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A KAUPAPA MĀORI DISASTER RISK REDUCTION FRAMEWORK

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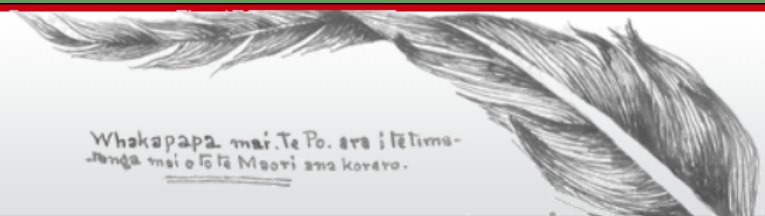

Ngāi Tahu Research Centre

EXECUTIVE SUMMARY

This report develops a kaupapa Māori disaster risk reduction (DRR) framework for the Whakahura Extreme Events and the Emergence of Climate Change Project. This project's main purpose is to use insights regarding extreme weather phenomena to guide effective and efficient adaptation decisions. The overarching aim of Whakahura is providing estimates of the changing costs of extreme weather events and the specific role of anthropogenic change in increasing these costs. This report is part of the Vision Mātauranga workstream of Whakahura. This workstream aims to understand extreme weather damage from a te ao Māori perspective, weaving contributions throughout the larger project. One critical step in the workstream is to ensure that outputs are aligned to the needs of iwi and hapū decision-makers with respect to managing assets (whenua, ngahere, awa, mahinga kai) and cultural infrastructure (e.g. marae, wāhi tapu). Matching tools to the aspirations of iwi and hapū is essential, given the increasing recognition of iwi and hapū as co-governance partners in emergency management.

To build the kaupapa Māori DRR framework the report takes a deeply historical approach in the first section. First, however, it outlines some of the key terminology used, specifically hazards versus disasters, vulnerability and risk, reduction and resilience, response and recovery, and climate versus weather. These provide a shared understanding of the core concepts of DRR, framing the rest of the report. After this, the report explains the traditional Māori framework for understanding, predicting, recording, communicating, and planning weather and climate. To do this, it details te ao Māori, or the Māori worldview, noting that it is holistic, relational, cyclical, and balanced. Outlining the Māori worldview is critical as it provides a framework for understanding what matters and is valued from a Māori perspective. It then describes the cosmic forces of mauri, tapu, and mana and outlines mātauranga Māori (Māori knowledge) as well as kauapapa and tikanga. After this the report examines traditional Māori climate and weather cosmology, exploring the role of the atua, the responsibilities of kaitiaki, and the importance of mātauranga as both a source of understanding and as a repository for knowledge. The report notes the central role of atua in climate and weather, explaining that the relationships between atua are actually the way to describe the energy relationships between the energy sources that generate climate and weather, noting that mana of the atua is the source of the climate in the Earth's atmosphere.

The report then uses the information outlined in the first section, focusing on contemporary Māori climate and weather in terms of how it has been understood, predicted, recorded, communicated,

and planned for in recent history. It examines the 'cosmological continuity' of mātauranga Māori and the Māori worldview, drawing on the environmental management plans (EMPs) iwi have developed as part of their growing co-governance responsibility. Alongside iwi EMPs, there are a range of groups working towards understanding, recording, communicating, and planning for climate change and extreme weather. This includes Māori researchers in Crown Research Institutes, academic institutions, and collaborative projects that bring together researchers. After showing that the traditional ways of viewing climate and weather, in terms of holistic, relational, cyclical, and balance, and of the roles of the cosmic forces, still remain strong, the report then moves onto more specific components of this understanding. These are grouped into two overarching categories, natural landscapes and cultural infrastructure. Here the ways in which climate and weather impacts and concerns relate to te taiao, taonga, mahinga kai, wahi tapu, marae, and communities is explored.

The next section outlines the Sendai Framework. First it critically examines the dominant physicalist paradigm that shapes most DRR thinking. It then provides a brief description of the origin of the Sendai Framework before moving into a more detailed analysis of what the framework is in terms of its key outcomes and goals, its global targets, and the priorities of the framework. It focuses in on possible Māori perspectives of these various components as well as noting the specific references made to indigenous people throughout the framework. It then details the work done to date on implementing the framework as well as Aotearoa New Zealand's own DRR strategy.

In the final main section, the kaupapa Māori DRR framework is outline. Here it is noted that the Māori view is more holistic, relational, and cyclical, emphasising the need for balance. In some ways, it collapses the difference between hazard and disaster, though there is still some room for nuanced differentiation. The report also explains how the cosmic forces of mana and mauri provide a powerful yet relatively simple way of understanding and, with more development, measuring risk and vulnerability. It then details how reduction is achieved through mātauranga, whakapapa, kaupapa, community, and tikanga, which provide the knowledge, connections, ethics, scale, and behaviours for reduction. Likewise, it notes that resilience can be enhanced through strengthening community, care, capitals, culture, and control, empowering communities to take the lead on reinforcing their capacity to withstand hazards.

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INTRODUCTION

Māori, like other indigenous peoples, developed a worldview – te ao Māori – and knowledge system – mātauranga Māori – that were well calibrated to life in their lands, living in synchronisation with nature's rhythms while managing the natural stochastic ruptures. The land their ancestors brought them to was a tempestuous place, located at the hinge of the southern hemisphere's weather systems and positioned on the Pacific's ring of fire, it was a land of wild winds, capricious currents, and seismic shifts. As part of this wider knowledge system, Māori established an analogue of a disaster risk reduction (DRR) framework. This 'framework' would be deployed and refined over centuries before contact and colonisation in the late 18th and early 19th centuries would see it largely supplaced by settlers, who also set about radically changing the land itself. Two centuries on from these dramatic changes, Māori have fought for and won the right to reassert their mana (authority) in the DRR arena both independently and in collaboration with the Crown (New Zealand state), just as the wider impacts from the industrialisation of the world are changing the climate, making this a more important yet complex endeavour. This report aims to provide a kaupapa (first principles) Māori framework for this process for the Whakahura Extreme Events and the Emergence of Climate Change Project, one that is framed by te ao Māori and utilises mātauranga Māori, but is also complementary to broader national and international disaster thinking and practice.

The key purpose of the Whakahura Extreme Events and the Emergence of Climate Change Project is to use insights regarding extreme weather phenomena to guide effective and efficient adaptation decisions. Extreme events have a wide array of flow-on effects for insurance and financial institutions, economic development, long-term community resilience, and spatial planning. The overarching aim of Whakahura is providing estimates of the changing costs of extreme weather events and the specific role of anthropogenic change in increasing these costs.This report is part of the Vision Mātauranga workstream of the Whakahura Extreme Events and the Emergence of Climate Change Project. The Vision Mātauranga workstream aims to understand extreme weather damage from a te ao Māori perspective, weaving contributions throughout the larger project. One critical step in the workstream is to ensure that outputs are aligned to the needs of iwi and hapū decision-makers with respect to managing assets (whenua, ngahere, awa, mahinga kai) and cultural infrastructure (e.g. marae, wāhi tapu). Matching tools to the aspirations of iwi and hapū is essential, given the increasing recognition of iwi and hapū as co-governance partners in emergency management.

This report aims to help guide the alignment between iwi/hapū and project outputs and tools, developing a kaupapa Māori framework for understanding the risks from extreme weather events. It does so by first outlining some of the key concepts in the disaster risk reduction (DRR) lexicon. Then it examines te ao Māori (the Māori worldview) including the related concepts of mauri, hau, tapu, and mana, as well as mātauranga Māori, kaupapa and tikanga. After this it details Māori climate and weather cosmology, focusing on the traditional conceptions and providing insights into the role of atua, kaitiakitanga, and detailing key mātauranga including the use of tohu. The next section explores contemporary Māori climate and weather perspectives, initially outlining the general cosmological constants from the traditional perspective, before examining how Māori view the impacts of climate change and extreme weather on specific 'cultural infrastructure', including both te taiao and built infrastructure. It the outlines the Sendai Framework for Disaster Risk Reduction, the international standard for reducing disaster risk to assets and infrastructure. Here the focus is on providing a general description, examining how indigenous people are referred to in the Framework, and offering a Māori perspective on some of the key components of the Framework. Finally, a kaupapa Māori framework is provided, amalgamating the preceding sections to describe how hazards, disasters, risk, reduction, and resilience can be understood from a Māori perspective.

TERMINOLOGY

There are a number of terminological concept categories that need to be delineated and defined: hazard and disaster; vulnerability and risk; reduction and resilience, response and recovery; and, climate and weather. Generally speaking, each of these sets are closely related concepts that nevertheless have important differences and relationships with each other.

HAZARD AND DISASTER

Hazard and disaster can be understood as having a cause and effect relationship in the DRR lexicon. A **hazard** is **any phenomena** that has the **potential to cause destruction** to **life and property**.[1] Hazards can be either natural or manmade. Conversely **disasters are not natural events**. "They are endogenous to society and disaster risk arises when hazards interact with the physical, social, economic, and environmental vulnerabilities and exposure of populations."[2]

A 'disaster' is when a hazard impacts people and the things they value. It is subjectively determined.

VULNERABILITY AND RISK

The terms vulnerability and risk also share a close relationship in the DRR vocabulary. Vulnerability refers to the **characteristics and circumstances** of a community or country that make it **susceptible to the damaging effects of a hazard**.[3] **Risk** is understood as **the probability of harmful consequences**, or expected losses, resulting from **interactions between natural or human-induced hazards and vulnerable conditions**.[4]

While vulnerability indicates the exposed areas and potential for damage from a hazard, risk refers to the odds that a hazard will impact vulnerabilities.

REDUCTION AND RESILIENCE

Reduction is the third pillar of DRR. In broad terms, reduction involves **the actions taken before a disaster to limit the impacts**. "Hazard and risk information may be used to inform a broad range of activities to reduce risk, from improving building codes and designing risk reduction measures (such as flood and storm surge protection), to carrying out macro-level assessments of the risks to different types of buildings (for prioritizing investment in reconstruction and retrofitting, for example)."[5]

The concept of resilience has emerged more recently in DRR discourse.[6] It can be understood as the intentionally-developed **adaptive or transformative capacity** of a community or country to **address the internal drivers of vulnerability and risk**.[7]

RESPONSE, AND RECOVERY

While the terms response and recovery are not commonly associated with disaster risk reduction (DRR) framing, they do feature in discussions regarding disaster resilience and are more typically associated with post-event activities.[8] Response refers to the actions taken immediately before, during, or directly after a disaster to save lives and protect property.[9] Recovery on the other hand is the coordinated efforts and processes to bring about the immediate, medium, and long term regeneration of a community and country after a disaster.[10]

Response is the short-term activity to reduce the impacts of a disaster, while recovery is the longer-term actions intended to restore a community or country after a disaster.

CLIMATE AND WEATHER

The difference between climate and weather has become increasingly contentious as one is confused or conflated with the other by climate change deniers. Put simply, **weather reflects short-term conditions** of the **atmosphere** while **climate** is the **average daily weather** for an **extended period of time** at a **certain location.**[11] As NASA explains, the "difference between weather and climate is a measure of time."[12]

Climate is what you expect, weather is what you get.

TRADITIONAL MĀORI FRAMEWORK

TE AO MĀORI – THE MĀORI WORLDVIEW

A worldview is the **primary lens** through which **people understand reality.** It is "the fundamental cognitive orientation of a society, subgroup, or even an individual."[13] Sometimes technically referred to as an ontology, worldviews provide the base 'model' of a person's understanding of what the world is and why it is that way. Worldviews are **a set of presuppositions that people hold about how their world works, what rules it runs on, and what is important.** These presuppositions range from basic understandings of sensory experiences through to more central beliefs – often referred to as axioms, principles, or postulates – that guide thought and behaviour.

Outlining the Māori worldview or **te ao Māori** is critical as it **provides a framework for understanding what matters and is valued from a Māori perspective**. Te ao Māori has four fundamental presuppositions: that life, existence, and reality can best be understood as **holistic, relational, cyclical, and balanced**.[14] These foundational beliefs provide the key framework through which reality is interpreted and understood and ultimately inform what is viewed as important and why it is seen as important.

Holistic

There are two interrelated aspects of holism. First, Māori do not see humans as separate or distinct from the environment, rather they view **humans as embedded within the nonhuman community of nature**, living with all the flora and fauna as well as the wider ecosystems in a unified ecologies of beings. As Nepia Pohuhu explained in the 19th century:

> "'All things unfold their nature (tupu), live (ora), have form (ahua), whether trees, stones, birds, reptiles, fish, quadrupeds or human beings."[15]

Second, the Māori spiritual realm is not separate or distinct either but instead **the spiritual world overlaps and entwines with the physical world**, as Manuka Hēnare explains: Māori "conceive of the universe as a two-world system in which the material proceeds from and interacts with the

spiritual."[16] O'Regan makes an important point regarding the way spirituality infused everything, explaining that:

> "It was through these atua [gods] that our old people related to the physical world. The physical world was those atua ... water was Tangaroa [God of the Sea]. They were not silly, they knew water was wet and all that, but they also knew it as Tangaroa. There was a unity in their perceptions."[17]

He also explains how seeing reality through a spiritual lens did not limit practical applications:

> "This does not mean that because my river represents an atua they should not be touched or used. One of the more endearing characteristics of Maori is their capacity to tie the practical together with their theological beliefs."[18]

Māori were not just able to perceive something as having two natures simultaneously but were also able to marry the spiritual with the pragmatic – they could both revere and respect nature while also utilizing it.

Relational

Māori also view relationships as critically important and mutually-shaping. This is embodied in the concept of **whakapapa**. Often translated as 'genealogy', whakapapa does not just trace ancestry, it is the 'Māori view of reality'.[19] **Whakapapa communicates the interdependence of all things, and the reciprocal relationships that exist between people and the natural world**. These relationships go beyond creating a sense of kinship, they are understood to be mutually shaping. From the way rivers shape the land and the land a river, to the impact pets have on their family and the impact a family has on a pet, relationships are understood to be central to Māori. **Whakapapa expresses the interdependence of all things and the reciprocal relationships that exist between humans and nature**.

Cyclical

For Māori "time scale . . . cycles continuously from the beginning to an end and back again."[20] This is reflected in the central importance of the puna, the spring motif, whose spiral dynamic reflects the **movement forward and returning back to the core**. The te reo Māori terms for ancestors – tūpuna – and grandchildren – mokopuna – convey how "we are each a reflection of our past and our future is a reflection of us—it is the unified flow of creation."[21] The term for the past – mua – also means in front as Māori see the past as they move forward, while the word for

the future – muri – means behind "because it cannot be seen."[22] **Māori view time as cyclical with the past as the guiding context for the future.**

Balanced

The Māori worldview, as Garth Harmsworth and Shaun Awatere explain, "acknowledges a natural order to the universe, **a balance or equilibrium**."[23] Manuka Hēnare expands on this, explaining that "people and the natural world are in a state of harmony, or balanced equilibrium towards each other."[24] Māori also understand that life is an ongoing series of interactions and processes that mean that **balance can never permanently achieved but rather only temporarily acquired**. Balance is a guiding belief of Māori reality, with a focus on "working toward equilibrium . . . [even though] this is always temporary and contingent."[25] Māori believe maintaining a **dynamic equilibrium** is critically important.

These four foundational beliefs provide the core framework within which a discussion of Māori understanding of climate and weather can be explained and understood. First, however, three of the key 'cosmic forces' that breathe life into te ao Māori, whilst simultaneously providing a guiding framework for the four foundational beliefs, need to be briefly outlined.

COSMIC FORCES

This section will explain the four core 'cosmic forces', so called because they can ultimately be traced back to the atua (gods). While the four foundational beliefs frame how reality is understood, the cosmic forces provide vitality and invigorate creation, but they also inform and constrain interactions. These three forces – mauri, tapu, mana – can be understood respectively as the **life essence**, the **sacredness of this essence**, and the **manifestation of the life essence and sacredness.**

Mauri

All beings within the cosmic family are understood to be **animated by mauri**, which can be translated as **'life essence'**. Mauri can also be more pragmatically understood as an entity's "life supporting capacity."[26] Mauri is intrinsically connected to whakapapa, as "all things are considered to have a mauri (life force) and to be living, and to have a genealogical relationship with each

other."[27] Mauri can be positively or negatively impacted by interactions between creatures, as John Patterson notes:

> "The mauri of all creatures are interconnected. If one creature suffers unnecessarily, that causes unnecessary harm to many others. After all, all creatures are regarded as kin, related through the whakapapa or genealogical tables that trace all beings back to Papa and Rangi, Earth and Sky. The life force or mauri of each creature descends through these genealogical chains, and so is related to that of all other creatures."[28]

Importantly, mauri is an **interactive life force** that is enhanced or depleted through relationships. There are four key forms of relationships that determine mauri: symbiotic (mutually enhancing mauri); mutualistic (mutually maintaining mauri); commensalistic (not affecting each other's mauri); and, parasitic (one body diminishing the mauri of another).[29] Importantly, the level of mauri an entity exhibits can to some extent be measured, but other elements remain immeasurable:

> "The mauri of a river comes not just from the level and diversity of fish it produces, or its water purity, but also the emotional subjective experience of catching the fish, drinking the water, the terror of it in flood, and the gentle sound of it lapping. The sum of these many expressions of the river are its mauri—its vibrancy—that when tacitly experienced enable it to be sensed as a river."[30]

Mauri is **critically important for understanding Māori relationships with the natural world**.

Tapu

Tapu means **sacred, holy, sanctified, pertaining to the gods**, with Peter Buck emphasising the last component as fundamental.[31] As Pardo and colleagues explain:

> "[T]he ability of cosmic processes to give, but also, to destroy has been widely recognized by Māori. There, the concept of *Tapu* arises. It refers to the sacred and also to the forbidden places, activities, and things, and it is therefore used as a protective measure that establishes ethical and practical norms, also imposing a social control. *Tapu* is the Māori system to cultivate appreciation and respect for another human being, another form of life, and any life force."[32]

It is a **cosmic power imbued in all things at the time of creation** by the atua and denotes the intersection between the human and the divine.[33] "Philosophically", Manuka Hēnare explains, "*tapu* is linked to the notion of *mana*… [expressing] the understanding that once a thing is, it has within itself a real potency, *mana*."[34] A core component of tapu is the understanding that "the world is not ours."[35] Animals, plants, and ecosystems are tapu and this tapu needs to be **treated**

with respect, awe and sometimes fear, but it depends on the relationship of one's own tapu to the tapu belonging to the other persons and life systems in the environment.[36]

Mana

Mana is usually translated as 'power' or 'prestige' but can more properly be understood as referring to **respect, acquired knowledge, control, intrinsic value, and influence**. Te Ahukaramū Charles Royal describes mana as a "quality, energy or consciousness in the world which can be harnessed and expressed in human activities through acts of generosity and wisdom".[37] Mana has four sources: mana atua is the divine power, from a universal source; mana tūpuna is an inherited power, from a historical (ancestral) source; mana whenua is a terrestrial power, from a localised source; and, mana tangata is personal power, from an inner source.[38] While the first three are relatively fixed, the fourth form is more fluid and is the key to an individual's influence. Mana is closely related to tapu, in its "primary meaning, tapu expresses the understanding that once a thing is, it has within itself a real potency, mana."[39] "All things possess tapu on their creation, and the source of the tapu comes from the mana (power/authority) of the atua… All things too have mana on their creation, however unlike tapu it is a power that is realised over time therefore, 'the child who is of chiefly line has not yet the mana, the power, of a chief, but has already the tapu of a chief'."[40] Mana is the outward sign of tapu.

The four foundational beliefs and three cosmic forces are critical to understanding Māori insights into climate and weather, the insights themselves are part of a wider body of understanding called mātauranga Māori, which must be described next.

MĀTAURANGA MĀORI

Mātauranga Māori is often simply described as 'Māori knowledge' though this does not do justice to the totality of the concept. "Mātauranga Māori", Hone Sadler outlines, "is a knowledge tradition or an epistemology."[41] It is both "a method for generating knowledge, and all of the knowledge generated according to that method."[42] Mātauranga Maori **encapsulates, embodies, and expresses the Māori worldview, values, culture and cultural practice, and perspectives**.[43] Mātauranga Māori and te ao Māori are two sides of the same coin, with the latter detailing *what kind of things exist* (ontology) and the former *what we can know and how we can know it* (epistemology).

Critically, mātauranga Māori is **an adaptive and flexible method of exploring and understanding the world around us**. Mātauranga Māori was "taken to Aotearoa by the ancestors of the present day Māori where it was further developed by adapting to meet the people's needs as well as to be compatible with the change in environment that they were encountering."[44]

> "Mātauranga embraces intergenerational continuity. Drawing on the knowledge of ancestors, it allows contributions to knowledge in the present to be passed on to descendants in the future. It can therefore be dynamic, regenerative, and capable of evolving to respond to modern day situations."[45]

Mātauranga can be understood as:

> "[A] cumulative body of knowledge, practice and belief that has evolved through an adaptive processes. This knowledge is not just "tradititional' [sic] but also contemporary, representing the totality of experiences of generations of Māori in New Zealand. Information and knowledge includes observing and recording changes in the physical environment, naming and classifying areas of risk, and predicting environmental disturbances."[46]

Māori have several methodologies and tools for analysing phenomena so that a better understanding can be gained.[47] Whakapapa is **the key cognitive tool for exploring and critically analysing new phenomena**. **Whakapapa** does not just trace people's ancestry, it is **the Māori view of reality**.[48] Māori do not see their 'cosmological family' in an undifferentiated way, similar to a human family. Instead, whakapapa is a complex genealogical narrative that identifies and classifies everything across creation and time.[49] It has been referred to by Māori academics as a 'mental construct' and a 'taxonomic framework' because of this capacity to identify and classify.[50] Mere Roberts and Peter Wills have referred to whakapapa as a "taxonomy of the universe."[51] It is "an analytical tool used to understand phenomena and their connections and relationships to other phenomena, locating phenomena in space and time."[52] As Mere Roberts explains:

> "In common with other oral societies, New Zealand Maori constructed mental maps by means of which they made sense of their phenomenological world. Their cognitive template, called whakapapa, consists of a genealogical framework upon which spiritual, spatial, temporal and biophysical information about a particular place is located."[53]

As a taxonomic framework whakapapa provides information on the relational dynamics amongst people – between individual as well as different members of a whānau, hapū, and iwi – and it also provides information about the natural world – offering practical knowledge about flora and fauna such as life cycles, habitats, harvesting and growing methods.[54] Whakapapa provides a map of all

nature and the relationships between and within the natural world, allowing Māori to see themselves in a web of kinship. Whakapapa has a clear analogue in phylogeny and taxonomy, and can be seen to express the shared DNA of all living things in a narrative form. Within this taxonomic framework, as Hone Sadler explains:

> "A Rangahau approach is one of searching for connectiveness, Whanaungatanga looking for relationships that connect all phenomena whether animate or inanimate. Identifying its roots, finding out how it came into existence. Through this process it became much more palatable for Māori to be reconciled to and become one with all phenomena that they came in contact with."[55]

The insights and information Māori gained through interpreting reality through whakakapa was generally codified through oral forms. Some narrative forms include moteatea (chants, poems), whaikorero (oratory, speechmaking), maramataka (calendar), waiata (songs), pepeha (quotations), whakataukī/whakatauāki (proverbs), whakapapa (genealogies) and pūrākau (stories) – each with their own categories, style, complex patterns and characteristics.[56] The oral codification is presented in a **narrative heuristic**. As Manuka Hēnare explains:

> "[The Māori] myth and legends are neither fables nor fireside stories; rather they are deliberate constructs employed by the ancient seers and sages to encapsulate and condense their views into easily assimilated forms of the world, of ultimate reality, and of the relationship between Creator, the universe and humanity. Worldview, then, lies at the heart of Māori culture, touching, interacting with, and strongly influencing every aspect of the culture".[57]

Ranginui Walker outlines how whakapapa is "a comprehensible paradigm of reality, capable of being stored in the human mind and transmitted orally from one generation to the next."[58] It is a conceptual model of reality that is understood and expressed through stories that help Māori comprehend and communicate their sense of 'being in the world'.[59] Framed through Latour's 'science in the making' language, "Māori knowledge, values and cultural practices are interrelated and co-constitutive actants that shape tangata whenua behaviours and actions at the iwi (tribal0, hapū (community), whānau (family) and individual levels to ensure community well-being. Collectively informed by experience, these cultural attributes, create unfinalised assemblages which operate as highly adaptable technologies to facilitate coping with daily challenges, including disasters. Within the disaster context these cultural technologies4 constitute an emergency response framework (see Figure 1) that may be adapted and applied to manage disaster-related risks, mitigate the social and environmental impacts of disasters as well as facilitate community

recovery and sustainability."[60] Thus, **Māori knowledge about climate and weather events and patterns is stored and expressed in narratives with characters and storylines that help encode and inform.** The "personification of natural phenomena… combined with metaphorical language enabled Maori to clothe explanations and meanings in poetic imagery."[61]

KAUPAPAPA AND TIKANGA

Any worldview generates a set of **operating principles**, from which stem rules and methods for decision making and action-taking, or **guiding practices**. For Māori these are **kaupapa** and **tikanga**, respectively, which emerge out of te ao Māori and mātauranga Māori. Kaupapa refers to principles and ideas that act as a **base or foundation for action** – they are ground rules, first principles and general principles. Tikanga can be described as method, plan, resource, custom but more generally is understood to be the '**right way of doing things**'.[62]

As Māori Marsden explains, kaupapa and tikanga "are juxtaposed and interconnected in Māori thinking."[63] Kaupapa is the **foundational source** of guidance with tikanga as the way in which these **rules and principles are put into action**. While kaupapa are foundational, tikanga "have been handed down through many generations and accepted as a reliable and appropriate way of achieving and fulfilling certain objectives and goals."[64]

TRADITIONAL MĀORI CLIMATE AND WEATHER COSMOLOGY

This section will build on the understandings of te ao Māori, mātauranga Māori, the cosmic forces, and the binding concept of whakapapa, in particular, to outline Māori climate and weather cosmology. This section provides a 'traditional' view of Māori understandings and has an overview perspective, in the following section Māori insights into climate and weather will be both contemporised and taken to 'ground level' in terms of specifics and details.

Atua

An understanding of the **atua** is critical as a number of other key climatic cosmology concepts emerge from these plentiful and ever-present small 'g' gods. Atua is usually translated as 'god' though they can be better understood as the **super/natural primary ancestors who personify**

particular environmental domains. Atua are "the progenitors and personifications of all known phenomena, both living and non-living."[65] They "act as both spiritual and spatially defined signposts of the environmental realm or territory within which the information coded in the whakapapa is located."[66] Māori "conceive of the universe as a two-world system in which the material proceeds from and interacts with the spiritual. Primacy, however, rests in the spiritual sphere."[67] Critically, there is "no distinction or break in this cosmogony, and hence in the whakapapa between supernatural and natural. Both are part of a unified whole."[68]

The Māori worldview is that all the elements of the natural world – the land, seas, sky, forests and birds, winds, rain and storms, volcanic activity, as well as people – are descended from the atua.[69] The "**whanau relations between the gods are actually the way to describe the energy relationships [dynamism] between the energy sources**."[70] Scientifically speaking, the Earth's climate is driven by energy exchanges, atua can be understood as the personified forms of these energies and the narratives that detail their interactions provide insights into dynamism between the different energy sources. The stories about the atua cover their origins, temperaments, and life histories, the atua and the whakapapa that leads from them to humans and the natural world around them provide a comprehensive understanding of reality.[71] Of course, this information is encoded in a way that is foreign to the reductionist scientific worldview and contains 'narrative tropes', e.g. the personification of elements and environmental systems, that are considered unscientific by most scientists. However, when understood as **a narrative heuristic** the **utility** and proximate **accuracy** of the **Māori conceptual model of reality** is clear.

In Māori cosmology, reality emerged out of **Te Kore or the void** – with some tribes locating a supreme atua called Io in Te Kore. Te Kore "means chaos – a state which has always existed and which contains 'unlimited potential for being'."[72] From Te Kore arose **Te Po or the night realm**. These transitions represent something deeply embedded in the Māori cosmology. Māori "**perceived the universe as a 'process'**, comprised of a series of interconnected realms separated by aeons of time from which there eventually emerged the natural world."[73] A single being came into existence in Te Po, who was then separated into two primal atua, **Papatūānuku** (Papa), the **Earth Mother**, and **Ranganui** (Rangi), the **Sky Father**. Papa and Rangi had numerous children who each personify and empower certain elements. The children of Papa and Rangi imbue their realms with the mauri generated from Te Kore. James Patterson explains that:

> "[T]he mauri of all creatures are interconnected. If one creature suffers unnecessarily, that causes unnecessary harm to many others. After all, all creatures are regarded as kin, related through the whakapapa or genealogical tables that trace all beings back to Papa and Rangi, Earth and Sky. The

> life force or mauri of each creature descends through these genealogical chains, and so is related to that of all other creatures."[74]

Papa and Rangi were once too close, cloaking their children in darkness and inhibiting their vitality; some of their children wanted to push them apart while others opposed this separation. Eventually they were pushed apart, bringing forth **te ao Marama** or the **world of light** and in the process all the siblings received dominion over their environmental realms.[75] The "sundering of the parents and the concomitant burst of light into the cosmos was the spark that started life for plants, fish, birds and people."[76] This origin story shares obvious parallels with the big bang theory, both involving the creation of the universe from a void with both an expansion and the generation of light.[77] This **conflict between the siblings** is "the **basis of the ongoing environmental struggle**. The rationale for the Earth's climatic elements and weather patterns are based on the Maori understanding of these relationships and the perpetual sibling conflict that exists."[78] The **mana of the atua** is the **source of the climate** in the Earth's atmosphere.[79]

Atua are the elemental origin of the weather and climate and "[c]hanges in weather and climate are considered the result of disagreement among the offspring over the separation."[80] All atua are responsible for 'the climate' in some way, though some are considered more influential. The **atua of the forest, Tane Mahuta**, who pushed his parents apart is understood as **the energy source responsible for the light, heat, fertility, growth and creation of all life**.[81] **Tawhirimatea, atua of weather**, who opposed his parents' severance, **produces storms, rain, lightning, thunder, hurricanes, hail stones and tidal waves** as a sign of his displeasure at the initial pushing apart as well as Rangi's depletion by humanity. The **Ra Ririki or stars** are also understood to **help control weather conditions and plant life**, with Rehua (Canopus) responsible for summer heat, drought and the parching of Papa.[82]

The narratives are not just interesting stories but provide a guide to natural resource use and have a predictive capacity for climate and weather, which is why indigenous knowledge is often referred to as 'environmental knowledge'. Many of the narratives provide key information about critical animal and plant lifecycles that help inform hunting, gathering and horticulture. Likewise, **the atua narratives help with weather and climatic predictions**, often with these species' lifecycles providing some of the critical information to inform these predictions.[83] Māori had numerous narrative taxonomies that combined astronomy, biological lifecycles, and cloud and wind patterns, amongst others, to predict the weather, determine the shift in seasons and map climatic changes, with these narratives embedded into the environment through places names and interpreted using stories that connect them into meaningful and memorable narrative heuristics.[84] As Apanui

Skipper, an expert in Māori weather prediction, explains, Māori "weather forecasting once could predict flooding months ahead with such accuracy that it makes European meteorology look error-prone. But since Europeans arrived, much of that knowledge has been lost, along with many indicators – such as trees that have been cut down."[85]

The mauri of the atua was strongest when the world was **utu** or in balance, before the natural processes where interfered with by humanity, who are influenced by the atua Aitua, the destructive nature of humanity, and Tu Mata Uenga, the warlike nature of humanity.[86] Balance in this sense does not mean harmonious, but rather that hazards were understood as a natural part of life and in some ways could be framed as positives:

> "Floods were also perceived as important ways to cleanse and maintain balance within the taiao (environment). Indeed, Māori recognised that floodwaters distributed both wai (water) and kōtai (alluvial soil) across their whenua (land), which improved the fertility of their soils, and ensured that their cultivations would be more productive in the next growing season. Accordingly, flooding was situated as part of normal functioning within social-ecological systems, which were premised on reciprocal and enduring kin-based relationships between Māori and more-than-human-beings (rivers, lands, seas, plants, animals, supernatural beings, gods) within their taiao."[87]

This understanding of balance between humans and nature was also underpinned by the long-term view Māori took, as Meg Parsons and Karen Fisher continue:

> "Rather than thinking about adopting a short-term (days, months, or years) view of environmental management and the material security of homes and livelihoods, Māori (paralleling many Indigenous groups) adopted a longer-term framing. Hence, even when flooding caused damage and loss for Māori (of lives, of 30 settlements, and cultivations), it was not necessarily deemed a disaster or emergency event due to the benefits that Māori and their more-than-human kin (both current and future generations) derived from the floodwaters."[88]

Critically, in Māori cosmology it is understood that "**human actions can affect climate and that all things in the environment (past, present and future) have a distinct meaning and relevance**."[89] Climate change damages the utu of the atua's mauri in a range of ways. "In relation to climate change", Anne Salmond explains, there are "an array of symptoms that show interlinked living systems moving away from a state of *ora* (health, well-being and abundance) towards a state of *mate* (ill-health, dysfunction, degradation and failure)."[90] Salmond continues by showing how the causes and symptoms are related:

> "Intensive agriculture that over-tills or over-grazes the land, for example, while using many imported inputs (diesel for machinery, chemical sprays and palm kernels as feed, in the case of intensive dairying) may also degrade aquifers, rivers, estuaries and harbours, contribute to biodiversity losses through mono-cropping and deforestation, and drive climate change through animal methane emissions, deforestation and the use of fossil fuels."[91]

Atmospheric pollution disturbs the balance and depletes mauri, forcing the atua to absorb the excess emissions. Several atua are most particularly impacted by a build-up of atmospheric heat, including Rangi Whakataka, the Earth's atmosphere, and Tiritiri o Matarangi, the pole of light that supports Rangi Whakataka. Rangi Whakataka protects Papatūānuku and her children from the damaging heat of Tama Nui te Ra, the sun, and depletion of Rangi Whakataka exposes them to the greenhouse effect. The Hau atua, who are responsible for air, oxygen and gentle breezes, are also depleted by the increased heat in the Earth's atmosphere. Rising sea levels caused by global warming will interfere with the ability of the atua responsible for protecting Papa, Kiwa Mata Papango and Kiwa Parauri, to prevent the erosion of coastal lands. Even the loss of a single taonga species is critical. The loss of the kauri could have a dramatic impact upon the Māori culture as the "kauri is a manifestation of Tane Mahuta (the atua, or god of the Forest). It was Tane who was responsible for prising apart Ranginui (the sky father) and Papatuanuku (the earth mother) hence allowing the profusion of life within the biosphere. The loss or change to kauri could cause immeasurable cultural and spiritual damage to Māori."[92]

Cosmologically speaking, the damage of climate change is a disturbance of the utu of mauri caused by humanity, which in turn sees the atua move from a state of ora to a state of mate.

Kaitiakitanga

Humans are direct descendants of the atua, imbued with mauri at the time of their conception by hau ora. They are bound together by whakapapa and this generates **whanaungatanga**. While often translated as 'kinship', whanaungatanga does not refer only to family ties between living people, but rather to a much broader web of relationships between people (living and dead), land, water, flora and fauna, and the spiritual world of atua. Humans are a part of and belong to the Earth, which nurtures human existence. Humanity has an obligation to nurture the mauri of the atua, just as the atua nurture the mauri of humanity. "Any kinship bond implies a set of reciprocal obligations, and these are encompassed in the concept of *kaitiakitanga* - the obligation to nurture and provide care."[93] Māori need to act as the **kaitiaki** or guardians because they share kinship with the atua and because atua sustain humanity. Kaitiakitanga is reciprocal, "[o]n the metaphysical level it refers to the various ways in which atua are manifest to support the present generation; each atua being seen to have its own area of concern. On the practical level, the practice of kaitiakitanga requires the Manawhenua ['authority' over the land] linked with resources in a particular locality, to mirror the kaitiakitanga of atua for the good of the entire descent group."[94] Natural resources are a **taonga** or treasure given to humanity, and the other flora and fauna. As Manuka Henare

explains, "[w]ith the idea of land and environment as gifts… go duties and responsibilities."[95] The Māori word for land is **whenua**, which also means placenta, representing this nurturing: the "land as the system of ecological interactions is a placenta that nurtures and sustains humanity. Humans reciprocate in special obligatory roles both the source of life and to the 'placenta' or ecology that nourishes them."[96] **Climate change impacts humanity's ability to act as kaitiaki of atua, reducing their capacity to ensure the utu of the mauri**.[97] It is through the 'genealogical layering' paradigm of whakapapa, that kaitiakitanga finds its rationale."[98] Merata Kawharu explains that kaitiakitanga is also:

> "[A]bout putting resource use, development or protection in context within an historical framework of how rights to exercise kaitiakitanga are justified. This means, for example, considering the relevance of ancestral association with lands and resources, and thus the rights and responsibilities descendants today now find themselves upholding. That is, kaitiakitanga is equally about the past and managing sets of relationships that transcend time and space: between atua 'gods, spiritual beings' and ancestors on one hand, and their living kaitiaki on the other."[99]

Kaitiakitanga is not just focused on managing relationships between the environment and humans but also about managing the relationships between past, present and future generations.

While kaitiakitanga is motivated by love, self-interest and obligation to protect and enhance the mauri of the atua it is empowered and actualised by mana – though in the post-colonial era the term rangatiratanga has come to encapsulate this aspect of mana – or more specifically their mana whenua or customary authority over and of land.[100] To be kaitiaki of the whenua requires having authority over the relationship with that land, kaitiakitanga requires mana/rangatiratanga. As Merata Kawharu explains, "*kaitiakitanga* is both an expression and affirmation of *rangatiratanga*… *Rangatiratanga* is the authority for *kaitiakitanga* to be exercised."[101] However, the traditional understanding of this authority is far more nuanced and reciprocal than the term 'authority' implies. The hau of "tribal land and forests is their vitality and fertility, which are also signs of their *mana*."[102] Mana is not only required to take care of the environment but taking care of the environment increases mana.

Mātauranga Māori

Mātauranga Māori contains a **vast store of climate and weather knowledge**, as well as **methods and cognitive tools for gathering more knowledge**.

The **names, or more accurately personifications, of weather phenomena help store and communicate weather and climate patterns** in a framework of memorable stories. For

example, after Tāwhirimātea, the atua of winds and tempest, vowed eternal revenge on all his brothers for separating their parents and produced a family of winds, a family of clouds, a family of rain, and a family of thunder and lightning. These children are numerous and cover the spectrum of possible types. For example, Tāwhirimātea:

> "[S]ent forth of his children Apuhau, and Apu-matangi, and Ao-nui, and Ao-roa, and Ao-pouri, and Ao-pōtango, and Ao-whetuma, and Ao-whekere, and Aokahiwahiwa, Ao-kānapanapa, and Ao-pakakina, and Ao-pakarea, and Ao-takawe – that is, Fierce Squalls, Whirlwinds, Dense Clouds, Massy Clouds, Dark Clouds, Gloomy Thick Clouds, Fiery Clouds, Clouds which precede Hurricanes, Clouds of Fiery Black, Clouds reflecting Glowing Red Light, Clouds wildly drifting from all Quarters and wildly bursting, Clouds of Thunderstorms, and Clouds hurriedly flying; and in the midst of these Tāwhiri-mātea himself swept wildly on."[103]

In the cosmological origin narrative, there are eight winds for the major points of the compass as well as onshore and offshore winds, warm winds, cold winds, and wet winds, with 32 fairly consistently named winds across Maoridom. Embedded in whakapapa, these are not only easier to remember but they are crafted into a range of narratives that facilitate weather prediction.[104] Each hapū and iwi have more tailored and specific narratives and names for local winds as well, such that the names and narratives were suited to the specific environmental context. For example, the northwest föhn wind in Canterbury, which has long been attributed to making locals angry, anxious, and irritable, is called Te Hau Kai Tangata or the wind that devours humankind, conjuring a sense of unease and death.

Place names, or wāhi ingoa, also serve as a way of **encoding climate and weather information**. "Embedded across the landscape are place names that reflect intimate knowledge of the locality. Place names, in effect, were the first hazard management systems put in place by local Māori to remind themselves of local hazards."[105] For example, Rangipō refers "to the spiritual battle between Ngātoroi-rangi and Hape-ki-tua-rangi, when day turned to night. The Central Plateau can be experiencing a fine, clear day, and then in an instant a storm front can sweep through the area, turning it freezing cold."[106]

One way in which critical environmental mātauranga is understood and communicated is through the '**body metaphor**'. Atua are personified and the natural phenomena they embody are often understood through a body metaphor. Expressing this analogy, a study of the Ngaruroro catchment explains "[a]s the veins carry the life blood of the physical body, so the veins of Tangaroa carry Life giving Water within Papatūānuku."[107] As Marei Apatu, Te Kaihautu (chief executive) for Te Taiwhenua o Heretaunga outlines with regard to the importance of aquifiers:

> "Rain comes from the tears of Ranginui (sky father) pouring on to Papatuanuku (earth mother) and turning into rivers and streams which are her veins and then out to Te Moananui A Kiwa (the

> sea). Some of the surface water from the tears seeps into the ground and becomes muriwaihou, which are aquifers. Muriwaihou are sacred because they resemble Papatuanuku's womb and amniotic fluid when she was carrying Ruaumoko (god of earthquakes, volcanoes and seasons) at the time Ranginui and Papatuanuku were split apart by their children. We liken it to a mother carrying a child, this is what makes our [aquifers] so important."[108]

This provides useful information of the **hydrological cycle** through the body metaphor that analogises these **various phenomena** as **relevant bodily functions**. In te ao Māori, rivers are understood as performing a similar function as veins and aquifers provide the same sustenance as amniotic fluid.

The encoding of environmental information through the body metaphor is clear in an explanation of the local environment by the hapū Ngāti Hāmua:

> "From here in the Wairarapa Valley our kaumātua tell us to take a close look at the skin on our body. We can see that it is neither smooth nor flat. Our skin is like the land, rising and falling like the peaks and valleys. The elders say look at the Tararua Ranges high above us, then to see how the mountains descend to the flat plains in the valleys only to rise again in the east on the Weraiti Hills. This is the land, it is Papatūānuku, the land and our skin are very similar. They then say to look at the hair that covers our bodies, the covering that keeps us warm and provides protection just like the grasses and trees upon the earth. It does not take long to begin to understand what the kaumtua are impressing upon us. They remind us that Tānemahuta covered his mother in a cloak of trees and plants to keep her warm; in her cloak he placed his children to accompany her. The kaumātua say "look at the hills that have no cloak, Papatūānuku's skin is left unprotected, it will become dry and it will fall away." Our skin peels after too much sun, it is the same as with Papatūānuku, but we call this erosion. Next they ask if we know the purpose of the arteries, veins and capillaries in the human body, to which we are able to say yes. These vessels carry the blood and oxygen or the 'life-force' around the body. They contain the anti-bodies that purify our blood. They then ask us to think of Papatūānuku as a human again. The waterways that cover Papatūānuku acts in a similar fashion. They provide the nutrients and water to the soils, plants and animals. They cleanse the land of impurities by washing them out to sea. They transport the gravels washed down from the mountains into the rivers and further out to sea. The Ruamahanga River is the main artery from which all the other rivers such as the Waipoua, Waingawa, Taueru and Whangaehu enter. These rivers are in turn fed by the many creeks and streams just the same as the veins in the human body."[109]

The knowledge base of mātauranga is useful and important. However, equally important is the **ways in which mātauranga classifies and understands this information**. As Dan Hikuroa explains, when Western science identifies something as:

> "[A] one-in-500 year storm… they are basing it on rainfall records. You are assuming what happened in the previous century will occur in the following century. I think that is a flawed approach. Whereas, mātauranga gives you a range of things that might happen but it does not try to pigeonhole. It is completely in tune with natural rhythms and cycles, whereas our current calendrical system is completely independent of those things. Have you ever heard the saying "summer is early this year"? That would never happen in a Māori framework. It will be summer when it is here."[110]

Mātauranga Māori and te ao Māori have a different conception of time. In many ways, Māori intergenerational awareness and the continuity of whakapapa narratives ensures that the **mātauranga Māori worldview is able to directly engage with climate timescales**.[111] This is what Skipper refers to as 'longitudinal observations'. This longitudinal view is further enhanced by the lack of 'silos' in mātauranga, as all knowledge is understood to be interconnected and these connections are seen as fundamental.

Tohu

Mātauranga Māori encodes climate information in indicators or **tohu** – which literally means mark, sign, and/or proof. The use of "**environmental indicators to forecast and predict changes in weather and climate** were widely used by generations of Māori across New Zealand."[112] Many of the tohu "were closely aligned with changes in the weather and climate – helping Māori to adapt their activities and prepare for the arrival of storms, floods and sometimes weather/climate extremes."[113]

Seasonal changes and weather forecasting are conducted through perceiving important differences in key tohu including ocean plumes, waves and currents, cloud types, timing of frosts and flowers, winds, migrations, blooms, even the contents of fish stomachs. In many cases, a single indicator is enough to determine weather. For example, Te Whānau-ā-Apanui from the Bay of Plenty have several relating to the plume from the White Island volcano – if it lies to the left, rainfall is to be expected, but if it stretches intact across the horizon it means fair weather.[114] As one local told the researchers:

> "The thickness of the plume, its shape, angle and the side on which the plume lies all indicate the type of rain, wind direction and storm intensity that can be expected. When the plume rises straight up then lies to the east Te Whānau-a-Apanui see that there is a high, light westerly breeze blowing and therefore safe to go out fishing. A careful watch still has to be kept just in case the weather changes. If the plume starts to break off the westerlies are strenthening [sic] – the sea will cut up – it is time to go home. If the plume bends westward the wind is swinging to the east and the sea will turn rough within hours. Time to get off the sea again. If the plume rises straight up then flattens and the end breaks off, watch out. Under these conditions no one would go out on the water. The westerlies are strengthening into gale force strength and by 1-2 hrs a violent storm will strike the Te Whānau-a-Apanui coastline hanging around for 3-4 days."[115]

Ngāi Tahu also have numerous weather indicators as well. For example, one tohu connects cloud types and movements with snowfall:

> "Ka kāpuapua te taipua kei muri i te pae o Te Tari-o-TeKaumira, ā, ka ahu atu ki te raki hoki, ka tae mai te hukapapa - When the cumulus clouds bank up at the back of the Hunter Ranges while being pushed by a northerly, snow is expected to fall shortly."[116]

In particular, when these types of clouds are seen moving in an anti-clockwise direction towards Timaru and moving north towards Banks Peninsula this storm front usually brings snowfall as well.[117] Another indicator connects winds with water conditions:

> "Ka kitea, ka rangona, kua tae mai te matahau, ka whakapapapounamu te moana - Its seen, then heard, Matahau has arrived, the ocean is calm."[118]

When the northwest arch is seen to the west over the Southern Alps, it indicates that the foehn – nor-westerly – wind has arrived and that this will have flattened the sea off Te Umukaha coast. The northwest arch also indicated that a much cooler southerly wind was coming, with the height determining the intensity of the southerly.[119] This northwest Foehn wind – renowned for causing irritability – is called 'Te Hau Kai Tangata', or the wind that devours humankind. The name serving as a tohu to remind people of the winds effects.

There are also a diverse array of different tohu that emerge from the cosmology and are incorporated into narratives that provide weather and climate information. Taniwha, supernatural creatures in Māori tradition, are a common form of tohu.[120] "Written records reveal an assortment of stories that tell of the impacts from great waves caused by storms, inundation caused by incantations, and water beings or giant lizards known as 'taniwha' causing destructive surges to imperil the lives of people near the water. It is likely that these events were recorded to give explanation to the causes of natural hazards, and to help to record the loss of life and serve as warnings about the nature of certain places."[121] Taniwha are used in a localised form and with their own specific stories.

Often these tohu were encoded and communicated using mnemonic devices, such as whakataukī (tribal proverbs). Whakataukī tended to be formulaic in structure, when "a particular tohu was observed in their locality then the expected outcome could be predicted with reasonable accuracy. For example: Ka pūehu te pae, he hau tonga kai te haere – When the horizon (seaward) has a dusty appearance, a southerly is expected: A Indicator (Dusty appearance) + B. Location (Horizon) = C. Outcome (Gale force southerly, and torrential rain in 3-4 days, striking the coast)."[122]

The **maramataka** or lunar calendar is a vast repository of mātauranga Māori. It is also **a predictive tool** that follows the movements and phases of the Moon and maps and encodes the influence it has on the environment and climate. It can be considered "the foundation of that body of localised tribal weather lore."[123] The maramataka is instrumental for deciding when to plant and harvest crops and indicating the best times to hunt and fish for different species. The maramataka helps Māori monitor and observe seasonal changes, weather and the migratory patterns of birds and fish. There are many maramataka and related tohu, and they vary from iwi to iwi. The appearance of the star Puanga (Rigel) marks the start of Māori New Year for numerous iwi across both motu. The cabbage tree (tī kōuka) is used by Ngāi Tahu use as a tohu, with early and profuse flowering marking that a long hot summer will follow.[124]

While many indicators were used on their own, often they provided more insight and predictive capacity when used collectively. "Importantly," Darren King and James Goff explain, "**many of these traditional indicators were used together to predict changes in the weather and climate**."[125] Ficune also notes this, explaining how Māori used "several indicators together to increase confidence in forecasts of climatic conditions. When there are contradictions among the indicators, a consensus-based approach is often taken."[126] In other words, multiple indicators used together provided a corrective, or a way of gauging and refining predictions. It is the connections between different patterns or events in the environment that enable a refined prediction of future weather.[127] Te Whānau-ā-Apanui provide an example of how a combination of indicators can provide environmental knowledge. They have a proverb to determine when the moon is at its fullest:

> Kia pā te rā ki te pae kia whakatātare mai te marama i runga i ngā pae maunga, kia kī mai te tai i te ahiahi. Koiana te marama kī tūturu - When the sun touches the horizon in the evening, when the moon peers over the hills and the tide is at its fullest. That is the fullest of the full moons.[128]

Three particular things had to be happening at the same time: a setting sun touches the western horizon; a rising full moon over the Raukūmara Ranges behind them, and; a high tide (highest tidal measurement using a peg system). The Te Whānau-a-Apanui elders did this every month to recalibrate the maramataka, or Māori lunar calendar.

Māori navigation is one of the best examples of the use of multiple environmental tohu together. Successful navigation involved assessing numerous tohu in conjunction to determine location and destination. Common tohu a navigator would use are:

- Position of the rising and setting sun

- Ocean currents and conditions
- Wave, swell direction
- Gauging the wind direction using a conceptual wind compass
- Air and water temperature
- Air pressure
- Colour of the sky
- Shape, size, patterns, height, movement and colour of clouds
- Speed of the waka; and
- Signs of floating debris or land-based seabirds.[129]

Mātauranga and the tohu it encompasses provided a number of ways of understanding and predicting climate and weather.

CONTEMPORARY MĀORI FRAMEWORK

This section will examine the ways in which Māori understand climate change and extreme weather disasters in terms of how it has been understood, recorded, communicated, and planned for in recent history using an array of desktop methods to scan through plans, reports, strategies, newspapers, books, and other sources of reporting. Using a range of different sources from media reports on disasters from Māori perspectives through to iwi environmental management plans (EMP) provides the broadest range of perspectives. While the research covered the entire post-contact era, much of the earlier reporting on Māori experiences of disasters fails to represent Māori perspectives. This is most likely due to a number of interrelated disparities and inequalities from these periods, including power, racism, and knowledge.

The aim is to put the previous section in context, to show what has remained important and how things have changed in the past several centuries. It will first look at how climate and weather are being understood, recorded, communicated, and planned for by Māori, whether as iwi, as Māori researchers in CRI or academic institutions, as Māori communities, as pan-Māori collectives, or individual Māori. Finally, it will drill down into how climate and weather are seen as impacting both 'natural landscapes' and 'cultural infrastructure' – that is, Te Taiao and both the physically and spiritually significant sites and spaces of the Māori world.

Generally, the cosmological perspective remains the fundamental shaper of Māori understanding regarding damage caused by climate change and extreme weather. In his findings interviewing a number of Māori academics on DRR, James Scott noted:

> "[The Māori] worldview does have an impact on disaster risk reduction. It serves as a filter through which their exposure to natural hazards and other environmental threats passes. When science and technology are filtered through traditional experience or worldview, it impacts their actions and decisions and—positively or negatively—affects risk reduction strategies."[130]

However, in the current era, **Māori have to navigate Pākēha and wider international influences and inputs** and **balance their traditional positions with contemporary practices and realities**. This is not to say that the core cosmology has been undermined but rather it is often adapted or operationalised to suit the realities of daily existence. That said, there have been a number of significant and consequential changes.

Contact and **colonisation** have had an array of **significant and ongoing impacts on Māori across virtually every aspect of life**. While covering all of these is impossible and beyond the

scope of this report, there are several key areas that are relevant. The first is that colonisation has seen Māori **lose mana whenua (or rangatiratanga in modern parlance) over much of their land**, which has **reduced their ability to reduce risk and prevent disaster**. A second critical, and related, finding is that the disasters caused by climate change and extreme weather often **reinforce the mamae (pain/suffering) caused by colonisation**. A third overlap is that **the intergenerational poverty** many Māori experience due to colonisation **exacerbates the risks** posed by climate change and extreme weather. Fourth, there has also been **significant losses of environmental mātauranga caused by colonisation**, alongside wider identity and cultural loses through the felling of forests, draining of wetlands, and the loss of species, which have reduced Māori capacity to understand and plan for climate change and extreme weather disasters.

COSMOLOGICAL CONTINUITY

This section will examine the current state of climate change and extreme weather understanding, recording, communicating, and planning that incorporates te ao Māori and mātauranga Māori. It draws on the EMPs that many iwi have developed as part of their responsibility under the Resource Management Act 1991. This has required ensuring a workable interface between mātauranga Māori, and Western technocracy and science. Many of the plans start with a focus on the centrality of the cosmological perspective, and the relationships and responsibilities between the people and nature emerges out of this perspective. Alongside iwi EMPs, there are a range of groups working towards understanding, recording, communicating, and planning for climate change and extreme weather. This includes Māori researchers in Crown Research Institutes, academic institutions, and collaborative projects that bring together researchers, such as the Deep South National Science Challenge - Adaptation Strategies to Address Climate Change Impacts on Coastal Māori Communities Project and NIWA's Māori Environmental Science Programme. There are also Māori communities and groups, such as the Te Ara Whatu – a group of young Māori and Pasifika working against climate change. Pan-Māori collectives such as the Iwi Chairs Forum, the Māori Council, the Māori Womens' Welfare League, and urban Māori organisations, have formed a National Māori Climate Network.

The cosmological perspective still provides the framework for understanding, recording, communicating, and planning for climate change and extreme weather disasters across a range of forums, groupings, and formats.

Many of the EMPs outline the cosmological foundations of their climate and weather understanding at the outset, providing the kaupapa for the rest of the document. For example, one EMP produced by Ngāi Tahu ki Murihiku called Te Tangi a Tauira (hereafter Te Tangi), explains that:

> Ki Uta Ki Tai [from the mountains to the sea] is based on the idea that if the realms of Tāwhirimatea (god of the winds), Tāne Mahuta (god of all living things), Papatūānuku (mother earth) and Tangaroa (god of the sea) are sustained, then the people will be sustained… The central component of the Māori perspective on the environment is the recognition of Mauri, the life principal in all objects, animate and inanimate. The presence of Mauri in all things entrusts people to appreciate and respect that resource. In this way, overuse, depletion or desecration of natural resources is not an accepted practice. Tikanga regulate activities concerning the conservation and sustainable use of natural resources in order to protect the Mauri. Tapu is the status accorded to all elements of the natural world in recognition of the Mauri that exists in them. Tapu involves the appreciation of, and respect for another life force, and life in general. Tapu is also used as a protective measure, a means of social control for understanding and awareness of the spirituality of all things… Whakapapa establishes links that maintain relationships between our people, language and their environment. All things whether animate or inanimate are connected and have Mauri, a life force. Therefore the welfare of any part of our environment determines the welfare of our people.

This opening statement outlines the centrality of the **atua** as the environmental personifications, the role of the **cosmic forces**, and the binding web of **whakapapa**. A second Ngāi Tahu EMP, Te Whakatau Kaupapa (hereafter Te Whakatau) similarly explains that:

> Like other Maori Tribes, Ngai Tahu claim the same whakapapa through Rakinui and Papatuanuku and see themselves as connected to the other descendants of Raki and his wives. Whakapapa then, binds Ngai Tahu to the mountains, forests and waters, and the life supported by them. In this way, all things are considered to have a mauri (life force) and to be living, and to have a genealogical relationship with each other. People are therefore related to the natural world. This shared whakapapa, uniting all things, reinforces the tribal philosophy that all things are from the same origin and that the welfare of any part of the environment determines the welfare of people… As all living creatures are born from Papatuanuku (mother earth), and all return to her on their death,

> Maori consider that they belong to the land and not vice versa… As well as reciting their genealogical relationship with each other and with other tribal groups, Ngai Tahu also recite the whakapapa which links humankind to the atua (deities) and to the earth, to the waters, forests, animals and birds.

As well as reinforcing the role of the atua, cosmic forces and whakapapa, this statement emphasises the **interconnected nature of the environment including humanity**, the spiritual, genealogical and practical **relationships humanity have with the environment** and the importance of **acting as kaitiaki** to ensure these relationships are maintained for future generations.

The active role of the atua is present in an interview with a member of Ngāti Porou:

> "It's just been take, take, take and there's been no give. And when there's no give, that's what happened with mother earth (papatuanuku). That's the only way she can say 'Hey, enough's enough', you know. The erosion, the floods, the kai is disappearing."[131]

They understand climate change and weather extremes as **a manifestation of the dynamic balance** or more precisely the **current imbalance** between nature as personified by Papatūānuku and humanity, with the atua meting out punishment for the imbalance created by humanity. In this framing, **Papatūānuku has agency and is an active participant** in the global environment.

This agency was also obvious at a wananga for Te Kura Whenua ki Wairarapa, a joint initiative of Ngāti Kahungunu Iwi Incorporated, Kahungunu ki Wairarapa and GNS Science. One participant said that "We believe that Papatūānuku (Earth Mother), she's constantly on the move one way or another, whether we see it or not. In slow motion, she is moving."[132] The **underlying causational actor of environmental change is the atua**.

The role of the atua can also be seen in a statement from a participant in NIWA's Māori Environmental Science Programme, when asked about rising sea levels: "I believe in time the sea will take what belongs to it."[133] As well as reinforcing the active role of Tangaroa this also emphasises the **belief that humans do not own or control nature**.

The agency of the atua is portrayed in a narrative framing by an interviewee in a research into changing coastlines: "Don't build whare (houses) which challenge Tangaroa (the god of the sea). He may invite himself into your marae (traditional meeting house)."[134] Here the placement of whare in areas that are at risk from the ocean is portrayed as threatening Tangaroa, with the potential for inundation as a result.

Similarly, after a massive slip washed out the road to a small Māori community in 2015, a kaumatua told the reporter that "on a spiritual level the flooding of the awa [river] was a reminder of its power and mana, and that even when it was tranquil, it still demanded a high level of respect."[135] This emphasis on the need to **honour natural phenomena** is both a manifestation of the **caring relationship Māori have with the environment** and **encoded mātauranga** that **warns people to be wary of rivers**. This **encoding** is **reinforced** by the **reference to mana** – both the river's power and the need to respect that power.

During climate change consultation with the Ministry for the Environment (MfE) the Director Māori Strategy at what was then MAF explained "[m]y personal motivation and that of my tūpuna is a desire to return the dignity and the mana to Papatūānuku. This is not merely a responsibility of the Crown; we also have a role to play."[136] The agency of the atua is emphasised, as is **the impact on the mana of the atua caused by anthropogenic climate change** and the importance of **acting as a kaitiaki** – of being responsible and caring for the environment.

Kaitiakitanga guided by mātauranga was also emphasised by another of the participants at the MfE climate change hui:

> "The world is awakening to a common cause and our Pākehā neighbours are finally waking up. They have abused our environment… We are in trouble here in the Pacific. We have a huge responsibility. It is not about colour of skin, but colour of character… Māori have all this knowledge and have had so for many years. I take individual responsibility for the environment. We have to unite and get serious… Hopefully the solutions will be based on our Māori model, our tikanga."[137]

In the Te Arawa Climate Change Strategy the **atua are framed as providing the 'ecosystem services' vital to human survival**:

> "Climate change is impacting the ability of Ranginui and Papatūānuku to provide the environment in which we need to thrive."[138]

The **relationships between humans and the natural world** are also referenced. Sandy Morrison, leader of the Deep South programme explains:

> "When I bring that to the present, it's not only acknowledging we have a spiritual side and mauri [life force], but we have a relationship with each other. We are in a web of interconnectedness with

> each other, where an action impacts the next. Now, we are experiencing climate change. We need to find out where that degradation started and work on how we can stop that happening now."[139]

The importance of reciprocal relationships – and the mutual obligations that underpin these – was clear to the Deep South team, who summarised their interview findings by noting that the "Kaumātua saw climate change as natures [sic] response to man-made change and therefore had an obligation to work with it – tiakina te taiao, tiakina te iwi – caring for the environment so that it can care for the people."[140]

At the MfE climate change hui it was expressed:

> "I have serious concerns about the government's programme – it is focused on money exchange and carbon trading. Tangata whenua are getting caught up in that. I am opposed to the trading system and the commodification of resources. I appreciate the concerns of Māori Land owners and their land use. My concerns are for Papatūānuku. Your options are too soft. Why are profits privatised and costs socialised? I support national environmental standards and national policy statements but again we must work in conjunction with Papatūānuku."[141]

The contrast between the Western economically-focused, anthropocentric view and the spiritually-grounded, empathetic, and caring relationship Māori have with the environment is clear in this statement.

The **view of nature as a holistic system** is still strong as well. As Pauline Harris explains:

> "For Māori we're less humanistic in our thinking – it's more of a holistic model where we're part of the environment, and have different value weighting for all species on the planet. Values inform how you write policy, what sort of research you do, your behaviours. So from a Māori perspective, having a more holistic view of the world where we are not central, we are one part, then informs your care for the environment."[142]

A similar connection between climate change and colonisation was made by Rachael Trow, writing about the experience of climate grief as a rangatahi (young) Māori, who noted:

> "[T]he climate crisis and the ongoing processes of colonisation are inextricably linked… Growing up with first-hand experience of the climate crisis unlocked the mamae that my tīpuna felt for their whenua 200 years ago, and I imagine a lot of tangata whenua can relate… because dealing with the grief of colonisation wasn't enough, we now have to watch the climate crisis harm the mauri of the whenua and the waters we have called home."[143]

At the MfE hui, one participant also referenced the **holism,** explaining, "[f]or us there is no separation between Ranginui and Papatūānuku. It is hard for us to separate out issues relating to

air quality, water quality, land mass and so on."[144] Here the **Western way** of **dividing environmental features into separate functions or features is challenged**. The Māori view is that these are all aspects of a singular system.

A board member of a climate initiative organised by Te Arawa explains, "[o]ur whānau were always very active in terms of being in the environment, and from that I learnt the reciprocal nature of te taiao."[145] The understanding that the **natural world is kin** also remains a common belief. As School Strike for Climate Change organiser explains:

> "I grew up with more of a sense to fix the climate. They [the generations before me] didn't have the media sources to tell them this is what is happening at a constant and consistent rate. The media is definitely a catalyst for climate anxiety; it pressures us. And that's the perspective of being a young person. But being Māori, it's even deeper than that. The Earth is whānau (family). It's spiritual, because that's just how our people work."

In the Ngāi Tahu climate change strategy it is stated that "[n]o matter where they are, Ngāi Tahu whānui can maintain relationships to places, resources and taonga under the new climate conditions, that will carry through their identity and pride as Ngāi Tahu."[146] Here as well as indicating the remaining importance of relationships, the **resilience these relationships** – and the adaptability of the underpinning Māori worldview – is emphasised. Even after the changing climate has transformed ecosystems and habitats, the relationships will remain as strong.

The **cyclical view** that **incorporates both ancestors and descendants** is also still present. In the Ngāi Tahu climate change strategy it is explained:

> "We will face the challenges of a changing climate in our takiwā with the courage, resilience and wisdom of our tūpuna, strengthened by all that makes us Ngāi Tahu, as we create a cultural legacy for those to come who must live in a changed world."[147]

This **intergenerational perspective** also encourages **learning from and emulating tūpuna**. As one participant in research on flooding resilience explained:

> "Every house should have a garden. One person that still does I know still does a big garden even today… He takes after his grandmother I suppose. I think it's following on from the old people... those old people who just did the work. Modelling from the parents."[148]

Te Tangi EMP shows how climate change is considered as **damage to the relationships of whakapapa** and outlines the impacts of climate change through an expression of Māori cosmology, particularly on the need for **balance** in both human-environment relations as well as the practical need to use resources for commercial and social purposes:

> From an environmental and spiritual perspective, Māori see the world as a unified whole, where all elements, including tangata whenua, are connected. Emphasis is placed on maintaining the balance of cultural and spiritual values in the environment while using resources for commercial and social purposes. The changes brought on by a warming climate caused by human interference directly affect this balance.

Te Tangi EMP goes on describe to specify ways in which **this damage or imbalance may manifest**:

> Recurring reports of the effects of global climate change highlight notable changes in seasons, fluctuating weather patterns and the frequency and insurgence of storm-like events. Although climate change is essentially global in nature, the effects of these changes are felt even more at regional and local levels. With an increase in greenhouse gas discharge at the global scale and the subsequent depletion of the ozone layer, local sources of emissions contribute further to global impacts. The effects of such in turn impact on the Southland environment. Local sources of emissions include industrial point sources, domestic and agricultural sources, burning and refuse disposal sites. These emission sources are increasingly of concern to Ngāi Tahu ki Murihiku as they essentially affect the mauri of all things, animate or inanimate at local, regional and global scales. Understanding the cumulative effects that localised emissions have on the global environment is integral when promoting the need to prevent further deterioration of our environment… The Māori world view requires higher level status in policy making given that it necessitates the need for all aspects of the environment to be considered during any activity. Ngāi Tahu ki Murihiku raise some concerns with respect to the implications on economy and industry from climate change and the associated national policies that are directed to curb such implications.

The Waikato-Tainui EMP lists both the biophysical impacts of climate change as well as the cultural and spiritual risks it poses, showing the intrinsic connections between pragmatic and intangible 'disasters':

> "Global warming and climate change are likely to result in a rise in sea levels; more extreme weather events; changes to rainfall patterns; increased erosion; changes in the population density and distribution of fish and wildlife; and changes in the viability of cultural and/or spiritual resources and activities… Most importantly, Waikato-Tainui wants to avoid any disruption that climate change causes to indigenous ecosystems, Waikato-Tainui cultural and/or spiritual beliefs and/or practices."

Climate change and extreme weather disasters have nested outcomes for Maori: first the impact is to the mauri of animals, plants, and ecosystems. The next level is disruption to the spiritual, cultural and practical relationships Māori have with the animals, plants, and ecosystems, including Māori capacity to protect and care for them as kaitiaki as an expression of mana whenua. The third level of is to current and future Māori wellbeing. Furthermore, climate change and extreme weather disasters means that each of these levels independently and interconnectedly lose their balance.

Mātauranga Māori

A number of sources noted the threats to mātauranga posed by the changing climate. **Climate change threatens the mātauranga** that informs insights into seasonal shifts and typologies. These changes have caused an array of species-specific changes as well, further impacting mātauranga and tohu, as well as impacting the ability to gather mahinga kai. Shaun Awatere explains how:

> "[A] tohu that is associated with the maramataka is that, when the pōhutukawa tree blossoms, then that's sending a tohu that marine species like the kina are about ready to be harvested. What we're seeing is the pōhutukawa trees are starting to blossom a lot earlier, but we're still uncertain as to whether the kina is ready to be harvested at that time."[149]

Likewise, a kaumatua told the Deep South programme that they had noticed that previously there were:

> "Clear seasons - summer is summer, winter is winter, then autumn, like that. But not now … it's all over the place. At one time, you could say okay, winter starts in June and finish in September. Nowadays it's totally different. You can have wintery days in November. You can have a very, heavy frost now and [then it] rains directly afterwards… that is unusual from the time when I was small."[150]

The seasonal patterns determined "local kaitiakitanga practices and harvest times; environmental indicators guided them."[151] The **changes to environmental tohu caused by climate change threaten both kaitiakitanga and mahinga kai.**

As a fisher explained to the Deep South team, different species of seafood:

> ".. all had their seasons … Everything has it's time… there's time for fish, there was time for oysters, time for mussels. And it never altered until recently. I realised about two years ago things are changing. Things [plants] are blooming out of season. Fishing is all out of kilter. Mullet never came till winter and now you've got mullet coming any old, time sort of thing. It's really changed."[152]

In terms of mātauranga providing understanding, the Maniapoto EMP makes the connection between climate, weather and mātauranga Māori clear:

> "Maniapoto greatly value and respect the climate and weather patterns that have contributed to mātauranga Māori and the relationship Maniapoto has with the environment that has sustained them for generations. Knowledge about local weather patterns and seasons has been an integral and vital part of Maniapoto life. Maniapoto tūpuna experiences, lessons and mātauranga have contributed to the extensive and continued customary uses and practices of natural resources and the environment. For example, knowledge of ocean and wind currents to navigate waka, where and when to fish, cycles of the moon for planting and harvesting kai, and the use of seasons to implement cultural rituals and celebrations."

There is an identified need to **harness the breadth of climate and weather-related mātauranga** for contemporary contexts, particularly by finding areas of compatibility and supplementarity with Western science. Darren King, head of NIWA's Māori Environmental Science Programme, believes that despite the scepticism of Western scientists, mātauranga Māori can add value to climate change science.[153]

"Māori have been dealing with climate variability for centuries", Darren King explains, and the knowledge obtained can provide deep and useful insights into current and future trends and patterns.[154] As King and Goff explain:

> "[Mātauranga Māori is] a cumulative body of knowledge, practice and beliefs that has evolved through adaptive processes. This knowledge is not just 'traditional' but also contemporary, representing the totality of experiences of generations of Māori in New Zealand."[155]

Similarly, the Deep South research project was focused on examining how a better understanding of aspects of the mātauranga Māori worldview could be explored and developed alongside climate change science, geomorphology, ecological economics and design principles, to inform new paradigms for resilience and adaptation to climate change.[156]

Darren King and James Goff have conducted through analysis of Māori oral history and:

> "concluded that Māori possess considerable "specific" knowledge (i.e. empirical or practical knowledge) of natural hazards and environmental change – referred to as Mātauranga Taiao – and that this archive of inter-generational experience (as well as contemporary practice) can contribute to natural hazards management and mitigation in A/NZ."[157]

Planning around climate change is gradually taking mātauranga Māori into account. Indigenous environmental knowledge systems, including mātauranga Māori, are "increasingly being recognised as alternative domains of knowledge that in many cases are relevant to present-day

challenges such as climate change."[158] Darren King and James Goff explain that a "handful of studies have explored the contributions of indigenous knowledge to understanding natural hazards."[159] The World Commission on Environment and Development has even called for the employment of local environmental expertise in environmental problem solving and identified the disappearance of 'traditional knowledge' and 'local experience' as "a loss for the larger society, which could learn a great deal from traditional skills."[160]

There are also **practical, lived experiences of mātauranga Māori** that provided insights into climate change. At one marae where access requires a trip across a river, one member has witnessed the environmental changes during his 60 years of steering the barge to the marae. In recent years, he's noticed the change in the flow of the water: "the flow of the water now has changed a hell of a lot. But I guess the general rise of water, that's worldwide and we just acknowledge that and work with nature the best we can."[161] Similarly, following the mass death of tuna (eels) in a Taranaki stream caused by flooding, Trustee and educator at Te Whenua Tōmuri Trust, Emily Bailey, said the eels were a pointer to deeper issues:

> "I guess what's happening down there is just a sign of the times with climate change, intensive farming and just poor management for a whole lot of reasons from the break up of rural communities to fertiliser companies getting out of control."[162]

In other words, **the tuna can be seen as a key indicator for wider systemic issues that exacerbate the damage caused by climate change**. As one respondent in the Ngati Toa Rangatira Waitangi inquiry explains:

> "When we were growing up our old people could tell three weeks in advance what the weather was going to be like, from the cycles of the moon and from the appearance of the moon and the sun. We had other methods of knowing weather patterns. For example, when we gutted blue cod, if they had stones in their belly, we knew that bad weather was coming. The cod swallowed stones to give them ballast so that they would not be thrown around as much by the swell. If we saw dolphins in the bay, we knew a southerly was coming. If we caught Wheke we knew a southerly was coming. If we could see Mount Taranaki we knew a southerly was going to come shortly. We could tell how long the southerly was going to blow for. We had our ways of knowing if a northerly was on its way, and so forth. We relied a lot upon reading the sky and reading other signs. I can still tell the weather using the old ways but with far less reliability. It was easier when we were growing up because the weather was far more settled then than it is now and we were more observant and had closer links with nature."[163]

The mātauranga around extreme events is contained in useful narratives. One such story is of the flicking tail of the taniwha in Matamata. Discussing recent flooding in the area, and the fact that all three local marae were located in places that did not flood, Dan Hikuroa explains the story:

> "The lizard is the stream, or resides in the stream, and its head is in the headwaters and the tributaries are its limbs. And the tail starts where the [Waitepuru] stream enters the flat plain. When you get floods, it naturally through centuries and millennia would flick from side to side and that was the tail. [There is] salient, scientific information that's been coded within the indigenous knowledge."[164]

Tohu

Te Tāhū o te Whāriki (hereafter Te Whāriki), a third Ngāi Tahu EMP, outlines some of the most critical tohu of climate change:

> Projected increases in the average temperature across the takiwā [territory/rohe] by up to 3ºC by the end of the century, with some areas experiencing a significant amount of additional hot days (days over 25ºC). For example, Aoraki is projected to have 80 more hot days by the end of the century under the worst case scenario.
>
> Projected variation in rainfall across the takiwā, with some areas experiencing drought while others extreme rainfall and flooding. For example, the West Coast can expect 70% higher rainfall by 2100 under the worst case scenario.
>
> Increases in storm intensity and frequency.
>
> Changes to the ocean including increased temperatures, changes in currents, wave height and productivity. A significant concern is the increasing acidification of the ocean, which will have a number of flow on effects to ecosystems including key kaimoana species.
>
> Sea level rise, which is a key concern for our coastal populations, with 2m by the end of the century being a realistic increase.

Many EMPs go into great detail covering a wide range environmental issues and strategies across key ecosystems across their rohe as well as flora and fauna and elements, including air, water, indigenous species – all of which provide a detailed insight into how impacts are conceived. While there is not space to cover the many hundreds of pages, the coverage of ō te hau or air in Te Tangi is insightful. First it outlines how air is viewed from a Māori perspective:

> Air is a taonga, valued for its life supporting capacity for all things. As with other taonga, the life supporting capacity of air must be maintained and enhanced, used with respect and passed on to the next generation in a healthy state. For Ngāi Tahu, the sky is Ranginui, father of the earthy progeny of Papatūānuku. Ranginui is adorned by celestial bodies such as the moon and the stars, and is associated with life and light. Following the separation of Ranginui and Papatūānuku (the

> sky and the earth), their child Tāwhirimatea fled with his father to the sky. From there, he presided over the elements, including the rain, wind, breezes, mist, dew and snow.

It then provides a range of tohu for air and atmosphere:

- Visibility
- View of specific landmarks
- Natural quiet
- Celestial darkness
- Ability for sound to carry naturally
- Darkness, unimpeded by light
- Ability to breathe uncontaminated air
- Ability to hear the sea
- Purity of air (smell, taste)
- Clean rain
- Ability to smell the sea

These tohu provide a te ao Māori framed perspective. They provide a way of determining the **mauri of the air and atmosphere**.

After covering local air issues Te Tangi provides an outline of global air and atmosphere:

> Discharges to air at a global scale and the depletion of the ozone layer are issues of concern for Ngāti Kuri. Such issues can manifest in global changes to temperature (climate), sea level, and the frequency, intensity of weather events such as storms.

And key issues at this level:

- Cumulative impacts of farming practices on global air quality
- Cumulative impacts of deforestation on carbon dioxide levels
- Cumulative impacts of vehicle emissions from increased population and development
- Health effects of increased solar radiation

- Sea level rise and impact on coastal areas

These global tohu are more generalised and have a greater overlap with Western indicators, perhaps revealing how **universal indicators can mesh with more localised and specific tohu**.

MANA WHENUA

Mana whenua encompasses the right of an iwi or hapū to maintain responsibility and hold authority over all resources contained within one's tribal rohe (area).[165] This is based on take, or claim, and ahi kā (continuous occupation). This section will examine the links made between climate change, extreme weather, and mana whenua. In particular, this focuses on both the wider issues surrounding power and influence over environmental decision-making as well as more specific Treaty-based issues. This section also covers rangatiratanga – itself a modern conception of mana.

The link between climate change and the Treaty has been made frequently. During consultation with MfE on climate change "Māori did not see that the development of climate change policy thus far reflected a 'partnership approach'."[166] Māori environmentalist Emily Bailey believes climate change is a Treaty of Waitangi issue.[167] Mataatua District Māori Council lodged a claim with the Waitangi Tribunal, made on behalf of all tangata whenua, asserts the Government had failed to fulfil its Treaty of Waitangi obligations to protect Māori land and property.[168] This claim, WAI 2607, states that the "New Zealand Government's response to the threat of global climate change represents a breach of the Crown's Treaty of Waitangi obligations towards Māori."[169] In turn, WAI 2607 notes that "cultural order comes from the natural environment and hence people have a responsibility to care for these systems… The role of Maori as kaitiaki (cultural guardians) of the natural environment has not been adequately recognised by the Crown."[170] Māori have a responsibility to care for the natural environment yet the Crown has restricted their authority and capacity to do so, **loss of mana whenua limits kaitiakitanga**.

Māori also want rangatira around climate change, as Mike King notes "if this society had been built on the tikanga of our tupuna we wouldn't be in the mess that we are in now. So for very practical reasons that Māori viewpoints are taken into account."[171] The convenor of Te Ara Whatu, India Logan-Riley, also wants greater Māori influence: "Previous and current governments have a lot of improvement to do when it comes to partnering with Māori effectively at both hapū, iwi

and community level. There is a lot of best practice recommendations that Māori have given to the government that they haven't actually listened to or used to inform their practice. We look forward to them hearing that better as we move forward so that we can get a piece of legislation that ensure Māori get to determine what climate action looks like for our communities."[172]

As the Te Arawa Climate Change Strategy explains:

> "It is generally accepted that climate change is an unforeseen consequence of colonisation, global forest removal, capitalism, and rampant industrialisation. These all stem in the main from western individualistic consumerism and granular left brain approaches to science and thought. The solutions needed therefore must be sourced from a different values base and thought processes and this is why Māori and indigenous peoples must lead climate change solutions rather than just contributing to them. We as Te Arawa are part of the transformational leadership change that is needed to correct the way in which the environment is perceived and managed and to ensure climate change is reversed."[173]

NATURAL LANDSCAPES

Te Taiao

The natural world, or Te Taiao, and all the flora, fauna, and ecosystems that make up Te Taiao, is understood by Māori as kin. At the broadest level, climate change and extreme weather are viewed as having a diverse array of negative impacts on Te Taiao with cascading consequences for Māori, including kaitiakitanga, mātauranga, and the tohu of weather and climate prediction. While Te Taiao as a whole, and the taonga within it, are of central importance to Māori, the concept of **whenua**, or land, is fundamental. Māori have strong spiritual bonds to the land, Papatūānuku. She provides unity and identity to her people and sustains them. Thus whenua is of central important to Māori as a form of personal and tribal identity, as well as being a key resource. It is a standing place to voice ideas and an important source of emotional and spiritual strength.

A research report done by NIWA's Māori Environmental Science Programme in conjunction with Ngāti Huirapa found that amongst the community "human modification of the environment was widely considered as having amplified community exposure to flooding risks."[174] As one participant explains: "Probably the thing that's changed is the stop banks [which] have made the problem worse. It becomes a real hazard...dangerous because the river [Temuka] was straightened."[175] As another participant explains, "[i]t's a risk that we created too, we can't just blame climate you've got to put it down to human error too."[176] **Human interference in the**

dynamic environmental balance of a river ecosystem can be seen to map more expansively onto anthropogenic climate change. As a counterpoint, however, historically, by some in the community flooding was not always viewed negatively as "Flood events bring out the tuna and 'cleanse' the river of debris and 'paru' [dirt, mud]."[177] What might be considered **'normal' extreme weather** does not have to be **viewed negatively,** if it is part of the **ongoing shifting of equilibrium.**

In 2018, the mass death of tuna (eels) in Waitekaure stream at Pungarehu was "being blamed on poor land management and the effects of climate change."[178] The significant changes to ecosystems following colonisation is connected with exacerbating the impacts of a changing climate. Just 8.1 percent - or 3000 hectares - of pre-European wetlands remain in Taranaki. Local kaitiaki, Tihikura Hohaia, explains how there has been:

> "[A] total lack of care for the smaller streams and then the feeders that come in on those are being drained and piped because they tend to be puna wai, short course springs. And farmers don't favour them because their cows bog them up so they prefer to run pipes through it, drain it and plant more grass over the top."

Tihikura Hohaia notes that climate change means storm surges like the one that had blocked the stream and droughts were predictable, but no planning was being done for them. The smaller water courses are vital for protection in extreme weather. "Those are the lungs" Tihikura Hohaia explains, invoking **the deeply embedded notion of key ecosystem (or Papatūānuku's) features as being analogous to bodily functions**, "Those are the very places that provide moisture, provide water." Instead, the water heads straight out to sea. "Over summer you would, in a healthy water course, expect those lungs to hold water back and release it slowly through these critical periods."

On their website, Ngāti Porou also reference how human interference have caused an imbalance also noting how the storm disasters have been exacerbated by the consequences of colonisation and have in turn resulted in worsening environmental conditions:

> "The land clearances of the turn of the century, followed by decades of unsustainable land use practices meant the whenua was wide open for the impact of erosion. This was on top of the weak rock sub-structure beneath the soil making the Waiapu Valley the most erosion prone land in the country. This meant that weather events such as the 1938 storm and Cyclone Bola in 1988 were particularly devastating for the rohe. The clearances also meant that erosion has had a particularly large impact on the Waiapu River. Today the Waiapu River has one of the biggest outputs of sediment of any river in the world at around 35 million tonnes a year. By comparison the combined sediment outflow of two of New Zealand's largest rivers - the Clutha and the Waikato - is roughly

> one million tonnes per year from much bigger rivers. Not only are we literally losing our whenua, but that earth is silting up the moana affecting fishing and other activities."[179]

In WAI 2607, it is explained that the "well-being of natural ecosystems is of paramount importance to Maori particularly given the fundamental role of the natural environment in defining Maori culture and values… Climate change has been and will continue to have a detrimental effect on natural eco-systems in New Zealand"[180] It continues:

> "The production and ecology of native flora and fauna will likely be challenged by new plant and animal pests, as well as the spread of pathogens and diseases as warmer weather favours conditions for increased competition. Some vulnerable species may face habitat loss and even extinction."[181]

Mokoia Island in Rotoroa is the backdrop for *Pokarekare Ana*, the unofficial national anthem, inspired by the forbidden love story of Hinemoa and Tūtānekai. The island is dotted with sacred sites and taonga, including the hot pool known as Hinemoa's bath on the shore line. The island is being impacted by rising lake levels caused by flooding. As the chair of the Mokoia Island Trust, Rawiri Bhana, explains:

> "What we call these 50 year and 100 year storms are becoming a lot more frequent. So, in Rotorua, in the last decade at least we are having a frequency of flood events - the rainfall has just been phenomenal - and then high lake levels… Our lakes are just higher than they normally would be at all times of the year. Our island is shrinking… We have got old aerial maps from 1950s and 60s and overlaid them on the current [maps of the] island and actually we are actually losing island, it is going underwater."[182]

Climate change poses an existential threat to the whenua itself, with the potential for substantial areas of land to be lost to rising oceans and lakes.

Revealing how colonisation has impacted management of Te Taiao, the Hikurangi Takiwa Trust and Te Papatipu o Uepohatu Trust considered challenging proposed national standards for forestry at the Waitangi Tribunal. Te Papatipu o Uepohatu Trust chair Tui Warmenhoven explains how forestry in their region needed more stringent monitoring because it was suffering from 'world class' erosion problems following the clear-felling of 80 percent of the native forests 130 years ago:

> "What the settlers of that time didn't realise was that we had very soft rock and very heavy rainfall, so there's certain times of the year where the rain is so heavy the soil just moves… Once those trees were gone, the soil quality was lost, everything has moved, and it is still moving - we're basically a moving catchment."[183]

Remediation work to limit damage to whenua also poses risks. In 2020 Māori landowners trespassed officials who began constructing a stopbank without their approval. They occupied their land in protest, with one Trust member explaining "You gave us no choice. We had no voice. You dug up our whenua, desecrating it."[184] Another explained, "The trust and whānau are aggrieved to see the dug-up state of our ancestral whenua, including the decimation of hundreds of trees along the bank of the Ōroua River, providing soil for the stopbank." The impacts of the remediation work have a resonance with the loss of mana over the whenua caused by colonisation,

Taonga species

The changing climate is also **threatening taonga species** in a number of ways. Regarding the kiwi, the chair of the Mokoia Island Trust explains:

> "… you have those summers where it is basically drought. Last summer our DOC rangers found two dead kiwi. When a protected bird dies there is an autopsy. And the scientists explained to me that because of the drought conditions, the ground is like concrete and so the young kiwis couldn't break the earth to eat grubs and worms. So, these two, young kiwis basically starved to death."[185]

Taonga species are also threatened as the changing climate either sees predator populations grow or drives them into new habitats. This has happened on Mokoia Island:

> "You don't associate it [rats on island] with climate change but it is a byproduct of that. We have found with these huge storm events, it washes out all the rivers, and the water rats that live down that river have been flushed into the lake. "We have had it documented by lake users. These rats are going to have to swim back against this water still coming out, or the natural, easiest port of call is to carry on to Mokoia Island."[186]

Te Arawa Lakes Trust also note the threat to taonga species and the potential increase in predation: "Warming waters in the Lakes will impact taonga plant and fish species. Some species (including pests) may thrive while others may diminish. This in turn, affects cultural resources, practices and way of life."[187] The loss of taonga species caused by climate changes will impact a wide

Mahinga kai

Mahinga kai, or traditional foods and the sites where they are harvested, are critical to Māori identity. Many mahinga kai sites were lost or reduced following colonisation, meaning that further threats from climate change reinforce these earlier losses. It is important for Māori to manage these resources to allow them to continue gathering kai (food) in the way the ancestors did, and

uphold mana and manaakitanga (host guests). Protecting mahinga kai is the essence of kaitiakitanga.

Mahinga kai species are threatened by changing weather and climatic conditions. At a climate change summit in Tairāwhiti, the summit convenor Tina Ngata said that ocean acidification, as a result of sea warming, posed a huge threat to kaimoana that Māori rely on as a food source. "There isn't really going to be a beach in Aotearoa that will escape acidification and those acidification levels, if we carry on with business-as-usual, spell an end to the shellfish species that we currently rely on, and have relied upon for centuries for our diet," Tina Ngata said. "Polar bears and ice sheets in Greenland are not something that our whānau here can relate to - you're not going to have a go there, you're going to have a hard time getting them to engage through that discussion, so when you start talking about kina, and pāua and kōura, that gives our people something much more relevant [to engage with]."[188] As Tina Ngata expresses, the impacts of climate change and extreme weather are most importantly **understood through a local framework**. These are the key relationships Māori have with Te Taiao, ones built up through centuries and understood through networks of whakapapa.

Rivers are silting up across New Zealand, which is having a devastating impact on the tuna (eel) populations. In an article from 2015, a Ngai Tahu fisher explained:

> "The fish numbers in the water have declined extremely badly and are in such a state that those fish that are there have to swim further to get to clean water, particularly the elvers. They come in July, August, September and they haven't got the right habitat to live in to get big enough to travel up the waterways… it was hard for Māori, which act as kaitiaki or guardians of the awa, to watch their traditional kaimoana dying. It's our food source, it's a very precious food source, it's a taonga [treasure] to us and to see the habitat going, it's like the nest is broken."[189]

The tītī or muttonbird harvest is also threatened by climate change. Ngāi Tahu kaumātua Michael Skerrett, who has been going to the islands for over 65 years and has built up considerable mātauranga surrounding the bird population and seasonal patterns explains "Last year was the first reasonable year we've had for 13 years, since 2007. That's all down to climate change."[190] The success of a season depends on the bird's food supply:

> "When we get El Niño conditions, the production of plankton drops, that's the bottom of the food chain. All the little animals that tītī feed on, krill and all those little animals are just not there when we get El Niño. So, if it is El Niño in the spring, they struggle to get to the condition to breed, don't lay so many eggs and they're spread out. The bulk of the parents leave by the middle of April and if they aren't developed enough they're not going to make it."[191]

Referencing the connections between the threats of climate change and previous impacts of colonisation on mahinga kai, Mokoia Island trust chairman Rawiri Bhana explains how the island was once "the Pak'n Save for the whole region". However, government departments turned it into a game reserve, unleashing introduced animals like pheasants, deer and goats. Since the 1980s, the trust has been restoring the island. As Rawiri Bhana explains:

> "We spent a decade eradicating pests from the island, bringing it back to what it was. Mother Nature is really good at regenerating after we have cleaned up our mess. Now are we faced with this new challenge: how do we protect our island again?"[192]

The threats of climate change to mahinga kai is a **strong analogue for the environmental consequences of colonisation**.

Māori environmentalist Emily Bailey is concerned about the impact warmer ocean temperatures will have on shellfish stocks, noting that "[w]e're going to lose our kaimoana if we're not careful…. It's just getting really, really hard to grow food and collect food."[193]

Similarly, a Te Ahi Waru and Te Akitai hapū at Ihumātao spokesperson identified the impacts of ongoing flooding, whilst also indicating that these effects were more significant for Māori communities: "It pretty much ruined a lot of the crops growing and the maraki and shellfish cannot be gathered because of the wash off of pollutants. It does really effect the more vulnerable communities."[194]

The changing climate also sees predators of mahinga kai increase in numbers. As an interviewee told the Deep South programme:

> "… once upon a time you could just … rush down and spear half a dozen great, big flounders … Now you could walk the whole beach and lucky if you get one or two. It's got a mantis shrimp. It eats into the wee flounder, about the size of your finger. They never used to be around before. Just [noticed in] the last four or five years they've been in the harbour. When we were kids we used to see these little, wee flounders in the rock pools by the water. … now you never see one."[195]

CULTURAL INFRASTRUCTURE

Wahi tapu

A wahi tapu is "a place sacred to Māori in the traditional, spiritual, religious, ritual, or mythological sense."[196] These are places that are subject to long-term – or even permanent – ritual restrictions

on access or use. Generally these include burial grounds, battle sites or places where tapu objects were placed. Research on sea level rise impacts on wahi tapu found that:

> "[T]he most significant concerns for Maori was the potential damage to coastal waahi tapu as a result of sea level rise, and the measures that would be employed by coastal management groups to prepare for and mitigate against such adversities, and indeed for any other adverse effects associated with climate change. Many expressed their opinions regarding how the coast and its resources should be managed in the face of climate change."[197]

Likewise, Horizons Regional Council noted that: "Māori communities are concerned about degradation of coastal spiritual and heritage sites, including pā, marae, urupā (burial grounds) and food-gathering sites, and the potential abandonment of these sites due to managed retreat."[198]

Urupā

An urupā is a cemetery or burial ground, Māori consider these sites both tapu (sacred) and taonga (treasured).[199] Mead explains that "urupā are always tapu but even here some urupā are more tapu than others. The important variable is often the antiquity of the urupā and whose remains are buried there."[200]

Urupā are threatened by rising seas and rivers. In a piece examining Māori vulnerability to climate change it is noted that urupā "are common along New Zealand's coastline and could soon become submerged."[201] Niwa research scientist Darren King explains how "[f]or some hapū and iwi there is a real pressing need to act to move tūpāpaku (corpses) to higher ground." He then asks:

> "What do we do with when it's multiple owned land? Do we let Tangaroa (the god of the sea) claim it? Or do we have conversations to divert interests in land to other places that are more resilient? It can be overwhelming when climate is so connected with everything."

Darren King refers to the atua of the ocean, Tangaroa – invoking the cosmological view of weather and climate, whilst also referring to the practicalities of Māori land in the post-contact reality. There is a blend of the pragmatic and the metaphysical.

In 2019, it was reported that a "Māori burial site atop a cliff in the Bay of Plenty has collapsed onto the beach below, scattering human remains into the sand and the sea."[202] This urupā was thought to date back to the 1300s – and the concern shown by Te Arawa iwi and hapū reveals that the importance of ancestors does not reduce with time. In response to the event, a "rāhui had been put in place for six weeks, which involved a ban on collecting kaimoana shellfish or other

seafood until the koiwi a tangata (human remains) had been retrieved and were reinterred." As the article noted, "hundreds of coastal urupā across the country threatened by rising seas and increasing storm events." It then provides several examples: "The urupā at Okahu Bay in central Auckland regularly floods and hapū Ngāti Whātua Ōrākei is discussing where to move it to, while in Māngere iwi are battling to save their urupā at Makaurau Marae." A Māori scientist working with different groups facing the possibility of having to move their urupā explains that "[e]xhuming the bodies is a last resort. That discussion is quite hard. It is such a tapu process, and trying to source land and resources makes it even more difficult." The **prohibitions of tapu make relocating urupā difficult**.

Te Ahi Waru and Te Akitai hapū have also experienced flooding at their urupā on the peninsula of Ihumātao. As a spokesperson explains, "It's extremely upsetting for those in our community because for those that do pass on we are having to put them into different cemeteries and move them around to other iwi land. Yeah it is just really degrading on our mana." Here the impacts of climate change are directly connected to **the ability of the hapū to express their mana** in this situation, they are rendered helpless by the rising tides – and no doubt the more restricted scope of their rohe – which reduces their mana.

Rising rivers also threaten urupā. Mirumiru Marae on the West Coast of the North Island are facing the possibility of having to relocate their marae and urupā due to rising river levels. "Coastal erosion and the change in the tides," one member notes, "if we have to move our marae [people think] I can't leave my baby here that's buried there, my tupuna, my parents."[203] Huramua Marae is also dealing with rising river levels threatening their urupā, over the last ten years, locals have attempted to hold the riverbank through planting and remedial work, but 6m on average is eroding every year due to increased rainfall. Chaans Tumataroa-Clarke from Huramua Marae explains that the "key principal guiding us is to maintain the authority and heritage of our families, our elders, our ancestors."[204] **Mana** and **whakapapa** play critical roles in decision making regarding hazards and risk to urupā. Chaans Tumataroa-Clarke continues, explaining "[w]e acknowledge the power and life-force of our river, know that we deliberated this issue and concluded to exhume our relatives, our ancestors and move them to rest near our marae." Urupā and other wahi tapu are understood within the wider environmental context, decisions around wahi tapu must be conducted within the te ao Māori framework – the **mana and mauri of the river need to be accommodated and respected**.

Te Rangatiratanga O Ngati Rangitihi secretary David Potter explains, "[t]he debris dam, which Ngati Rangitihi strongly oppose, will result in damage to a wahi tapu [sacred place] and an archaeological site."[205] The council had ignored its obligations under the Resource Management Act to consult Ngati Rangitihi. David Potter told the Herald that the iwi wanted the dam stopped regardless of the effect on the 57 property owners. He said Ngati Rangitihi told them not to build in the area when it was subdivided in the 1970s. "They built on a burial ground. We asked them not to build there."[206] The iwi had also warned that the area was prone to flash floods.

The connection between land loss and climate change is made by the environmentalist Emily Bailey, who explains that "[o]ften, more importantly, a lot of urupā (burial grounds) are on the coast… This fact is stressful, and with the legacy of land confiscation still keenly felt by Taranaki Māori, creating new places to bury their dead were already limited."[207] Even when the connections between colonisation and extreme weather impacts are not made explicit they can still be determined. Umupuia Marae was flooded in 2017, and trustee Laurie Beamish stated that it was important to "have a hui that talks about the proximity of our koiwi (bones) our tupuna (ancestors) in the burial grounds right next to the road so that the wāhi tapu (sacred area) is not compromised with any rebuild of the road."[208]

Marae

A marae is a fenced-in complex of carved buildings and grounds that belongs to a particular iwi, hapū, whānau, or Māori community. Māori people see their marae as tūrangawaewae – their place to stand and belong. Marae are used for meetings, celebrations, funerals, educational workshops and other important tribal events. A marae incorporates a carved meeting house (wharenui) with an open space in front (marae ātea), as well as generally having a dining hall and cooking area, and a toilet and shower block. In 2009, Te Puni Kokiri reviewed of marae across New Zealand in their report *Status of Marae in 2009 – Te Ora o te Marae i 2009* but it did not discuss disasters or climate change.[209]

In their EMP, Ngāti Hauā note that "Our deteriorating marae infrastructure and facilities may be vulnerable to natural hazards, natural disasters, and the effects of climate change." Likweise, Poupatate Marae whānau have had previous experience with flooding and its impact on the marae. Initially, the marae was located closer to the Rangitikei River than its current site. After a severe flood, it was moved to higher land in 1870. One whānau member explained:

> "Our maraes were moved because of the floods, and they were flat down on the river bank. So floods like that, they would have been rushed right out, hence the reason why they moved them up on top of the hill and down the road further. There were actually two marae down by the river – Te Tikanga, which is now up on top of the hill, and Poupatate."[210]

Because the marae has been relocated to higher ground, when floods swept through the region in 2004, it was safe and ended up serving as a hub for displaced people. "Three whānau from the area relocated to the marae for about a month following the event. Throughout that period, other members of the community also visited and utilised the marae on a daily basis… The marae also provided accommodation during the recovery phase, allowing whānau members to resume their normal daily lives"[211] This is an important point, while marae are threatened by climate change and extreme weather they are also **central community hubs providing respite and safety in disasters**. One article in 2013 noted the cost of insuring a marae:

> "We know insurance comes at a huge cost for Maori, iwi and hapu who have to insure their home contents, their homes and businesses and also their marae. The cost of full insurance for marae can be unaffordable for many hapu and iwi. Some marae are paying at least $12,000 annually in insurance but others pay much more, depending on the risks, such as flooding."[212]

As the author, then MP Tariana Turia explained "at Whangaehu, the cost of insurance is still enormous because of the flood risk, despite the protections we have put in place." "Our marae are the central hub for whanau and hapu activity - so restoring and protecting the marae is a high priority, but it is one that is financially challenging for many of us" Tariana Turia continues, emphasising the role marae play in contemporary Māori communities.

Insurance was raised after flooding saw a river run through the meeting room at the Putiki Marae and damaging 200 year old carvings, as were more subjective elements to the damage. One local explained that it "was an emotional experience", noting that "repairing sacred Maori art would not come cheap when the taonga was priceless."[213] "Insurance-wise," the local explained, "we couldn't even get an evaluation on the carvings, with [them] being original. No insurance company wanted to go near it." The idea of the marae as a taonga was repeated in another story about flooding, as one member explained that all they wanted to do was stay and protect the marae which they see as their taonga.[214]

In another article, Darren King, from NIWA, worked with Matihetihe marae in the Far North, situated behind sand dunes in Mitimiti north of the Hokianga harbour. As he explains, "[t]he sea is encroaching particularly during storm events. They've had multiple floods at the marae. We did

some work to better understand what the future might look like up there, the implications of the changes ahead. The whānau there are working on a climate change strategy for their marae."[215] Another marae in similar circumstances is Mirumiru Marae on the West Coast of the North Island. The marae is at risk of flooding and erosion due to rising river levels from climate change. As one member explained, "we became aware that access, not just to our marae, but over the hill at Kiritehere, to our papakainga areas. The water, the tide marks were starting to encroach on the land banks. You'd be sitting there some days and there are waves that are rolling over our bridge at Kiritehere." Flooding has stopped the marae from holding tangihanga, whānau hui, as one member notes, "We haven't been able to carry out some of the traditional practices that we've always done over here because of the change and the climate and our tidal movements."[216]

COMMUNITIES AND ECONOMIES

This section will examine how the impacts of climate change and extreme weather are understood to impact Māori communities and economies.

Community

"Some Māori communities", Janet Stephenson and colleagues explain, "may be disproportionately vulnerable because of their socio-economic characteristics, and heavily exposed because of their reliance on coastal mahinga kai, and the proximity of housing and community infrastructure to active coastal processes such as erosion."[217] Furthermore, many Māori communities are located in suboptimal areas, as "Māori were left with small sections of some of the worst land, and where settlements had once been on elevated sites with ample space, they were now squashed into often damp, low-lying areas."[218]

The Ngā Pae o te Māramatanga and Manaaki Whenua report *He huringa āhuarangi, he huringa ao: A changing climate, a changing world* explains that:

> "It is expected that Māori will be disproportionately affected by climate-change-related health impacts, although impacts will vary between communities and be influenced by geographic location, socio-economic status, existing health conditions, health system capability, and the capacity to adapt. Direct impacts on health include increased exposure to potentially harmful weather events such as heatwaves and floods. Indirect effects include reduced water availability and quality. Impacts on water are likely to be greatest where reticulated supply systems are poorly developed (or absent altogether), and where communities lack the resources to import water or pay for private treatment facilities. Other indirect impacts include the arrival of new infectious-disease vectors such as mosquitoes, disruptions to health services and food security, housing and livelihood stresses, and health inequalities."[219]

The Iwi Leaders Group have a branch focused on climate change policy. Mike Smith leads this branch, and he explains "[w]e're super vulnerable, like we are to anything. When it comes to climate change it's like the poorest people in the world are going to be hit the hardest first and that's a lot of us."[220] Here Mike Smith makes the connection between poverty and risk clear and direct.

Ngāti Porou provide a deeper historical context to this connection, worth quoting in full:

> "The impact of erosion and flooding was felt as early as the 1930s. A huge storm in 1938 caused extensive damage right across the rohe. In Tokomaru Bay bridges were washed away and huge boulders scattered at the school. At Waiomatatini Ta Apirana Ngata's Bungalow was flooded and the marae dining hall was undermined and collapsed. At Rangitukia buildings were swept into the river. Whanau at the time were left in a desperate plight. Although the development schemes had helped alleviate some poverty, Maori whanau were still suffering badly from the economic depression. Some whanau at Rangitukia for example had lost their whole crop of kumara in the floods and had little to eat and the community as a whole had little to spare… The impact of Cyclone Bola in 1988 was hugely destructive. But the impact was much worse because it hit a people who were suffering financially after being devastated by the economic changes of the time. High unemployment and a struggling local economy meant that when the environmental storm hit, it met a perfect social and economic storm and the impact was simply devastating. The biggest long-term threat to our environment is global warming caused by human-made emissions of carbon dioxide. The negative impact of climate change on the world's economy will have the most impact on our people because we are the poorest in this country. Erosion will continue to worsen, affecting our whenua and our ability to farm sustainably. The impact of storms like those of 1938 and 1988 will worsen and the super-storm cycle will speed up in frequency."[221]

The Ngāti Rangiwewehi EMP also makes the connection with poverty:

> "Rural settlements such as Awahou Village are vulnerable to extreme weather events. Important contextual factors that influence the exposure and sensitivity of rural Maori settlements and infrastructure to climatic hazards include low investment in rural infrastructure (e.g., clean water resources, housing, and roading), the marginal nature of some Maori land-blocks and the building of settlements and infrastructure close to waterways, floodplains and coastal areas. Additionally landowners often have lower economic power and restricted access to finance and these factors contribute to an overall reduced capacity to cope."[222]

In the Te Arawa climate change strategy this connection is also made: "Te Arawa experiences a disproportionate amount of economic poverty. This means that our whānau face other struggles that make mitigation for and adaptation to climate change difficult."[223]

Climate change and particularly sea level rise places some Māori communities at risk. Regarding the rising tide in Mitimiti, one participant told the NIWA Māori Environmental Science Programme: "It's a worry because yeah, you can see there is a change, and I think the worry for me is the timeframe. Say for instance down here, even though we're up on a hill, the reality is, that

tide could be just sitting below the house in we don't know how many years. So that's a concern. And just making sure we still have a community in the next 30 years' time, you know what I mean."[224]

Māori communities at risk also draw **parallels between retreat from sea level rise and land loss caused by colonisation**. In Awatarariki the council have been advocating a managed retreat from the coast for a group of threatened houses, which has generated a range of positions and emotions. As one whānau explained, "I'm not scared, when it rains that doesn't worry me. I don't feel unsafe, I'm quite happy in my family home which I have lived in for over 30 years. Where do I go where I'm not in danger from tsunami, earthquakes, volcanoes? Where in New Zealand could you go?" As they note, the situation has left them feeling like "We have no agency, no comeback, no mana."[225] Another Māori resident saw parallels between land loss during colonisation to their current situation, "My tipuna would be turning in their graves knowing I'm having to fight for our whenua again."[226]

Likewise, Adreanne Ormand makes the connection between climate change and colonisation, explaining that she

> "[S]ees these as having their origin in colonization. "I think that in these communities you're dealing with a real sense of how to survive. What affects us the most? What puts us at risk the most? It's not the natural disasters … it's this incremental stuff that we see people die from. We don't see them die from volcanoes or tsunamis, we see them die from diabetes, heart attack, worry, lack of education, poverty." In Dr. Ormand's view, their lives are about survival. "… death by a volcano, tsunami, or earthquake, is a quick death. This other stuff I see as slow death."[227]

Economy

The 'Māori economy' is largely built on primary industries, which are at risk from climate change. WAI 2607 notes that "The livelihoods of Maori are strongly linked to agricultural and horticultural land use… Maori agricultural and horticultural investments are exposed and vulnerable to climate variability."[228]

The report *He huringa āhuarangi, he huringa ao: A changing climate, a changing world* also outlines that:

> "Changing climatic conditions are expected to present diverse risks to Māori capital, enterprise and employment. Over 68% of Māori businesses are in the primary sector, where climate change impacts are likely to be significant. Large proportions of Māori land are already experiencing high rates of erosion. Over 80% of Māori land is defined as hilly-to-mountainous and is susceptible to major erosion events such as landslides. Extreme rainfall events associated with climate change are likely to exacerbate the problem, and future-proofing this land is critical. Māori are also soon to

> own nearly 40% of commercial forestry plantations, which are vulnerable to climate extremes such as high-intensity storms, droughts and wildfires. More frequent and severe droughts, particularly across eastern and northern areas of the country, are very likely to affect production yields and product quality in Māori forestry, farming and horticulture operations. Māori investments in the fisheries sector are also significant (Māori own 33% of quota by volume). Nearly half of these investments are in potentially at-risk species like pāua, kōura and hoki. Overall, changing climatic conditions are expected to adversely impact the natural assets of the Māori economy."

TE REO MĀORI

Climate change and extreme weather also threaten te reo Māori and the connections to nature embodied in the language. As the Science Learning Hub outlines:

> "Climate change may also erode te reo Māori. As te reo Māori is place-based, there are risks to the integrity of te reo Māori me ōna tikanga through sea level rise and the displacement of iwi/hapū in coastal margins to alternative locations, potentially severing the link between iwi/hapū, whenua and taonga."[229]

This point is also made by *He huringa āhuarangi, he huringa ao: A changing climate, a changing world:*

> "Most landscapes have waiata [songs], pūrakau [narratives], whakatauki [parables], and karakia [prayers] associated with them that inform about human-environment history, claims to place, and risk. Climate-change-related damage, modification, and/or permanent loss of cultural locations and features, especially sites of significance, may therefore also affect the retention of specific forms of language and customary practice." [230]

And the MfE report *Our Atmosphere and Climate 2020:*

> "Because te reo is often closely associated with a place, there are risks to the integrity of te reo, tikanga (customs), and the intergenerational transfer of mātauranga from sea-level rise and the displacement of iwi or hapū who live near the coast."[231]

Even something as intangible as language is at risk from climate change.

CONTEXT

Disaster studies

Disaster studies have transformed dramatically since the 1970s.[232] Both DRR and disaster risk management (DRM) emerged as key frameworks during that decade, along with further conceptual additions such as resiliency, response, recovery, and in particular, vulnerability.[233] In particular, the **new focus on vulnerability was heralded as a new paradigm**.[234] It created the distinction between a physical 'hazard' and the 'disaster', with the latter now understood "within the context of everyday life and how power and resources are shared within society—that is, to appraise vulnerability to disaster as a cultural, economic, political, and social construct."[235] Disasters became "moments of space-time compression within broader social and historical processes."[236]

However, even as the conceptual scope of disaster studies has broadened, it remains **bounded by scientific and technocratic (decision making by experts) approaches** and is consequently, relatively event-centric and linear in its framing. This is not very surprising as it is a largely Western creation and as such reflects the deeper Western ways of understanding and relating to the world. In the field of disaster studies, this is referred to as the physicalist – or more expansively "geophysicalist and technocratic reductionism" – paradigm.[237] This paradigm is governed by deterministic laws of cause and effect and is good at providing insights into physical systems. However, its usefulness is far more limited when it comes to complex, chaotic systems. That is, systems that are both physical – e.g. the water in a river or the lava in a volcano – and socio-ecological – e.g. human society – in constitution. Its ability to provide control over physical systems has also engendered a dangerous assumption the same control is achievable for socio-ecological systems, which underpins the technocratic approach. These are limitations placed on disaster studies by the underpinning Western beliefs about reality and ways of exploring and understanding it. The Western worldview by default frames disasters and the associated preparations and reactions in terms of linear cause and effect, and seeks to understand and manage them through science and technocracy, respectively.

Janki Andharia argues that disaster studies "is largely dominated by scientists and technocrats" and that the "hazard-centred paradigm is located in a general discourse of capitalist modernity where nature and society are separate and nature is a commodity that can be appropriated and controlled through the application of expert knowledge."[238] Likewise, Andrew Oliver-Smith refers to "the

heavily technocratic bias in disaster management" and notes how the field has failed to "meaningfully address the question of causality of disasters" such that "the social roots of disasters in formal institutional contexts has actually had little effect in the actual practice of disaster risk reduction."[239] Rather, risk is viewed as an externality that should be managed and prepared for rather than avoided "by addressing the underlying socially embedded causes and risk drivers."[240] "Current approaches," Ksenia Chmutina and colleagues explain, "see disasters as a one-off "event" rather than as a sociopolitical process."[241] "Cultural and anthropological perspectives are largely ignored by 'scientific literature'" and "disaster management practice has focused on impacts and technological 'fixes'", Janki Andharia explains, "resulting in the study of disasters becoming largely event centric, bounded by space and geography."[242] In his review of the literature, JC Gaillard suggests that while disaster studies claims "to be so critical and radical" it "may still be perpetuating the hegemony of Western scholarship", finally concluding that "disasters continue to be seen as technocratic issues, as they were 40 years ago."[243] The field needs "different epistemologies."[244]

As a counter, Alicia Sliwinski refers to what she consider the "defunct event-centric, 'hazards view' of disasters—where the goal of recovery meant a return to the status quo, albeit with improved technological fixes."[245] She further identifies how a "linear understanding… [use to inform] sequential typologies." Thus, while acknowledging the influence the linear, events-centric framing had, she believes that "[c]ontemporary approaches have debunked this 'physicalist paradigm' and instead adopt integrated and multidisciplinary lenses."[246] Yet, Christine Gibb, refers to the still "dominant physicalist discourse in disaster studies."[247] Likewise, Ksenia Chmutina and colleagues note that "the measurement of progress towards DRR remains event/hazard-centric."[248] Janki Andharia also "stresses the need to go beyond the current dominant view of disasters, based on instrumental rationality."[249] Andrew Oliver-Smith notes that DRR needs to "focus not solely on catastrophic *events*, but on the risk and vulnerability that preceded the event(s)", understanding disasters "as processes that unfold through time and their beginnings are deeply embedded in societal history and culture and responses to threat as well as impact must be framed with that understanding in mind."[250] Even as the field has evolved, **disaster studies still largely centre around 'the event', are sequentially ordered – though admittedly 'resilience' can be seen as straddling the risk-reduction-disaster-response-recovery linear flow – and are based on a scientific approach to knowledge and a technocratic approach to management.** The Sendai Framework has been criticised by some for continuing the dominance of the physicalist paradigm, though this is a relatively rare criticism compared to previous Frameworks.[251]

Sendai

Adopted in 2015, the Sendai Framework for Disaster Risk Reduction is the latest iteration of the international community's collective disaster risk reduction planning. Collective planning by the international community for Disaster Risk Reduction can be traced back to the 1990s, the decade designated the 'International Decade for Natural Disaster Reduction'.[252]

The end of the Cold War facilitated international cooperation just as a growing consensus emerged around the risks posed by climate change, biodiversity loss, and socio-economic inequality. The Sendai Framework's predecessor, the Hyogo Framework for Action 2005–2015, emerged as part of the wider global accord that saw the creation of the Framework Convention on Climate Change, the Millennium (and then Sustainable) Development Goals, and the Convention on Biological Diversity.

> "Synergies between international policy frameworks, including between the United Nations' Framework Convention on Climate Change (UNFCC), the Sustainable Development Goals, and the Sendai Framework for Disaster Risk Reduction, are being realized to take advantage of the Agenda 2030 policy window. As a result, reducing vulnerability and building resilience are no longer seen as competing, but rather as parallel concepts, converging toward the improvement of societal outcomes."[253]

This section will outline the Framework's outcomes, goals, targets, and priorities – also providing a Māori perspective for each – before examining its implementation internationally and in Aotearoa New Zealand. First, however, a graphic outline of the Framework.

Chart of the Sendai Framework for Disaster Risk Reduction
2015-2030

Scope and purpose

The present framework will apply to the risk of small-scale and large-scale, frequent and infrequent, sudden and slow-onset disasters, caused by natural or manmade hazards as well as related environmental, technological and biological hazards and risks. It aims to guide the multi-hazard management of disaster risk in development at all levels as well as within and across all sectors

Expected outcome

The substantial reduction of disaster risk and losses in lives, livelihoods and health and in the economic, physical, social, cultural and environmental assets of persons, businesses, communities and countries

Goal

Prevent new and reduce existing disaster risk through the implementation of integrated and inclusive economic, structural, legal, social, health, cultural, educational, environmental, technological, political and institutional measures that prevent and reduce hazard exposure and vulnerability to disaster, increase preparedness for response and recovery, and thus strengthen resilience

Targets

- Substantially reduce global disaster mortality by 2030, aiming to lower average per 100,000 global mortality between 2020-2030 compared to 2005-2015
- Substantially reduce the number of affected people globally by 2030, aiming to lower the average global figure per 100,000 between 2020-2030 compared to 2005-2015
- Reduce direct disaster economic loss in relation to global gross domestic product (GDP) by 2030
- Substantially reduce disaster damage to critical infrastructure and disruption of basic services, among them health and educational facilities, including through developing their resilience by 2030
- Substantially increase the number of countries with national and local disaster risk reduction strategies by 2020
- Substantially enhance international cooperation to developing countries through adequate and sustainable support to complement their national actions for implementation of this framework by 2030
- Substantially increase the availability of and access to multi-hazard early warning systems and disaster risk information and assessments to people by 2030

Priorities for Action

There is a need for focused action within and across sectors by States at local, national, regional and global levels in the following four priority areas.

Priority 1
Understanding disaster risk

Disaster risk management needs to be based on an understanding of disaster risk in all its dimensions of vulnerability, capacity, exposure of persons and assets, hazard characteristics and the environment

Priority 2
Strengthening disaster risk governance to manage disaster risk

Disaster risk governance at the national, regional and global levels is vital to the management of disaster risk reduction in all sectors and ensuring the coherence of national and local frameworks of laws, regulations and public policies that, by defining roles and responsibilities, guide, encourage and incentivize the public and private sectors to take action and address disaster risk

Priority 3
Investing in disaster risk reduction for resilience

Public and private investment in disaster risk prevention and reduction through structural and non-structural measures are essential to enhance the economic, social, health and cultural resilience of persons, communities, countries and their assets, as well as the environment. These can be drivers of innovation, growth and job creation. Such measures are cost-effective and instrumental to save lives, prevent and reduce losses and ensure effective recovery and rehabilitation

Priority 4
Enhancing disaster preparedness for effective response, and to «Build Back Better» in recovery, rehabilitation and reconstruction

Experience indicates that disaster preparedness needs to be strengthened for more effective response and ensure capacities are in place for effective recovery. Disasters have also demonstrated that the recovery, rehabilitation and reconstruction phase, which needs to be prepared ahead of the disaster, is an opportunity to «Build Back Better» through integrating disaster risk reduction measures. Women and persons with disabilities should publicly lead and promote gender-equitable and universally accessible approaches during the response and reconstruction phases

Guiding Principles

- Primary responsibility of States to prevent and reduce disaster risk, including through cooperation
- Shared responsibility between central Government and national authorities, sectors and stakeholders as appropriate to national circumstances
- Protection of persons and their assets while promoting and protecting all human rights including the right to development
- Engagement from all of society
- Full engagement of all State institutions of an executive and legislative nature at national and local levels
- Empowerment of local authorities and communities through resources, incentives and decision-making responsibilities as appropriate
- Decision-making to be inclusive and risk-informed while using a multi-hazard approach

- Coherence of disaster risk reduction and sustainable development policies, plans, practices and mechanisms, across different sectors
- Accounting of local and specific characteristics of disaster risks when determining measures to reduce risk
- Addressing underlying risk factors cost-effectively through investment versus relying primarily on post-disaster response and recovery
- «Build Back Better» for preventing the creation of, and reducing existing, disaster risk
- The quality of global partnership and international cooperation to be effective, meaningful and strong
- Support from developed countries and partners to developing countries to be tailored according to needs and priorities as identified by them

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The United Nations Office for Disaster Risk Reduction

The New Zealand National Disaster Resilience Strategy published in 2019 summarises the key ideas of the Framework as:

- A greater effort to understand risk (in all its dimensions), so we can prioritise investment, make better risk-informed decisions, and build resilience into everyday processes.
- A shift of focus from managing disasters to managing risk, including to reduce the underlying drivers of risk (exposure and vulnerability).
- A broader whole-of-society approach to risk – everyone has a role in reducing and managing risk.[254]

The core outcome the Framework aims to achieve is the "substantial reduction of disaster risk and losses in lives, livelihoods and health and in the economic, physical, social, cultural and environmental assets of persons, businesses, communities and countries."[255] To achieve this, its main goals are to **both prevent new and reduce existing disaster risk**.

The **focus on prevention** marked a "**paradigm shift in DRR**, from earlier strategies of managing disasters once they occurred to minimizing the risk of disasters and building societal resilience to future events."[256] "Central to the Sendai Framework is a shift of focus from managing disasters to managing risk, including the reduction of the underlying drivers of risk, that is exposure and vulnerability."[257]

It aims to prevent new risk and reduce existing risk through integrated and inclusive economic, structural, legal, social, health, cultural, educational, environmental, technological, political and institutional measures. These measures are intended to: prevent and reduce hazard exposure and vulnerability to disaster; increase preparedness for response and recovery; and, strengthen resilience.

MĀORI PERSPECTIVE

Both the outcome and goal of the Framework explicitly reference 'culture', specifically aiming to reduce risk to 'cultural assets' through 'inclusive cultural measures'. Both of these inclusions provide a degree of nuance and versatility to the Framework as they infer that both the identified 'assets' at risk and the methods deployed to protect all 'assets' will be partly determined partly by cultural values. One potential area of concern is the use of the term 'assets', which frames the calculus of value through an econometric lens.

GLOBAL TARGETS OF THE FRAMEWORK

The Framework has seven global targets:

1. Substantially reduce global disaster mortality by 2030, aiming to lower average per 100,000 global mortality between 2020-2030 compared to 2005-2015;
2. Substantially reduce the number of affected people globally by 2030, aiming to lower the average global figure per 100,000 between 2020-2030 compared to 2005-2015;
3. Reduce direct disaster economic loss in relation to global gross domestic product by 2030;
4. Substantially reduce disaster damage to critical infrastructure and disruption of basic services, among them health and educational facilities, including through developing their resilience by 2030;
5. Substantially increase the number of countries with national and local disaster risk reduction strategies by 2020;
6. Substantially enhance international cooperation to developing countries through adequate and sustainable support to complement their national actions for implementation of the framework by 2030;
7. Substantially increase the availability of and access to multi-hazard early warning systems and disaster risk information and assessments to the people by 2030.[258]

The targets can be grouped into two general categories. Four of the seven targets (1-4) are outcome-focused, they seek a reduction in human and material losses from disasters. The remaining three targets (5-7) are input-focused, pursuing nationally-led and owned mechanisms to reduce disaster risk.

MĀORI PERSPECTIVE

Several of the Framework's targets reinforce a Western worldview. Target 3 emphasises 'economic loss' and 'gross domestic product', placing an instrumental lens over damage. It conflates 'value' with 'worth' and in so doing restricts intangible and/or intrinsic value.

Target 4 has a focus on 'critical infrastructure'. Examples of this are provided as "water, transportation and telecommunications infrastructure, educational facilities, hospitals and other health facilities."[1] There is a risk that what is deemed 'critical' will ignore or exclude Māori infrastructure.

FRAMEWORK PRIORITIES FOR ACTION

The Framework has four priorities for action:

Priority 1: Understanding disaster risk.
Priority 2: Strengthening disaster risk governance to manage disaster risk.
Priority 3: Investing in disaster risk reduction for resilience.
Priority 4: Enhancing disaster preparedness for effective response and to "Build Back Better" in recovery, rehabilitation and reconstruction.

The priorities for action focus on understanding risk across all dimensions. They guide and incentivize both the public and private sectors to address disaster risk through strengthened risk governance. They require multi-hazard early warning systems to be put in place, seeking to protect productive assets, improve both the safety and functionality of critical infrastructure, and strengthen disaster preparedness.

MĀORI PERSPECTIVE

Priority 1

Understanding disaster risk must include te ao Māori perspectives.

Priority 2

Any reference to governance invokes the need for rangatiratanga – Māori need at least some authority and control over DRR as it relates to them.

Priority 3

Investment needs to be at least partly determined by Māori authority and control.

Priority 4

'Build Back Better' must at least in part be determined by Māori and te ao Māori, as 'better' can be understood as at least partly culturally determined.

INDIGENOUS PEOPLE AND INDIGENOUS KNOWLEDGE IN THE SENDAI FRAMEWORK

There are four key references to indigenous people and knowledge in the Framework. First it is explained that:

> **Section 1 (7) - Introduction:** There has to be a broader and a more people-centred preventive approach to disaster risk. Disaster risk reduction practices need to be multi-hazard and multisectoral, inclusive and accessible in order to be efficient and effective. While recognizing their leading, regulatory and coordination role, Governments should engage with relevant stakeholders, including women, children and youth, persons with disabilities, poor people, migrants, indigenous peoples, volunteers, the community of practitioners and older persons in the design and implementation of policies, plans and standards.
>
> **Section 27 (h) - Strengthening disaster risk governance to manage disaster risk:** To empower local authorities, as appropriate, through regulatory and financial means to work and coordinate with civil society, communities and indigenous peoples and migrants in disaster risk management at the local level.

During the development of the Sendai Framework "the necessity for Indigenous Peoples to have a voice in order to reduce disaster risk and vulnerability" was stressed.[259] Imposing centralised solutions to local problems", Lambert explains, "threaten a community's capacity to initiate risk reduction and save lives." [260] In this development phase four recommendations with regard to indigenous people were outlined:

1. recognition and better use of Indigenous perspectives and knowledge by incorporating these;

2. support for the creation of regional Indigenous networks to give voice to Indigenous advocates for disaster risk reduction;

3. advocacy, through respective National Platforms, for 'a seat at the table' and for the inclusion of Indigenous knowledge in national disaster risk reduction planning; and

4. provision of opportunities for Indigenous participation in regional and international forums.[261]

MĀORI PERSPECTIVE

The inclusion of indigenous peoples as 'relevant stakeholders' is a useful starting point for Māori. However, the way they are referenced in the wider list of stakeholders is not commensurate with the partnership position of the Treaty of Waitangi.

The Framework also highlights the importance of indigenous knowledge in understanding disaster risk:

> **Section 24 (i) – Understanding disaster risk:** To ensure the use of traditional, indigenous and local knowledge and practices, as appropriate, to complement scientific knowledge in disaster risk assessment and the development and implementation of policies, strategies, plans, and programs of specific sectors, with a cross-sectoral approach, which should be tailored to localities and to the context;
>
> **Section 36 (a) (v) – Role of stakeholders:** Indigenous peoples, through their experience and traditional knowledge, provide an important contribution to the development and implementation of plans and mechanisms, including for early warning.

As Simon Lambert and Melanie Mark-Shadbolt note, this "reaffirms the role of Indigenous Knowledges (IK) as complementing and contributing to more effective DRR. This hard won space for IK comes as Indigenous communities voluntarily contribute to the local management of disasters, including wildfire and threats to biodiversity in forest ecosystems."[262] Within wider DRR planning circles the capacity to proactively reduce risk from environmental hazards is the prime value of indigenous knowledge in disaster management, with many indigenous communities enacting DRR strategies in their planning, design, and life styles.[263]

MĀORI PERSPECTIVE

The inclusion of indigenous peoples as 'relevant stakeholders' is a useful starting point for Māori. However, the way they are referenced in the wider list of stakeholders is not commensurate with the partnership position of the Treaty of Waitangi.

PROGRESS TO DATE

As with all of the international agreements focused on ambitious goals and outcomes, progress on the Sendai Framework has been slow and uneven. Understanding disaster risk – the first of the Framework's priorities – has been particularly challenging.[264] Regarding the second priority on strengthening disaster risk governance, a number of countries have begun implementing legal frameworks covering disaster risk reduction and response. The third priority regarding the importance of investing in disaster risk reduction for resilience is universally acknowledged, however, financing these investments has so far proved to be much more difficult.[265] However, as one of the more targeted of the agreements, comparatively significant progress has been made since the Framework was signed, particularly in terms of monitoring and reporting.[266] By 2019, 113 countries were reporting at least partially for 2017, and 104 countries had started reporting for 2018.[267]

NEW ZEALAND DRR STRATEGY AND MĀORI

Rather than provide a comprehensive overview of New Zealand's DRR strategy, this section will focus on either general elements of relevance or those specific to Māori.

One area of interest for Māori is rangatiratanga over DRR. In the years since signing the Framework, "Aotearoa New Zealand has undergone governance reform that has resulted in realigned priorities and increased identification of the need to manage natural hazard and climate change risks."[268] There is "currently tension as to who should assess and manage vulnerability" in Aotearoa New Zealand."[269] While the Sendai Framework is incorporated into emergency management planning it is not referenced in strategic or statutory documents that guide land use planning under the RMA.

In 2019 the Aotearoa New Zealand Government published the National Disaster Resilience Strategy (NDRS). The NDRS notes in a section on *Resilience and te ao Māori* that recent Māori responses to disasters have "generated considerable interest in Māori disaster resilience. Māori moral and relational attributes applied to creating community resilience promote a collaborative

approach to disaster response and recovery, commitment to environmental restoration, and the extension of hospitality to others experiencing adversity."[270]

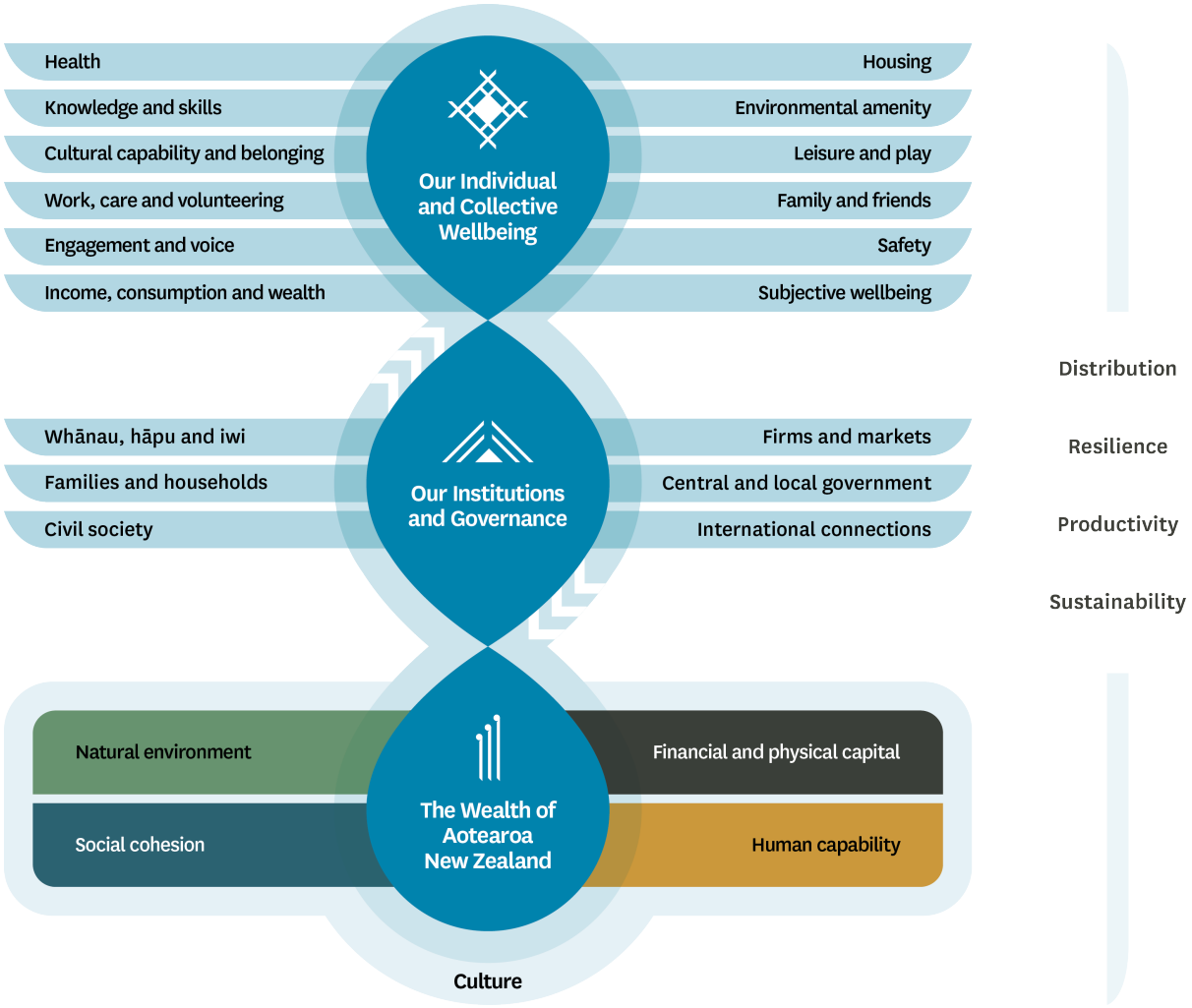
One of the objectives of the NDRS is:

> "Build the relationship between emergency management organisations and iwi/groups representing Māori, to ensure greater recognition, understanding, and integration of iwi/Māori perspectives and tikanga in emergency management."[271]

The NDRS uses the term whakaoranga, meaning "the rescue, recovery and restoration of sustainable wellbeing."[272] As the NDRS notes:

> "[The process of] whakaoranga – the rescue, recovery and restoration of sustainable wellbeing – and may be applied to whānau, hapū, and iwi, tribal homelands as well as all communities and parts of New Zealand impacted by disasters. The whakaoranga process is underpinned by kaupapa Māori (cultural values), informed by mātauranga Māori (cultural knowledge and science) and carried out as tikanga Māori (cultural practices). These cultural attributes interact to co-create community and environmental resilience in the context of disasters.

The NDRS also "incorporates the Treasury's Living Standards Framework [LSF] and considers the types of resilience needed to protect and grow our wellbeing."[273] The "LSF provides a conceptual, theoretical, and practical basis for thinking about good economic, environmental, and social policy in an integrated way."[274]



MĀORI PERSPECTIVE

While the four capitals concept has been critiqued by Māori, it still brings wider understanding closer in line with te ao Māori.

INPUTS AND OUTPUTS BETWEEN SENDAI AND KAUPAPA MĀORI FRAMEWORKS

There are a number of important inputs and outputs between the Sendai and Kaupapa Māori Frameworks:

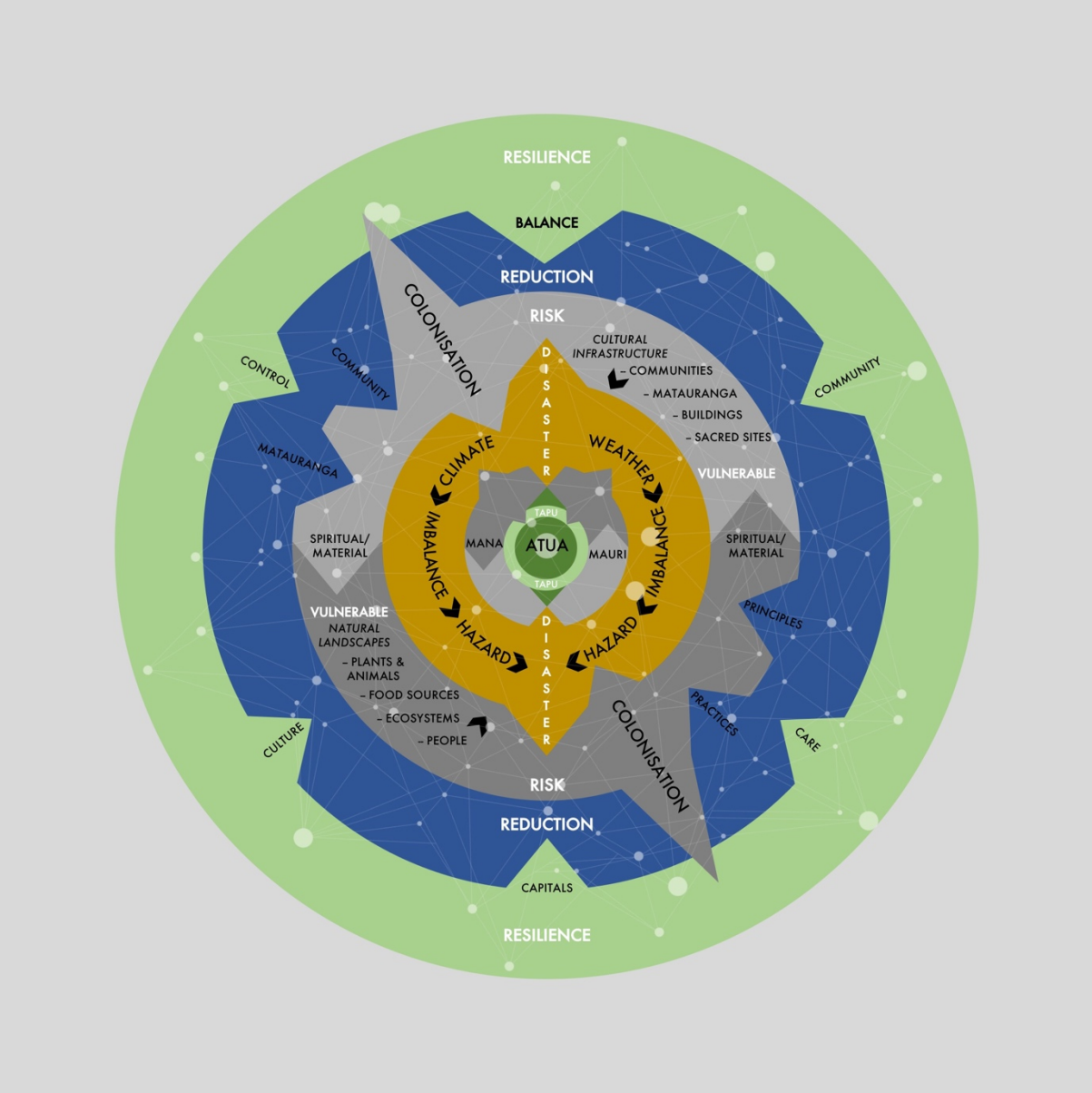
- Māori have a broad understanding of risk, and the vulnerabilities to it. This comes both from the deep underpinnings of te ao Māori, where the holistic, relational, cyclical, and balanced understanding of reality resonates with the need to work in ways that prevent

and reduce risk across human and non-human communities, and from their increased vulnerability caused by colonisation;

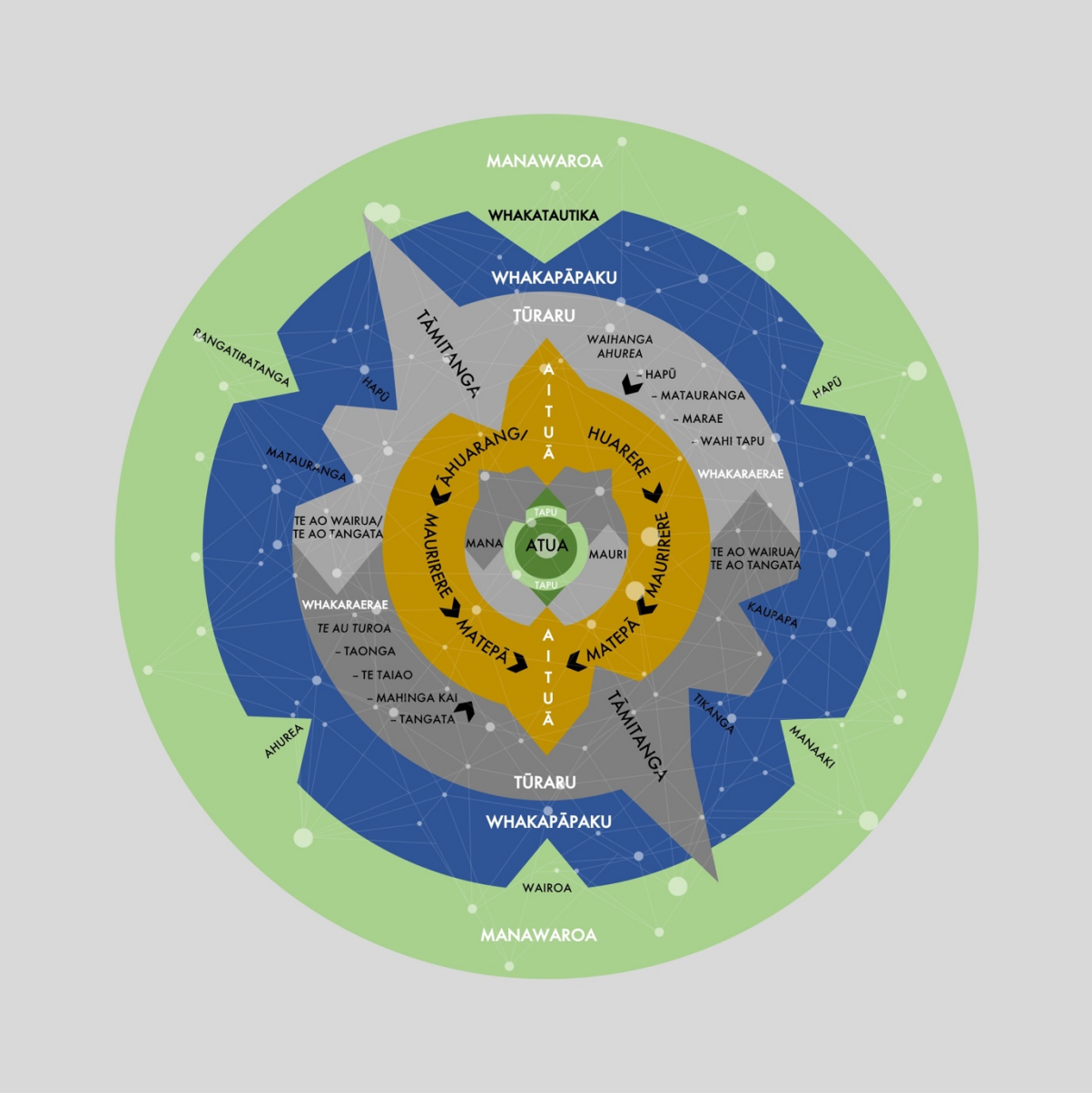
- The Māori understanding of disasters and the risks they pose provides a complementary 'plug in' for New Zealand's wider strategy, helping make it more comprehensive and inclusive;
- The Sendai Framework's emphasis on disaster risk governance has particular relevance for Māori, who seek to increase their rangatiratanga, though Māori will need to be more than 'relevant stakeholders'.

KAUPAPA MĀORI FRAMEWORK

The following framework has been structured to focus on hazards, disasters, risk and vulnerability, reduction, and resilience. The aim is to provide kaupapa Māori interpretations of these core components of DRR, but to do so in a way that is both able to serve as an interface between standard DRR and kaupapa Māori approaches but is also tūturu, that is real and authentic to te ao Māori and mātauranga Māori. Rather than present this information in a linear framework, Graphic 1, in English, and Graphic 2, in te reo Māori, provides this **DRR framework using a holistic, relational, and cyclical form – though as will be seen there is both balance and imbalance**. The graphic takes a circular form, incorporating both the holistic and cyclical elements, with each concentric sphere symbolising a critical aspect of the framework. It should be noted that while the spheres are distinct, in many ways they bleed together, particularly for reduction and resilience. The graphic also incorporates the relational interactions across each sphere through the use of triangles (or chevrons in some cases), which symbolise critical interferences or influences. For example, the atua are the source of both mana and mauri, so their circle has triangles jutting out into the each of the cosmic forces' orbit. The one exception is whakapapa, which is represented as a network of nodes across the entire graphic, intended to indicate the all-encompassing nature of whakapapa as a web that binds all of creation. Finally, these concentric spheres can be seen as having both an inward and outward force, much like the play between gravity and fusion within a star. The atua are at the centre, manifesting everything else including the hazards and disasters they cause (if sometimes by-proxy caused by humanity), while resilience can be seen as pushing against these hazards and disasters, providing the stabilising counter-force. Each concentric layer will be examined after the graphics.



Graphic 1 – Kaupapa Māori DRR



Graphic 2 – Kaupapa Māori DRR

Hazards

A Māori DRR framework needs to be built on insights into the nature of the hazards posed by extreme weather and climate change from a Māori perspective. The UN defines a hazard as a "process, phenomenon or human activity that may cause loss of life, injury or other health impacts, property damage, social and economic disruption or environmental degradation."[275] Māori understandings of hazards are different from this physicalist definition, requiring a 'cosmological perspective'. This must **start with the atua**, who lie at the centre of the graphic because of their foundational role. All the elements of the natural world are descended from the atua, which is shown in the graphic by the web of whakapapa spreading out as a network across all spheres. The atua are also the source of mauri, tapu, and mana. The sacred restrictiveness of tapu is indicated through its ring-like shape placed protectively around the atua, with the arrows from mana into tapu representing the relationship between these two. Mauri and mana are more dynamic, interactive forces, which is represented by the way their arrows flow into each other and they are both moving around the atua and tapu.

A Māori definition of hazards would include reference to the spiritual causes and consequences, and the UN definition might be simply amended to note that hazards are '**spiritual/material** processes, phenomenon, or human activity…'. The following will cover only causes as the consequences are dealt with in the next section. Critically the spiritual and material are intertwined, hence the slash, though the spiritual precedes and informs the material, hence the word order. They are both at the same time rather than being one or the other. A hazard is manifestly physical yet will have an underlying spiritual component though even breaking it into such binaries is difficult as the spiritual and material cannot be separated. For example, the Hawkes Bay earthquake in 1931 was understood by local Māori as the angry response by the atua Rūaumoko (atua of earthquakes) to the despoliation of Te Whanganui-a-Orotū lagoon by sewage.[276] At the same time, they understood this was a physical event, with both physical causes and outcomes. It needs to be remembered that the atua are the personifications of the natural phenomena so the 'anger' could be understood as the increasing pressure on the tectonic plates. The causes were manifold, it was not just the anger of the atua but the apparent failings of local Māori as kaitiaki, as Xavier Forsman explains:

> "Many of the local Māori were dismayed that the waters from which they collected food were rapidly becoming spoilt. Some tried to avert the pollution by digging trenches to let the freshwater

> from the adjacent rivers flow in but the efforts were largely futile. The locals' role as kaitiaki was under threat, and it was thought that a failure on their part to fulfil their role would surely anger the gods."[277]

A spiritual explanation does not deny a physical one, they work in conjunction.

What makes these occurrences 'hazards' from a Māori perspective is that **they cause an imbalance, and this imbalance is both spiritual and material**. As India Logan-Riley explains, hazards "are a consequence of an imbalance with nature."[278] At the spiritual level it may be caused by an imbalance with an atua or between several atua, or by a human breaking tapu, and this in turn will imbalance the cosmic forces; materially, the imbalance could be between two parts of the environmental system, say the pressure on the tectonic plates, and the result will be the shifting of that imbalance to the ecosystems that sit above the plates. The spiritual and material explanations are complementary. Therefore, a critical addition to the amended definition above then is an '**imbalanced** spiritual/material processes, phenomenon, or human activity'.

The cosmic forces play a role as well. In relation to the Hawkes Bay earthquake, Forsman explains:

> "By attributing the earthquake to a god, the expression of mana may be thought of in two ways. Firstly, the earthquake itself as nature's ultimate expression of mana and as a response to the pollution of the Lagoon. Secondly, for the locals, the earthquake represents a loss of mana which reflects upon themselves and the rest of their kinsmen, and up to the ancestors from which their mana derives."[279]

Māori conceptions of hazards are not just understood through atua but have a tangible basis as lived experience. Because of the way Māori view time, **even historical events have a present day form, meaning they are not just a component of cultural history but of everyday reality**. As Darren King and James Goff describe, Māori oral narratives "contain substantial evidence of extreme disturbances across local land and seascapes, including stories of major floods, landslides, volcanic eruptions, earthquakes and tsunamis."[280] The Māori understanding of hazards – and the tohu through which they are understood and predicted – is a core component of mātauranga.

Disaster

The UN defines disasters as "a serious disruption of the functioning of a community or a society at any scale due to hazardous events interacting with conditions of exposure, vulnerability and capacity, leading to one or more of the following: human, material, economic and environmental losses and impacts."[281] **Disasters from a Māori perspective include the same human, material, economic and environmental losses and impacts as the conventional DRR**

framing, though these impacts are viewed in a holistic manner compared to the physicalist paradigm, with an intrinsically spiritual dimension, as indicated by triangles connecting the cultural infrastructure and natural landscapes sphere on the graphic, and by the labelling of spiritual/material at each intersection between the two. For example, **an environmental impact is not viewed as just the loss of a useful resource or amenity value, but rather can be understood to have direct human and spiritual consequences**, in some ways akin to the loss or injury of a loved one. From a conventional perspective "if an earthquake happens in an uninhabited area, it is not typically considered a disaster."[282] However, for Māori this is still a disaster as the land is viewed as kin, with its own intrinsic worth. In many respects, then, **there is little distinction between a 'hazard' and a 'disaster' in te ao Māori**. As Meg Parsons and Karen Fisher explain, for Māori, disasters "are not merely biophysical events, but rather occur within diverse socionatures (interwoven social, ecological, political, economic, and metaphysical worlds)."[283]

The concept of 'disaster' has an expanded understanding within te ao Māori. Disasters, Ocean Mercier considers, can cover a broad spectrum:

> "[M]y thoughts would turn to an earthquake, but is it also a disaster when a canoe overturns and four fishermen from a small community drown? My work tends to focus [on] the earthquakes, but I'm not sure that's reasonable without appreciating that earthquakes occur infrequently; other things happen more frequently, and the community's perception of risk and about whether or how to prepare for something is informed by how they prepare for and respond to more everyday kinds of things. So for example, a big flood might be a disaster, like a deluge that results from a typhoon. But recurrent flooding happens, and people prepare for that and respond to that in incremental ways. So theoretically, when the big one happens, they already have had enough experience with the smaller ones that they take action. It's a matter of scalability. Because all of New Zealand is very earthquake prone, earthquakes are very fresh in people's minds. On New Zealand's South Island, it's an important hazard. The Christchurch earthquake is still fresh in people's memory, and so they might, in terms of perceptions of what constitutes a disaster, earthquakes are rated quite highly."[284]

The **impacts of disasters on mana** was another point made by Ocean Mercier:

> "[I]f a disaster, say a flood, comes through and takes out all of the crops, then that leader is no longer able to provide for the wider community and may have to [humble himself] and ask other communities to help out. That might be interpreted as a loss of mana. That's quite a radical shift away from thinking just in terms of the loss of lives or physical assets."[285]

Disasters are **not just physical but also spiritual**. As Adreanne Ormond explains, "spiritual risk is absolutely key and many [Māori] processes are designed around spiritual risk, particularly at the community level."[286]

The **concept of 'disaster' was analogised with colonisation**. One interviewee told Simon Lambert and Melissa Mark-Shadbolt that:

> "One of the greatest disasters, I think, is being Indigenous people in a society that is not based in Indigenous values. So, it's almost like we exist as being's clinging to an extinct identity in a world that does not support it to flourish. That then filters down to influence many of the other ways that we know and recognize disaster. And one of the main things that we fight at home in terms of trying to survive, is trying to keep our identity. And that identity is largely linked to natural resources."[287]

Colonisation as a 'disaster' is widespread and ongoing, it can be understood as a 'meta-disaster' for Māori as it influences and impacts all other disasters they have experienced since. As Simon Lambert argues, 'Indigenous communities occupy a post-disaster world by definition… Indigenous Peoples are still responding, and barely—if at all—recovering from colonisation, the uber-disaster that provides a template for ongoing capital accumulation."[288] Meg Parsons and Karen Fisher make an interesting point after discussing Pākehā attempts to control rivers: "Floods were not necessarily interpreted as a disaster event for Māori within the Waipā however, the settler-state's responses to flooding were a disaster (part of the continuing disaster of colonisation)."[289] In other words, the perceptions of what a 'disaster' are can be so wildly variant in a settler state that the attempts to manage what Pākehā see as a disaster may actually be perceived as the disaster by Māori. Simon Lambert refers to "colonisation [as] the epitome of Smith's… 'disastrous accumulation'."[290] "Disastrous accumulation", Neal Smith himself explains, "has its origins not in a sullied environmental realm beyond the responsibility of capital but in the disastrous social relations that intrude capital accumulation between the natural world and people's need to live within that world."[291] In terms of colonisation as disastrous accumulation, Lambert notes that:

> "At the level of community and neighbourhood, household and family, many Indigenous peoples are experiencing the physical, economic, social and cultural collapse of their space and place. This has happened while non-Indigenous spaces and places have continued their expansion."[292]

There are a number of different ways in which colonisation interacts with the concept of disaster, from it being an underlying and ongoing disaster for Māori, to the way it exacerbates other disasters, to the way it changes what can be considered a disaster.

Vulnerabilities and risks

The UN defines risk as the "probability of harmful consequences, or expected losses… resulting from interactions between natural or human-induced hazards and vulnerable conditions."[293]

Vulnerability is defined as the "characteristics and circumstances of a community, system or asset that make it susceptible to the damaging effects of a hazard."[294] In essence, then, vulnerability indicates the exposed areas and potential for damage from a hazard, while risk refers to the likelihood that a hazard will impact vulnerabilities. Simon Lambert and Melanie Mark-Shadbolt conclude that "Indigenous communities will interpret their vulnerabilities as risks to their cultures in addition to their physical, financial, and social wellbeings."[295] However, it could be more accurate to say that Māori **vulnerability is best understood as the potential impacts of hazards on mana and mauri, which can have physical, financial, and social manifestations**. This is symbolised by the use of the same colours for the mana and mauri sphere and the cultural infrastructure and natural landscapes sphere. Māori risk is exacerbated by colonisation. The loss of mana following colonisation has increased Māori risk by making mana and mauri more vulnerable. This is compounded by the loss of mauri caused by colonisation, which has increased the vulnerability of the environment itself, as large swathes of forest have been cut down, wetlands drained, and waterways damned or diverted. Past and ongoing Māori experiences of colonisation, from land loss through to political and economic marginalisation provide a reflection point that embeds and enlivens Māori vulnerability to disaster at a visceral, lived level. As Sandy Morrison explains:

> "When I bring that to the present, it's not only acknowledging we have a spiritual side and mauri [life force], but we have a relationship with each other. We are in a web of interconnectedness with each other, where an action impacts the next. Now, we are experiencing climate change. We need to find out where that degradation started and work on how we can stop that happening now."[296]

At a deeper level, because of the interconnected and interactive nature of both mana and mauri, it could be argued that Māori perceptions of what is vulnerable and the risks posed are heightened. **A disaster cascades, with the impacts effecting vulnerabilities that from a western perspective may appear to have no tangible connection but for Māori are tied together through the web of whakapapa and the cosmic powers**. Māori are likely to be both more exposed across more areas and more likely to experience a disaster.

While risk and vulnerability are more unified, or at least interconnected, in te ao Māori, there are more vulnerable aspects of both cultural infrastructure and natural landscapes that are at higher risk due both to their importance to Māori and the legacy of colonisation. Simon Lambert also notes that "[r]isks may include some that are unique to Indigenous communities – exacerbated by colonisation and ongoing marginalisation."[297] In another article, he notes that "Indigenous vulnerabilities are the flip-side of non-Indigenous resilience."[298] This mirrors the ways in which a

disaster for Māori may well be the Pākehā methods of reduction and resilience. While the specific natural and cultural landscapes will vary within Māoridom, broadly the natural landscapes can be understood as whenua (land), or more specifically the land an individual or group has whakapapa with, taonga (treasured resources, including plants, animals, and minerals), and mahinga kai (food resources and the areas they are sourced from). Cultural landscapes is a more amorphous concept, covering everything from wahi tapu (sacred traditional, spiritual, religious, ritual, or mythological places including burial grounds and battle sites) to buildings such as marae (communal buildings on tribal land), as well as the communities themselves, their economies, and the Māori language (te reo Māori) itself.

The **holistic view** has **practical ramifications** across understanding of hazards, vulnerability, and risk. During interviews with Māori academics on DRR, James Scott found:

> "[W]hen Māori were asked to define or elaborate on the concepts of hazards, vulnerability and risk, their responses led to a broader and deeper understanding of the issues facing Māori communities. These include, for example, land ownership and land use, which lead to poor water quality, which in turn affects sustainable agriculture and changes to the social and cultural make-up of a community."[299]

As well as mapping broader environmental interconnections, this summary also indicates the **connections between hazards, disasters, and responses** with wider **changes following contact and colonisation**.

Reduction – response and recovery

Reduction is defined by the UN as the "concept and practice of reducing disaster risks through systematic efforts to analyse and manage the causal factors of disasters, including through reduced exposure to hazards, lessened vulnerability of people and property, wise management of land and the environment, and improved preparedness for adverse events."[300] It has both an analytic and managerial quality, then, connecting understanding and action. There is also, to a degree, some bleed over with disaster response and recovery in terms of actions, particularly, which will be referenced here.

From a Māori perspective, there are five key components – symbolised by the triangles jutting into the risk sphere. Two are largely focused on understanding, two on action and one providing a bridge between the two. The two which provide understanding are mātauranga and whakapapa, which have been discussed above, these provide the knowledge base and abductive

epistemological methods for identifying hazards, risk, and vulnerability in a more unified and interconnected manner than the physicalist paradigm. The bridging component is kaupapa, often translated as principles or values, but in some cases best understood as ethics as they are moral principles that govern a person's behaviour. As Kenney and colleagues explain, kaupapa "effectively constitute a set of moral rules that are relationally implemented to address natural hazard risk and mitigate the impact of natural disasters."[301] Some of the most salient are: whanaungatanga (strengthening human relationships); kotahitanga (creating unity); rangatiratanga (showing leadership); wairuatanga (appreciating the spiritual), arohatanga (acting with love) as well as manaakitanga and kaitiakitanga, both of which James Ataria defines and contextualises when asked about risk and reduction:

> "… what comes to mind when you talk about risk and risk reduction, are some basic Māori values, things like manaakitanga, which is the notion of the responsibility for caring for things, both animate and inanimate things. It comes with things like kaitiakitanga, which is often referred to as stewardship of natural resources and for the notion of creating benefit and wellbeing for your community, for your people, for your families."[302]

McLachlan and Waitoki also identify how "shared cultural values held by community members ensured that responses were fast, and targeted… [Māori] communities have a much greater connections and bonds that reflect traditional values of aroha, manaakitanga, kaitiakitanga, mātauranga Māori and rangatiratanga"[303] They highlight the role of rangatiratanga, noting:

> "Māori taking leadership of coordinating and addressing community needs at times of crisis provided an opportunity for Māori collective skill and action to be in the front of mind for tau-iwi communities and organisations. These leaders were noted as being able to identify and activate resources from within or across Iwi."[304]

Showing how these kaupapa are action-oriented, Kenny and Phibbs explain how from "a Māori view point, accepting responsibility for others is also intrinsically linked with enacting rangatiratanga (actioning leadership) and is embedded at every level of interaction during times of adversity."[305]

The two aspects that guide action are community, itself underpinned by whakapapa, and tikanga, which can be translated as practices or more accurately the right practices. Adreanna Ormond provides an explanation of how community works toward reduction:

> "[F]amilies traditionally had different roles and responsibilities; one family might have been responsible for a particular part of the shoreline, another family might have been responsible for

> looking after a forest. So, a lot of things like risk and hazard can actually go back to those families and those people who had that responsibility to look after those particular assets."[306]

Kenney and colleagues also outline how communities function in emergency management:

> "Within the Māori world, families are the core units of cultural capital so genealogies shape social infrastructure on Māori marae (community centres). Emergency management roles are delegated to specific families and in some instances individuals in times of adversity. The intergenerational transmission of these roles has ensured that emergency response training commences at an early age and incorporates observational learning of future responsibilities."[307]

Likewise, the 2019 National Disaster Resilience Strategy (NDRS) provides a good summary of Māori response and recovery in the face of disasters:

> "When a disaster occurs, the responsibility of caring for others and Te Ao Tūroa (the natural world), falls to whānau, hapū and iwi with historical ties to the areas impacted by the disaster. Whakapapa creates a kinship-based form of capital understood by Māori as whanaungatanga (close relationships), that will be drawn on to aid whānau, hapū, and wider communities during times of adversity. Whānau, hapū and iwi respond quickly and collectively to provide support and address the immediate needs of their communities as well as to institute practices that will aid the recovery, and the development of disaster resilience in affected regions."[308]

This was also emphasised by McLachlan and Waitoki:

> "Responding to crises allowed local Māori to show their strengths, to be aware of whānau needs, and to show their ability to provide hospitality and care for large numbers of people experiencing crises in the community."[309]

Critically, community stands as a counter to the technocratic, expert-led DRR of the physicalist paradigm. For Māori, DRR needs to be led by the community, which also aligns with the kaupapa of kotahitanga, rangatiratanga, whanaungatanga, and manaakitanga. Expertise comes from the totality of lived, localised experience of both current and past generations.

Tikanga provide this lived, localised experience, in conjunction with broader, deeper mātauranga. Regarding traditional tikanga, Kenney and colleagues explain:

> "Traditional environmental risk mitigation practices such as land mapping and settlement fortifications protected communities by preventing land slippage from episodic flooding as well as ensuring that settlements were developed on stable bedrock. Coastal marae (community centres) were situated so inhabitants could identify early indicators for tsunami and/or king tides and respond accordingly. Inland settlements were located in proximity to rivers to facilitate food security, with secondary sites established as flood evacuation centres. Food security was enhanced by the application of resource management practices. The implementation of traditional conservation practices ensured sustainable hunting and fishing… When natural disasters occurred

> it was understood that skills and material resources, such as food and accommodation, would be made available to ensure the needs of the entire community were addressed."[310]

Informing tikanga is the need to protect mana and mauri, as the hapū of the iwi Ngāi Tahu explain in their environmental management plan: "Tikanga regulate activities concerning the conservation and sustainable use of natural resources in order to protect the Mauri."[311]

Finally, the ongoing consequences of colonisation are understood to impact Māori abilities to reduce risk, as symbolised by the triangle jutting out from the risk sphere into the reduction sphere. Reasons for this include the economic marginalisation of Māori communities, the loss of mātauranga and associated kaupapa and tikanga, as well as the loss of many of the tohu (indicators) Māori used to understand the natural world, including identifying hazards and the risk they pose.[312]

Risk reduction, **response,** and **recovery** are built through **maintaining the reciprocal ethic of care and stewardship** for **other people** and the **natural environment**, creating **strong communities**.

In terms of the reciprocal care, one respondent told King and colleagues that:

> "[I]f any locals come unstuck somewhere along the line, you can guarantee that someone [will help them out]… cos we all know each other, we're all related somewhere along the line… and [if] someone's in trouble, always somebody comes along and says, "Hey, have you got something we can help with?" Everybody gets together and sooner or later it's all fixed up. That's how the people are around here. They're bloody good man, they're beautiful people around here. I wouldn't go anywhere else in the bloody world to live, because you know exactly what you've got with people here."[313]

The 2019 National Disaster Resilience Strategy (NDRS) provides a good summary of Māori response and recovery in the face of disasters:

> "When a disaster occurs, the responsibility of caring for others and Te Ao Tūroa (the natural world), falls to whānau, hapū and iwi with historical ties to the areas impacted by the disaster. Whakapapa creates a kinship-based form of capital understood by Māori as whanaungatanga (close relationships), that will be drawn on to aid whānau, hapū, and wider communities during times of adversity. Whānau, hapū and iwi respond quickly and collectively to provide support and address the immediate needs of their communities as well as to institute practices that will aid the recovery, and the development of disaster resilience in affected regions." [314]

The need for **reciprocal care** was clear in the response given by Dr James Ataria when asked about hazards, risk, and vulnerability:

> "I don't think we actually have Māori words for those terms. "[Your questions has] gotten me thinking, what is the language that we use to describe those types of things? And I guess what comes to mind when you talk about risk and risk reduction, are some basic Māori values, things like manaakitanga, which is the notion of the responsibility for caring for things, both animate and inanimate things. It comes with things like kaitiakitanga, which is often referred to as stewardship of natural resources and for the notion of creating benefit and wellbeing for your community, for your people, for your families."[315]

The need to protect from disasters, Ormond explains, meant that:

> "[F]amilies traditionally had different roles and responsibilities; one family might have been responsible for a particular part of the shoreline, another family might have been responsible for looking after a forest. So, a lot of things like risk and hazard can actually go back to those families and those people who had that responsibility to look after those particular assets."[316]

The **importance of whakapapa and relationships in response** to disaster was emphasised by Kenney and Phibbs, writing with respect to the response to the earthquakes in Ōtautahi/Christchurch:

> "The Ngāi Tahu-led Māori Earthquake Recovery Network while also providing similar services differed from these groups as they had pre-existing linkages into the community, a built infrastructure that was able to be used to provide shelter to people who were displaced by the earthquakes, established external linkages to government agencies, such as the ministry for Māori development, as well as traditional authority over the region in which the earthquakes occurred."[317]

The care engendered by whakapapa was not restricted to fellow tribal members, as the Kaiwhakahaere of Te Rūnanga o Ngāi Tahu at the time of the earthquakes, Mark Solomon, said:

> "We are collectivised we have brought all the Māori providers together asked them to table a stocktake of what they can offer ... so that we can link in with all the other services to help out in the community... I asked the Māori community if we could include the Asian and migrant community, because they would be outside, to which I got an immediate agreement."[318]

As Kenney and Phibbs note of Solomon's response:

> "[D]ecision-making regarding the implementation of support is a product of collective agency. In this context collective agency has facilitated a collaborative response that has ensured broad-based support for the entire community and provided targeted assistance to communities identified as particularly vulnerable… In doing so it may be inferred that the Māori community's approach to disaster risk reduction is not merely inclusive of the 'other' but accepts collective responsibility for the 'others' well-being."[319]

Te Arawa kaumatua, Toby Curtis says Te Ara ki Kōpū: Te Arawa Climate Change Strategy will help guide decision-making, and support adaptation and mitigation planning:

> "The strategy provides a pathway for whānau, hapū and iwi to work proactively – empowering our way of knowing and seeking new ways of living – to ensure our tribe's collective survival. We have a long history of navigating change and transformation. We will continue to look to our whakapapa, and the generations of knowledge that have supported our way of life, to show us the way forward"[320]

As Te Arawa we can liken the challenge of climate change to the journey of the Te Arawa waka; with an impending crisis affecting our way of life and the need to respond and seek a new way of life to ensure our collective survival…. We have a long history of navigating change and transformation. Te Ara ki Kōpū gives voice to the significant courage, resilience and adaptation of our people over many generations."[321]

In a similar vein, Kenney and colleagues outline what they view as the three core components of a Māori emergency response framework:

1. Mātauranga Māori: "Māori knowledge and understanding of natural hazards, is crafted from physical knowledge ascertained from the senses, perceptual knowledge created through the interpretation of experience and theoretical knowledge developed in response to the evaluation of subtle environmental patterns. These forms of knowledge collectively comprise all information pertaining to aspects of the environment, for example geophysical, marine and ecological knowledge that may be used to shape Māori community responses to disasters."[322]
2. Kaupapa: Māori values "effectively constitute a set or moral rules that are relationally implemented to address natural hazard risk and mitigate the impact of natural disasters. Foundational values include whakapapa (genealogy) and whānau (family). Within the Māori world, families are the core units of cultural capital so genealogies shape social infrastructure on Māori marae (community centres). Emergency management roles are delegated to specific families and in some instances individuals in times of adversity. The intergenerational transmission of these roles has ensured that emergency response training commences at an early age and incorporates observational learning of future responsibilities. Other key values also shape Māori approaches to natural hazards management. Kaitiakitanga (guardianship, protection) underpins a social obligation to provide a safe environment for the wider community. Manaakitanga, which encompasses

extending hospitality, respect and support to all community members during a disaster, is enacted through the provision of basic necessities (shelter, food) and psychosocial support. Whakawhanaungatanga, meaning the process of building and maintaining relationships, includes the operationalisation of intra and extra-tribal relationships to mobilise resources and activate social support networks."[323]

3. Tikanga: "Traditional environmental risk mitigation practices such as land mapping and settlement fortifications protected communities by preventing land slippage from episodic flooding as well as ensuring that settlements were developed on stable bedrock. Coastal marae (community centres) were situated so inhabitants could identify early indicators for tsunami and/or king tides and respond accordingly. Inland settlements were located in proximity to rivers to facilitate food security, with secondary sites established as flood evacuation centres. Food security was enhanced by the application of resource management practices. The implementation of traditional conservation practices ensured sustainable hunting and fishing. Eel and fish traps for example, were designed to capture limited numbers of mature stock. Mahinga kai (traditional gardens) were seasonally planted and harvested. Food security was also facilitated through food preservation (smoking/drying) and storage practices. Pataka (raised stores) protected food resources from foraging birds and floods. Rua kumara (ground storage pits) ensured root vegetables did not get affected by frosts. When natural disasters occurred it was understood that skills and material resources, such as food and accommodation, would be made available to ensure the needs of the entire community were addressed."[324]

As they view it, mātauranga contains the information necessary to respond and recover from hazards and disasters, Māori values help address natural hazard risk and mitigate the impact of natural disasters, while tikanga provides a guide to mitigation practices and strategies.

Kenney also identifies eight key kaupapa as central to Māori emergency management:

- Whakapapa: genealogy
- Whakawhanaungatanga: establishing relationships
- Manaakitanga: hospitality, kindness
- Kotahitanga: unity
- Rangatiratanga: leadership
- Kaitiakitanga: guardianship
- Wairuatanga: spirituality

- Mana Motuhake: separate identity.[325]

The importance of collective leadership was also emphasised by Kenney and Phibbs, in their interviews with those who had experienced the Ōtautahi/Christchurch earthquakes: "the notion of rangatiratanga (collective leadership), which is conceptualised as both a value and a practice, is equally privileged, and research participants expressed high regard for the various levels of collaborative leadership evidenced during the Māori response to the earthquakes."[326] They also noted that "From a Māori view point, accepting responsibility for others is also intrinsically linked with enacting rangatiratanga (actioning leadership) and is embedded at every level of interaction during times of adversity."[327]

Resilience

Resilience is a relatively new concept in DRR, meaning "conceptualisations are yet to converge into one widely accepted framework."[328] There have been "conflicts and controversies that have arisen when it has been used" in the DRR realm.[329] At a fairly basic level, the UN Office of Disaster Risk Reduction, drawing inspiration from Walker's commonly used one, defines 'resilience' as:

> "…the ability of a system, community or society exposed to hazards to resist, absorb, accommodate to and recover from the effects of a hazard in a timely and efficient manner, including through the preservation and restoration of its essential basic structures and functions."[330]

From a Māori perspective, this description is relatively compatible as it is focused on a holistic system, community, or society that has an underlying emphasis on relationships. However, resilience as part of kaupapa Māori DDR would need to include a spiritual element, and would have to further emphasise the need to work with rather than against the natural world and the hazards it presents. One area of contention is that for Māori and other indigenous peoples, the goal of 'preserving' or 'restoring' is not as important regarding wider systems and society as they live in oppressive and marginalising settler colonial structures. As Penehira and colleagues state:

> "We seek a concept of resilience that emerges from our own realities, that speaks to our individual and collective selves, that recognises colonisation as a constant adversity, and that supports acts of resistance in order to dismantle colonialism and re-establish Māori and Indigenous self-determination."[331]

That said, preservation and restoration of Māori systems, communities, and society are critical components of resilience but they need to be understood in the broader colonial context in which they sit.

There are two levels to building resilience for Māori, the first more immediate level focuses on what could be called 'strategic pillars' needed to become more resilient, while the second, higher level focuses on the need to create and maintain balance, across the natural world, human world, and the spiritual world. Five strategic pillars are identified in the framework: community, care, capitals, culture, and control, as symbolised by the triangles thrusting from the resilience sphere into the reduction sphere. The role of colonisation is also acknowledged with the triangles passing through into the resilience sphere.

Strong community bonds and social cohesion are a vital element of resilience. Despite the impacts of colonisation, as Stephenson and colleagues note, "the strong social bonds and long-established processes for nurturing others in Māori communities may make them more resilient in other ways."[332] Similarly, Cram explains "Māori endurance and survival throughout the colonial context of the past 200 or so years has been a collective endeavour, as people have drawn on traditional institutions (e.g. whānau, hapū, marae, Iwi) and more recently pan-Māori organisations (e.g. Māori Women's Welfare League) for support and hope."[333] Likewise, In explaining how response and recovery manifest in Māori communities, Lambert and colleagues detail how they view resilience:

> "The response and recovery of Māori to the massive dislocation of the earthquakes in Ōtautahi displays the strength and resilience of Māori cultural values and skills as well as the distressing effects of ongoing Māori economic vulnerability… However, we make the comment that framing Māori resilience as somehow emanating from generations of poverty risks reifying the economic vulnerability of Māori and diluting attention from a key component of resilience to hazards and disasters, namely, asset wealth. By emphasising that Māori resilience is nuanced, place based and culturally attuned, we hope to expand the possibilities for better disaster preparation and improved post-disaster recoveries."[334]

Again, in counter to the physicalist paradigm, the Māori approach is for resilience to be an emergent outcome of communities rather than government or council

The need for care comes from the kaupapa outlined in the section above, particularly manaakitanga, and its constituent concept of mana, and arohatanga. **Building resilience for Māori is premised on caring for both human and natural kin as well as atua**. Care for humans is key to resilience, as Cram notes in regard to an earthquake, "Māori values underpinned this response, including a love for the people."[335] This need for care of nature and the atua was

expressed during climate change consultation with the Ministry for the Environment (MfE) the Director Māori Strategy at what was then MAF explained "My personal motivation and that of my tūpuna is a desire to return the dignity and the mana to Papatūānuku. This is not merely a responsibility of the Crown; we also have a role to play."[336]

The capitals here refer to natural, financial, built, human, and social – though social has been dealt with in the community section above. **Vibrant ecosystems, adequate wealth, well located, built, and maintained infrastructure, requisite skills and knowledge, as well as robust social networks, and cohesion are foundational components of building resilience**. Natural capital is critical, as Te Tani explains: "if the realms of Tāwhirimatea (god of the winds), Tāne Mahuta (god of all living things), Papatūānuku (mother earth) and Tangaroa (god of the sea) are sustained, then the people will be sustained."[337] "Indigenous spirituality," Lambert explains, "has a key role in averting and healing various pathologies, often linking Indigenous resilience to relationships with land."[338] Regarding financial capital, Lambert and colleagues explain: "As for a stronger resilience to future disasters, we can only point out the fundamental aid to expanding options, namely, economic wealth and security. Engineering a wealthier Māori society remains vital to improving the resilience of Māori and poses a continuing challenge to efforts to reduce our collective vulnerability to what are recurring events."[339] In the NDRS the sources of Māori resilience are understood as:

> "Māori moral and relational attributes applied to creating community resilience promote a collaborative approach to disaster response and recovery, commitment to environmental restoration, and the extension of hospitality to others experiencing adversity. Māori also have assets and places, which have often, and will again be mobilised to secure community wellbeing in the aftermath of disasters."[340]

While not identified in the same way, in pointing to 'assets and places' the NDRS is also noting the importance of asset wealth to resilience. In terms of human capital, tikanga and mātauranga play a fundamental role. "Tikanga Māori", Proctor explains, "is an inherent part of… resiliency, and marae structures and protocols already in place provide a vital framework."[341] "For Indigenous communities," Lambert outlines, "ancient knowledge of environmental hazards has enabled a certain resilience to recurring disasters such as floods, drought, tsunamis and earthquakes."[342] Vasileiou and colleagues note that "Local knowledge is a critical social element of adaptive capacity and resilience of communities."[343] Mātauranga provides the reservoir of local knowledge necessary to ensure resilient Māori communities.

The role of culture should be clear, and it also has a strong alignment with community, care, as well as social and human capital. All of the aspects discussed in reduction are important here,

including mātauranga, kaupapa, and tikanga – though to be clear, it is not just key informational aspects of Māori culture that provide resilience but just **having a strong connection to Māori culture, identity, and spirituality as this is a source of wellbeing**. As Lambert explains, "resilience is enabled within the cultures of Indigenous peoples."[344] Lambert and colleagues also note "the strength and resilience of Māori cultural values and skills" and how "Māori resilience is nuanced, place based and culturally attuned."[345] Kenney and Phibbs explain that "Cultural attributes that are protective of community well-being have… been noted in contemporary Māori communities following discrete flooding events."[346] Regarding the role of mātauranga, kaupapa, and tikanga, Phibbs and colleagues explain how the:

> "Māori community-led response to the Christchurch earthquakes demonstrates how traditional Māori knowledge, values and practices may be actioned to support a national disaster response and to facilitate community resilience."[347]

In the Ngāi Tahu climate change strategy it is stated:

> "No matter where they are, Ngāi Tahu whānui can maintain relationships to places, resources and taonga under the new climate conditions, that will carry through their identity and pride as Ngāi Tahu… We will face the challenges of a changing climate in our takiwā with the courage, resilience and wisdom of our tūpuna, strengthened by all that makes us Ngāi Tahu, as we create a cultural legacy for those to come who must live in a changed world."[348]

Here the role of culture, and its adaptability to new realities, is understood as the core of resilience. Also, the importance of connections to nature as a part of culturally-derived resilience is indicated. On this, Rotorangi and Stephenson note:

> "The term 'cultural resilience' has emerged to refer to this continuity of a coconstituted set of long-term relationships between the cultural identity of a people and the set of social-ecological relationships within which this identity was founded."[349]

The final of the five is control, which aligns with the kaupapa of rangatiratanga and kaitiakitanga in particular, and is essential for community-led resilience. It should be noted that this is not as hierarchical or bounded as western conceptions of control may be. As Kenny and Phibbs explain, "the Māori community's approach to disaster risk reduction is not merely inclusive of the 'other' but accepts collective responsibility for the 'others' well-being."[350] This is leadership guided by kaupapa, meaning it is unified, caring, and collective. Regarding rangatiratanga, in terms of resilience and colonisation, Penehira and colleagues note that a related concept is 'resistance'.[351] They quote Tousignant and Sioui, who note that:

> "Characteristics specific to the notion of resilience in Aboriginal cultures are spirituality, holism, resistance and forgiveness. The main obstacle to overcome in the process of resilience is the phenomenon of co- dependency which leads to superficial attachment, lack of trust, and refusal of authority."[352]

This, as Simon Lambert notes, "adds an activist angle to how resilience is conceived."[353] As they later write, "resilience has to be understood and indeed our only engagement with it must be as something far transcending survival and approximating greater Māori and Indigenous autonomy and control."[354] Thus, due to the legacy and ongoing impacts of colonisation Māori resilience needs to be predicated on a degree of resistance, **without rangatiratanga the other elements of resilience cannot succeed fully**.

At the higher level, there is a need to focus on restoring balance to relationships between humans and nature in order to ensure long-term resilience, and thus building mana and, in particular, mauri. As Andrea Tunks writes, with regard to climate change, the "solution lies in restoring balance to the natural world and meeting our obligations to the other parts of the Earth's whakapapa; healing the Earth from the Greenhouse effect."[355] She then goes on to quote Māori Marsden, explaining that:

> "Mauri as life-force is the energy within creation which impels the cosmic process on towards fulfilment. The processes within the physical universe and therefore 'pro-life' and the law of self-regeneration, latent within creation will, if not interfered with, tend towards healing and harmonising the eco-systems and biological functions within Mother Earth."[356]

Resilience, ultimately, from a Māori perspective requires a more harmonious relationship with Papatūānuku, one premised on ensuring what might be understood as a dynamic equilibrium where human outputs are balanced with inputs.

CONCLUSION

This report has outlined a kaupapa Māori DRR framework. The Māori view is holistic, relational, and cyclical, emphasising the need for balance. In some ways, it collapses the difference between hazard and disaster, though there is still some room for nuanced differentiation. The cosmic forces of mana and mauri provide a powerful yet relatively simple way of understanding and, with more development, measuring risk and vulnerability. Reduction is achieved through mātauranga, whakapapa, kaupapa, community, and tikanga, which provide the knowledge, connections, ethics, scale, and behaviours for reduction. Likewise, resilience can be enhanced through strengthening community, care, capitals, culture, and control, empowering communities to take the lead on reinforcing their capacity to withstand hazards. As this framework works its way through various stakeholders, it will be refined, adapted, and customised, it serves as the foundational armature upon which these changes can be made.

This framework has been designed for both Māori decision-makers as well as non-Māori stakeholders. It is guided by te ao Māori and built using mātauranga Māori, but also utilises the western worldview and knowledge system as both a datum and counterpoint. There are several interrelated reasons for this. The first is that the Māori framework will need to operate within a wider western context and building on existing concepts whilst highlighting critical differences provides an interface for this to occur within, both for Māori and non-Māori. The second is that it provides an easy access point for non-Māori as it utilises familiar concepts even if they are framed differently, hopefully guiding them from dominant conceptions of DRR to kaupapa Māori understandings. The third is that in the past century and a half, te ao Māori and mātauranga Māori have been subjected to a sustained attack that has sought to denigrate and even dissolve Māori ontology and epistemology. By showing the ways in which a kaupapa Māori DRR framework can complement and improve on the dominant conception, this report hopes to emphasise the contributions Māori ways of seeing and understanding can make to the broader dialogue within disaster studies and management.

Implementing this framework in Aotearoa New Zealand will be both easy and difficult. Even for Māori, some of the statements and connections may not ring true as there is wide variation across Māoridom regarding te ao Māori and mātauranga Māori. Equally, at a more practical level some of the positions may be contested simply because they not seen as important as other areas. These conversations and debates are welcome, as this framework is intended as a catalyst for dialogue

rather than as a fixed and final pronouncement. Furthermore, it is anticipated that as iwi (tribes) become increasingly engaged in DRR they will develop their own frameworks that suit their specific tribal views and knowledge. Hopefully this framework can serve as a starting point for that work. More broadly, the New Zealand government has indicated a willingness to incorporate Māori perspectives into DRR planning as well as increasing recognition of iwi and hapū as co-governance partners in emergency management. This framework is intended as to help facilitate these processes, providing a 'translation' of DRR concepts and thinking with a schematic of a kaupapa Māori DRR framework. Embedding these into policy and planning will take more work, though as the National Disaster Resilience Strategy and a raft of previous legislation that has incorporated te ao Māori and mātauranga Māori relatively successfully, there is a precedent for this type of synthesis.

As our world moves into an increasingly unstable climatic epoch, humanity as a collective is going to need every insight and perspective it can get. While this kaupapa Māori DRR framework has been developed specifically for Māori, and Aotearoa New Zealand, much of it is not only closely aligned indigenous perspectives globally, but could also be adopted by western politicians and practitioners without too much adaptation. In particular, in terms of resilience, the empowerment of communities through building of the capitals, an emphasis on culture, and the importance of caring for one another, is a lesson we all need to learn as we move deeper into the Anthropocene.

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