads and road maintenance has largely been unchanged since the 1990s. While some injections of direct Treasury money have improved urban cycling and public transport in the larger cities, the bulk (between two thirds and four fifths) of the National Land Transport Fund continues to be spent on making it easier for people to get around by car. The active transport proportion of the National Land Transport Fund has consistently been less than 2%, and under the current government, all active travel infrastructure projects were temporarily halted, while other important measures for encouraging lower carbon travel, like reduced public transport fares and lower speed limits on some roads, have been reversed.

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[35] Stats NZ "Te Pā Harakeke: Māori housing and wellbeing 2021" <www.stats.govt.nz>.
[36] Elinor Chisholm and Sarah Bierre "Submission on the Healthy Homes Amendment Bill (No. 2)" (12 June 2016) <www.healthyhousing.org.nz>.

67. Climate change-related transport regulation has thus far focused on electric vehicle subsidies (the Clean Vehicle Discount Scheme introduced in July 2021 and repealed at the end of 2023); and disincentivising the most polluting vehicles (the Clean Car Standard, watered down in July 2024). E-bike subsidies were initially signaled to be included in the electric vehicle subsidies and incentives, but this was never implemented.

68. In the **food system**, despite Ministry of Health contracting to translate our climate-friendly diets modelling finding into policy statements to incorporate into the Eating and Activity Guidelines, these statements were not incorporated into the 2020 revisions to the guidelines. Agricultural emissions continue to be exempt from the Emissions Trading Scheme. Instead, the focus has been on farm-based self-monitoring and reporting, and Crown investment in technological research to reduce per animal methane emissions.

69. As an explanation for the Crown's mitigation policy design, the **commercial** determinants of health have important implications for climate change and hauora Māori, and whether the Crown is Tiriti-compliant. That the Crown's climate policy direction over the past three decades has been towards technological fixes rather than Tiriti-based, healthy and equitable, is likely a result of an imbalance of power and influence over policy decisions by commercial interests. This has been identified as a major barrier to global action in the IPCC Sixth Assessment Report, which identified the influence of fossil fuel and agricultural corporations in blocking progress.[37]

70. In Aotearoa this influence can be *contrasted* with the influence of the Crown's hapū and iwi Tiriti partners, as well as other organisations acting to whakamana the provisions of Te Tiriti, and health in climate policy. In just one example of a range of forms of influence, we have been analysing Ministerial diary data in the transport and agriculture policy domains. *Our*

[37] Intergovernmental Panel on Climate Change *Climate Change 2022 Mitigation of Climate Change Working Group III Contribution to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change* (2022).

analysis suggests commercial interests dominate diarised meetings, while very few meetings are identifiable with iwi and hapū.

71. In summary, the Crown's responses to climate change are not only inadequate in speed and strength to protect Māori health and avoid exacerbating health inequities for Māori, but the mitigation policies also themselves are not being designed in ways that would optimize co-benefits for hauora Māori and contribute to eliminating health inequities. It is likely that this is a result of an imbalance of power in policy-making away from Tiriti partnership, and towards commercial interests.