NGĀ PAE O TE MĀRAMATANGA

TE AROTAHI POLICY PAPER SERIES

Arowhānui

Number 10—December 2025

Climate Change Risks and Solutions for Māori

This Arowhānui paper, part of Ngā Pae o te Māramatanga's (NPM's) *Te Arotahi* policy paper series, is an evidence synthesis designed for policy analysts. It draws on 20 years of NPM climate change research to inform decision-making that reflects te ao Māori (the Māori worldview) and supports flourishing Māori economies, environments, and communities. Māori investment in climate research benefits all New Zealanders, providing new scientific insights that contribute to stronger solutions that are uniquely effective for Aotearoa New Zealand.

Context

Climate change impacts Māori specifically due to historical, cultural, geographic and socioeconomic factors, and will exacerbate many of the stresses and inequities already faced by Māori. Climate initiatives and policies that take a one-size-fits-all approach will not adequately address the specific needs and contexts of Māori communities. Targeted, equity-based approaches in partnership with Māori communities are required.

Research has assessed the specific climate change risks facing whānau, hapū, iwi and Māori businesses. The report *He Huringa Āhuarangi, He Huringa Ao: A Changing Climate, A Changing World* (Awatere, 2021) shows that Māori wellbeing across four domains will be moderately impacted by 2050: he kura Taiao (living treasures); whakatipu rawa (Māori enterprise); he oranga tāngata (healthy people); ahurea Māori, tikanga Māori (Māori culture, values and principles).

He Kura Taiao (Living Treasures)

Risks

Changes in temperature, precipitation patterns, rising sea levels and extreme weather events pose threats to the ecological stability and sustainability of whenua and ngahere Māori. Biosecurity incursions from new species that find New Zealand's climate newly habitable is another area of deep vulnerability. These environmental challenges affect biodiversity, agriculture, water resources and cultural heritage sites. Risks are diverse and vary by location, meaning responses need to be localised.

Solutions

Nature-based solutions for adapting to climate change can create wider benefits and new opportunities. Land-based solutions, or 'green infrastructure', can absorb water and carbon, engage communities and improve wellbeing. Re-vegetating nature corridors to connect habitats ki uta ki tai (from mountains to the sea) supports native biodiversity and protects against erosion (Awatere, 2021).

Re-establishing forest in upper catchments can effectively attenuate floods in towns downstream, at less cost than hard infrastructure methods (Reid, 2025).

Coastal and riverine solutions, or 'blue infrastructure', can buffer storms, increase community resilience and protect wildlife habitat. Restoring wetlands and estuarine environments to buffer sea-level rise could support recreation, mahinga kai, and aquaculture alongside biodiversity and sequestration benefits (Awatere, 2023). Hinemoana Halo is one example of a Māori-led collaboration building carbon-plus credit markets for funding nature-based solutions (Conservation International Aotearoa, n.d.).

Case study: Rokohouia Delta

Modelling shows that reestablishing forests in the upper catchments of the Rokohouia Delta, encompassing the Christchurch area, could reduce floods by approximately 30% by 2060. This green infrastructure solution sequesters carbon and restores biodiversity, and could be less costly and more effective than grey infrastructure such as flood walls and detention basins (Reid, 2025).

Whakatipu Rawa (Māori Enterprise)

Risks

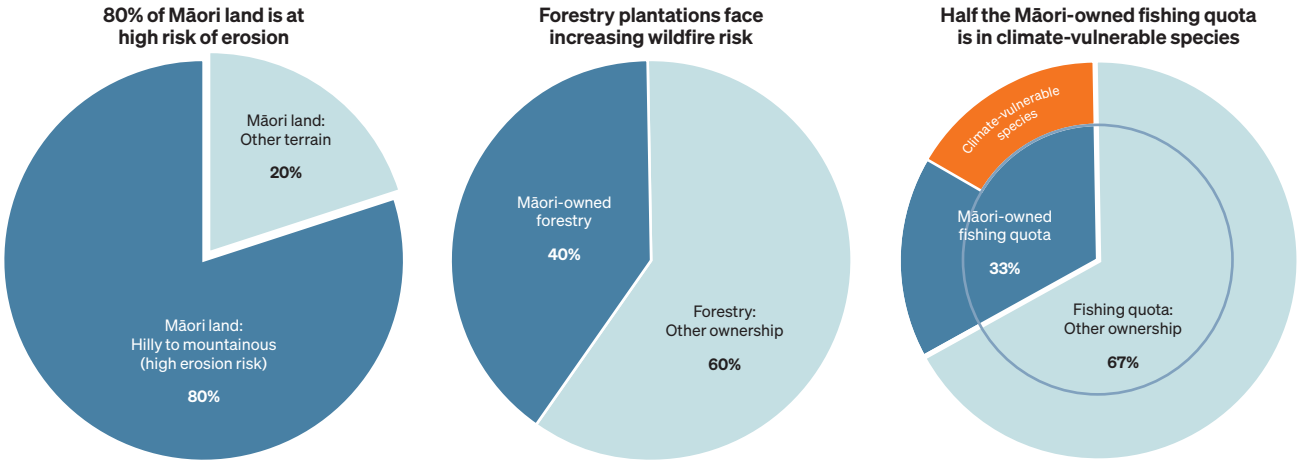
Māori have a high level of investment in climate sensitive sectors that are highly susceptible to climate change shifts. Around $40 billion in Māori assets across nearly 5000 Māori-owned businesses (BERL Economics, 2022) are in agriculture, forestry and fishing, exposing Māori capital and enterprise to the risks of changing climate conditions. This is likely to impact employment of over 21,000 Māori in the primary industries (BERL Economics, 2022), with cascading impacts on whānau, communities and marae.

Over 80% of Māori land is defined as hilly to mountainous and is already suffering from high rates of erosion, exacerbated by extreme rainfall events. Māori own nearly 40% of commercial forestry plantations, which face increasing wildfire risk. Māori own 33% of fisheries quota by volume, and nearly half of these investments are concentrated in species vulnerable to climate change. Changing drought occurrence is very likely to affect Māori forestry, farming, and horticulture operations, including production yields and product quality (Awatere, 2021).

Solutions

The Māori economy has grown substantially in recent years, from $17 billion in 2018 to $32 billion in 2023, with the asset base expanding from $69 billion to $126 billion over the same period (Ministry of Business, Innovation & Employment, 2021). The governance structures of Māori entities provide enduring foundations for this economic contribution. Adapting to climate change is critical to maintain this economic growth.

Māori awareness and concern regarding climate change is high, and climate change risk is key in land use decision-making. Māori are exploring diversified land use opportunities that adapt to climate change,



such as renewable energy, reducing and diversifying stock, and investigating the cultivation of food crops more suited to a changing climate.

Access to credible research, information and expertise, including mātauranga Māori, and effective engagement with whānau and landowners are necessary to support these land use decisions. Affordability is a barrier, especially for smaller Māori land blocks, but whenua Māori entities are showing great resolve by making changes as their balance sheets and capabilities allow (Bishara, 2025).

Case study: Whakatāwai Station

Prior to European colonisation, the Waiapu Valley was a thriving community with mosaics of different crops under cultivation. It is home to Whakatāwai Station, leased for pastoral grazing, a land-use deemed unsustainable by the committee of management due to a high proportion of erodible marginal land at further risk of erosion due to climate change, low biodiversity of plants and animals, and disconnection of the shareholders from their ancestral land. The He Waka Taurua framework offered a transformational way forward, guiding partnership between researchers and Whakatāwai Station shareholders. Weaving together science and mātauranga Māori resulted in a list of alternative land uses. A mixed afforestation scenario (mānuka and rongoā farming) was perceived to be the most desirable land use option, because the trustees recognised that having a diverse mix of plant species would generate the highest biodiversity, and there was potential to increase labour and revenue generated by honey and oil production from mānuka (Harcourt, 2022).

He Oranga Tāngata (Healthy People)

Risks

Climate change is already affecting the health of New Zealanders (Royal Society Te Apārangi, 2017) and this will intensify if climate change is allowed to continue unchecked. The evidence strongly suggests that health impacts will disproportionately affect Māori. Direct impacts to health include death, illness and injury due to heat waves and extreme weather events. Powerful indirect impacts on health include shifting patterns of infectious disease, air pollution, freshwater contamination, sea level rise causing displacement, and increasing food insecurity. The mental health impacts of climate change are likely to be significant and represent a poorly recognised burden on the health system, with disproportionate impacts on Māori and socioeconomically disadvantaged populations already facing high rates of mental illness and substance use disorders (Hailes, 2018).

Solutions

Collective Māori institutions (such as hapū and marae) and enduring tikanga (such as kaitiakitanga and manaakitanga) provide unique strengths for addressing the impacts of climate change on Māori health (Awatere, 2021). Solutions to climate change impacts on Māori health build on these strengths, enabling Māori communities to draw on local knowledge, maintain relationships, and share decision-making.

One example of a practical solution based on these foundations is the Haumanu Hauora policy framework (Masters-Awatere, 2023), co-designed by researchers with the Waikato, Lakes, and Bay of Plenty District Health Boards to guide health institutions in preparing for climate change risks and impacts. The framework enables internal and external Māori voices to contribute throughout the policy process, to strengthen health institution responsiveness to Māori health needs. The framework connects to existing iwi led climate change strategies grounded in collective institutions and tikanga.

Ahurea Māori, Tikanga Māori (Māori Culture, Values and Principles)

Risks

Māori communities are already feeling the social and cultural implications of climate change (Bishara, 2025). Cultural infrastructure is likely to be increasingly affected, where marae and urupā (cemeteries) are located on erosion-prone land or in low-lying coastal areas or river valleys under threat from inundation. Sea-level rise and displacement from coastal areas will have consequences for Māori identity, social cohesion, prosperity and wellbeing (Awatere, 2021; Bishara 2025). Managed retreat requires collaborative, community-led approaches, or

risks cultural dislocation.

Financial precarity amplifies exposure to shocks, and narrows access to risk-transfer tools such as insurance. Māori communities are further disadvantaged, because collective title and intergenerational ownership models are mismatched with commercial insurance requirements (e.g., individual titles, mortgage-linked policies). This results in under-insurance and slower recovery (Expert Working Group on Managed Retreat, 2023). Climate-related risks can therefore amplify socioeconomic inequalities, degrading the social cohesion that is critical for adaptation to climate change.

Solutions

Evidence supports moving away from one-size-fits-all policy toward localised approaches for climate change (Masters-Awatere, 2022) because environmental conditions, community infrastructure and capacity, and cultural contexts vary regionally, and historical inequities can create different baseline conditions. Iwi and hapū governance institutions are increasingly asserting their rangatiratanga (autonomy) to manage climate change risks and support the wellbeing of their communities.

Including te ao Māori expertise in climate decision-making supports balanced consideration of economic, environmental, social and cultural factors. Research has developed practical methods to support integration of Māori perspectives: a climate justice tool acknowledges progress while identifying opportunities for system transformation (Jones, 2024); and a disaster risk reduction framework helps officials translate standard disaster risk concepts into te ao Māori understandings (Rout, 2024).

Success Factors

Māori responses to climate change see the wellbeing of people and the environment as indivisible, reflected in the whakatauki 'Ka ora te whenua, ka ora te tāngata' (when the land is well, the people are well). One of the greatest opportunities for a paradigm shift is the growing influence of this Māori worldview (Ruru, 2018).

Kaitiakitanga is a powerful enabler of adaptation due to its objective of intergenerational care for the environment. Whakapapa, the principle of connectivity between people and the natural environment, is another important concept that guides hapū and iwi adaptation responsibilities to past, present and future generations (Lawrence, 2024). Cultural practices like rāhui regulate human activity when there is a risk to the oranga and sustainability of natural resources (Bishara, 2025).

Research underscores the importance of scientific processes and understandings, including those embedded in **mātauranga Māori**, to effectively address climate change (Bishara, 2025). Mātauranga Māori is a source of reliable, accurate, and precise place-based knowledge (Hikuroa, 2017), able to encapsulate the vastness of climate change in a number of ways. First, it provides a powerful conceptual framing of climate change as an imbalance in the relationship between humanity and the environment. Second, the use of patterns grounded in empirical observation means mātauranga Māori builds up insights into a whole, rather than in separate knowledge silos. Third, Māori intergenerational knowledge ensures that mātauranga Māori is appropriate for longitudinal observations over climate time scales (Rout, 2024).

Case study: Taniwha as historical record

Traditional knowledge systems include sophisticated risk assessment frameworks. For example, taniwha narratives are a form of historical record, and an example of mātauranga that has effectively communicated risk and kept Māori communities safe. One pūrākau regarding the Waitepuru stream (Matata, Bay of Plenty) refers to a lizard with a flicking tail. This narrative represents the movement of the low-lying stream section, carving out new channels after a flood, warning people not to build structures within reach of the flicking tail. The taniwha was considered when building three marae in Matata, and when two debris flows smashed into Matata in 2005, although a number of houses were destroyed, not one of the three marae was impacted (Hikuroa, 2017).

Recommended Policy Actions

Our 20 years of research has identified 15 actions to contribute to more effective and equitable climate policy, reduce climate change risks for Māori, and support mitigation, adaptation and recovery.

General Recommendations

1. **Include Māori in governance, policy and implementation to address barriers or gaps** in climate change planning and strengthen responses (Masters-Awatere, 2022). Māori tribal organisations have a critical role in defining and addressing climate risks and policy responses (Ruru, 2018). Te Tiriti o Waitangi obligations should be embedded in all policy decisions.
2. **Draw from all available information sources for responsible decision-making, including mātauranga Māori.** A mātauranga framework exists for assessing the use of mātauranga Māori in evidence-based decisions (Environmental Protection Authority, n.d.).
3. **Integrate te ao Māori expertise to inform adaptation planning,** to help whānau/hapū/iwi and Māori business. Clear adaptation pathways are required for multiple domains, and require funding and financing adaptation investments and compensating losses (Ruru, 2018).
4. **Consider the rights of future generations** with political commitment to addressing the risks of climate change to natural ecosystems and biodiversity (Awatere, 2021).
5. **Establish funding mechanisms that enable communities** to develop adaptation solutions, supporting local infrastructure investment, research capability, and monitoring systems that will make communities more resilient (Expert Working Group on Managed Retreat, 2023).

He Kura Taiao (Living Treasures)

6. **Monitor environmental change and societal impacts** to inform high-quality climate change decision-making under the Climate Change Response Act for mitigation and adaptation, and under resource management legislation. A less fragmented monitoring system is urgently required, and should include mātauranga Māori-informed and Te Tiriti-aligned indicators (Ruru, 2018).
7. Urgent work is needed to **better understand the social, cultural, wellbeing, and fiscal implications of climate change extremes** for Māori enterprises and communities (Awatere, 2021).
8. **Consistent emissions targets and environmental bottom lines** that aren't subject to election cycles are required to reduce uncertainty and diversion of resources into policy responses.
9. **Shift from exclusively grey infrastructure projects toward integrated blue-green-grey infrastructure**, supporting nature-based solutions that provide multiple benefits at less cost.

Whakatipu Rawa (Māori Enterprise)

10. **Involve Māori landowners in decision-making processes** to mitigate climate change risk on whenua Māori (Bishara, 2025).
11. **Create clear, actionable adaptation plans** for primary industries recognising locked-in warming scenarios and supporting proactive rather than reactive responses.
12. **Develop public insurance mechanisms for collective assets**, intergenerational properties and cultural assets that are inadequately covered by commercial insurance products. Public insurance models similar to EQC for flood protection are needed (Expert Working Group on Managed Retreat, 2023).

He Oranga Tāngata (Healthy People)

13. **A Māori-centred systems approach to climate change health policy** is vital to address Māori health vulnerabilities likely to be exacerbated by climate change (Masters-Awatere, 2022).

Ahurea Māori, Tikanga Māori (Māori Culture, Values and Principles)

14. **Recognise and resource the crucial role of Māori and marae** in community responses to emergencies (Stone, 2024)[18] with formal legislative inclusion of marae as critical infrastructure for disaster response, and ensure proactive funding for maintenance, equipment, and preparedness (Rout, 2024).
15. **Managed retreat policy must be collaborative and involve communities** in decision-making

processes. Communities will require support for cultural continuity, livelihoods and wellbeing, not just economic compensation, to avoid creating cultural dislocation and resulting inequities (Expert Working Group on Managed Retreat, 2023).

Ki te kore te tangata e manaaki i tōna taiao,
ka kore te tangata e whai oranga

If people do not take care of the environment,
we are not taking care of our own
health and wellbeing

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How to cite this paper

Ngā Pae o te Māramatanga. (2025, December). Climate change risks and solutions for Māori (Te Arotahi Series – Arowhānui Paper, No. 10). Ngā Pae o te Māramatanga. https://doi.org/10.20507/tearotahi.arowhanui.2025.010

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ABOUT NGĀ PAE O TE MĀRAMATANGA

Ngā Pae o te Māramatanga (NPM) is Aotearoa New Zealand's Māori Centre of Research Excellence (CoRE). Funded by the Tertiary Education Commission and hosted by Waipapa Taumata Rau | The University of Auckland, NPM has 21 partner research entities and a national network of Māori researchers spanning all major disciplinary fields.

NPM research is driven by a vision of creating the foundations for flourishing Māori futures and bringing about transformative change for our communities, our environs and Aotearoa. NPM is an important vehicle by which Aotearoa continues to be a key player in global Indigenous research and affairs.

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Arowhānui papers are evidence syntheses within Te Arotahi, Ngā Pae o te Māramatanga's policy paper series, drawing on multiple NPM research projects over time. They offer broad insights and recommendations to support transformative change in law, policy, and practice.

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ISSN: 2624-4462 (Print) | ISSN: 2624-4470 (Online) | DOI 10.20507/tearotahi.arowhanui.2025.010