KIA WHAKAKOROWAI I A PAPATŪĀNUKU

An Indigenous conceptualisation of extreme weather events

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Abstract

The article adopts a novel pūkenga-based approach to develop a narrative of extreme weather events informed by Indigenous knowledge. Three key findings, identified from co-learning amongst Indigenous researchers and pūkenga, are seen as required to formally (re)generate knowledges-in-place. First, an understanding of causal factors reveals the collapse of local knowledge narratives and the need to renew these. Second, te ao Māori (TAM) framings progressively assembled from narratives by pūkenga centred on environment, community and wellbeing generate authentic, alternative, coherent and verifiable accounts of how local material and spiritual conditions relating to extreme weather events are seen from a TAM worldview. These accounts speak to how intergenerational, lived and remembered extreme weather events are codified in mātauranga-a-iwi. Third, reconceptualising extreme weather events from a TAM perspective produces relational knowledge with practical outcomes.

Introduction

Papa was laid bare after the separation [from Ranginui] and so Tāne-mahuta cloaked his mother with a korowai of flourishment that supported the growth of native flora and fauna. What we are seeing is the return of Papa to this bare state through the actions of tangata. When Papa is stripped bare, Tāwhirimātea takes umbrage. The resulting floods are caused by the hara. Flooding

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cleanses Papatūānuku of human-induced harm. Recloaking the whenua is required in this instance, to resolve the hara, to rebalance the system: Noho tahanga a Papatūānuku, kia whakakorowai i a ia [Papatūānuku is in a desolate, naked state; she needs recloaking]. (Keita Ngata)

Before the extreme weather events (EWEs) that have recently swept Aotearoa New Zealand, governmental concern was already converging on the urgency of disaster risk resilience and transition behaviours. The Intergovernmental Panel on Climate Change (2021) recently reiterated that "it is unequivocal that human influence has warmed the atmosphere, ocean and land. Widespread and rapid changes in the atmosphere, ocean, cryosphere and biosphere have occurred" (p. 1). Like other Indigenous peoples, Māori maintain a critical concern for Papatūānuku and recognise both the fragility of our ecologies and the continual disruption caused by humans (Harmsworth & Awatere, 2013). In this context of climate change (CC), questions concerning risk, impacts and adaptation strategies as they pertain to Māori communities must be meaningfully explored and actioned (Awatere et al., 2021).

This research, while focused on locally centred mātauranga-a-iwi from Ngāti Porou knowledge holders, additionally offers some conceptualisations of extreme weather and insights that can inform wider Aotearoa (and international) thinking on indigenising CC adaptation responses. We discuss specific knowledges-in-place from the research area—Te Tairāwhiti, the Gisborne region of the North Island—that give glimpses into how CC adaptation might be indigenised. This is crucial because in Aotearoa adaptation responses need to be reorientated to appropriately integrate te ao Māori (TAM) perspectives and draw on local context-specific information and mātauranga.

Conceptualising EWEs from a TAM perspective means asking what we can learn if we consider lessons that are codified in traditional ways and apply them thoughtfully in contemporary contexts to rebalance human interactions with Papatūānuku. This article aims to reframe the language and narrative on EWEs and draws on kōrero with Indigenous pūkenga to inform local and regional decision-makers on how TAM conceptualisations of extreme weather might be leveraged for appropriate decision-making contexts, enabling reframed TAM CC adaptation responses to be implemented.

Increasingly, CC narratives in Aotearoa recognise that EWEs are part of Aotearoa history.

Te Tairāwhiti is one of the most erosion-prone regions of Aotearoa and indeed the world (Harmsworth et al., 2002). Frequent and extensive flooding occurs throughout the Waiapu Catchment but has always had a particularly devastating effect on the areas where many Māori either work or live. Research showing that EWEs will increase in Te Tairāwhiti makes indigenising CC adaptations even more urgent (Melia et al., 2019). Māori are the predominant population in Te Tairāwhiti, with long-term and ongoing links of occupation, and should be involved in co-creating adaptation strategies that will affect their livelihoods and futures (Smith, 2020).

Iwi governance entities are increasingly asserting their rangatiratanga to manage CC risks and meet the wellbeing needs of whānau, hapū and iwi (see, e.g., Maketu Iwi Collective, 2023). Iwi and hapū mātauranga of past EWEs are a valuable source of otherwise inaccessible information that can be used to shape adaptation to CC and inform emergency responses (McLachlan & Waitoki, 2022). However, there remains a dearth of specific guidance for whānau, hapū and iwi to support their CC adaptation and mitigation action. Most advice is framed for central and local government agencies. This article is therefore a demonstration of insights and practical suggestions already on hand from codified Māori/Indigenous knowledge.

Crucial role of Indigenous knowledges for climate change adaptation

Often marginalised in colonised contexts, Indigenous situated knowledges are of huge importance to developing local solutions (Whyte, 2017). D. Lewis et al. (2020) state that "Indigenous peoples also possess worldviews and traditional knowledge systems that are critical to climate mitigation and adaptation, yet, paradoxically, these are devalued and marginalized and have yet to be recognized as essential" (p. 897). Equally, Western research methodologies often marginalise Indigenous ways of caring for the environment as they can be blind to a range of ways of knowing the world (Greenaway et al., 2022). Research design that centralises Indigenous values, realities and priorities requires partnerships with Indigenous communities, and the incorporation of Indigenous knowledges and perspectives "beyond superficial understandings" (D. Lewis et al., 2020, p. 897).

TAM, with its holistic approach, spiritual and tangible dimensions, centuries-long knowledge accumulation, place-based expertise, and whakapapa relationality of kaitiakitanga—caring for the environment—can and should be part

TABLE 1 A sample of Te Ao Māori–informed frameworks, strategies and policies, and co-governance arrangements

Examples	Kaupapa
Non-statutory frameworks, policies and strategies informed by TAM framing	
Arotakenga Huringa Āhuarangi: A Framework for the National Climate Change Risk Assessment for Aotearoa New Zealand (Ministry for the Environment [MfE], 2019)	Considers CC, vulnerability and TAM perspectives, and risk assessments.
Urutau, ka Taurikura: Kia Tū Pakari a Aotearoa i Ngā Huringa Āhuarangi | Adapt and Thrive: Building a Climate-resilient New Zealand: Aotearoa's First National Adaptation Plan (MfE, 2022)	Aims to enable Māori-led climate action, planning and solutions that build climate resilience.
Exploring an Indigenous Worldview Framework for the National Climate Change Adaptation Plan (Ihirangi, 2022)	Outlines cohesive cultural values and principles from which to approach climate action.
Co-management and co-governance in practice: Statutory arrangements	
Waiapu River Memorandum of Understanding (MoU): The Waiapu Restoration Agreement with the Ministry of Primary Industries (MPI) focuses on river restoration, and the MoU calls for collaboration between Ngāti Porou, MPI and Gisborne District Council for a unified approach to address challenges.	Calls for long-term commitment and collaboration with a 100-year vision: "Healthy land, healthy rivers, healthy people." Acknowledges the intergenerational approach required to achieve that vision (see MPI, 2020).
Whanganui River Personhood 2017: Te Awa Tupua (Whanganui River Claims Settlement) Act 2017 confers legal personality on the river.	Settlement focused on health and wellbeing: "The Crown will not own the riverbed. The river will own itself. That's a world-leading innovation for a river system" (see "Te Awa Tupua", 2016).
Te Urewera Personhood 2014: Considered a living person, Te Urewera is spoken for and governed by a board. Care for Te Urewera, including the tracks and facilities, is carried out by Ngāi Tūhoe's operational entity.	Working to develop a new kind of visitor experience—one that is rich with culture, appreciation of Papatūānuku, and care for nature and people. (Department of Conservation, n.d.; Tūhoe, n.d.)
Auckland Tūpuna Maunga Management 2014: Maunga Authority co-governs 14 Tūpuna Maunga following a 2014 Treaty of Waitangi settlement. The Authority comprises equal representatives from Ngā Mana Whenua o Tāmaki Makaurau and Auckland Council, together with Crown (non-voting) representation.	Single integrated management plan to set the direction for maunga restoration, protection and management (see Tūpuna Maunga o Tāmaki Makaurau Authority, 2022).
Waikato River Co-management 2010: Independent statutory body (Waikato River Authority) under the Waikato-Tainui Raupatu Claims (Waikato River) Settlement Act 2010. A co-governance and co-management framework between the Crown and river iwi. The Authority has 10 board members—five appointed from each river iwi and five Crown-appointed members.	Achieve the restoration and protection of the health and wellbeing of the Waikato River for future generations; promote an integrated, holistic and coordinated approach to the implementation of the vision and strategy and the management of the Waikato River (see Controller and Auditor-General, 2016).
Kaipara Harbour Management 2005: Integrated Kaipara Harbour Management Group (IKHMG) formed to implement obligations between Ngāti Whatua ki Kaipara hapū and MoU partners under a Treaty of Waitangi Deed of Settlement. Now the Kaipara Remediation Programme.	Promote integrated management, interagency coordination, and kaitiakitanga of Kaipara Harbour and catchment (see IKHMG, n.d.) utilising traditional Māori and Western knowledges to manage Kaipara as an interdependent system.
Māori academic framings and Māori work in the CC space	
Stemming the Colonial Environmental Tide: Shared Māori Governance Jurisdiction and Ecosystem-based Management over the Marine and Coastal Seascape in Aotearoa New Zealand. Possible Ways Forward (Joseph et al., 2020)	Final report for Sustainable Seas National Science Challenge project Whaia te Mana Māori Whakahaere Tōtika ki Tangaroa | In Pursuit of Māori Governance Jurisdiction Models over Marine Resources.
"He waka eke noa | We are all in the same boat: A framework for co-governance from Aotearoa New Zealand" (Maxwell, Awatere, et al., 2020) "Navigating towards marine co-management with Indigenous communities on-board the Waka-Taurua" (Maxwell, Ratana, et al., 2020) values, and practices, alongside international initiatives such as ecosystem-based management (EBM)	The Waka-Taurua framework improves how marine co-management systems are developed by facilitating a more structured and equitable discussion of both Indigenous-Māori and broader societal worldviews, values and practices.
"Indigenous Approaches to Disaster Risk Reduction, Community Sustainability, and Climate Change Resilience" (Kenney et al., 2023) "A 'Te Ao Māori' Disaster Risk Reduction Framework" (Rout et al., 2024)	Indigenous perspectives on disaster risk reduction, CC adaptation, environmental resilience, sustainable development.
He Huringa Āhuarangi, he Huringa Ao: A Changing Climate, a Changing World (Awatere et al., 2021)	Tikanga Māori responses to CC, with the long-term goal of "greater realisation of Māori aspirations and capabilities for flourishing Māori and tribal economies, environments and people" (Awatere et al., 2021, p. 11).

of CC adaptation responses (Harmsworth & Awatere, 2013; Hikuroa, 2017). We argue that a range of knowledges is necessary: from core Māori concepts that are integral to understanding how Māori make sense of the world such as whakapapa, mana, mauri and kaitiakitanga to pūrākau, mātauranga and tikanga, including written and non-written ways of understanding and being-in-the-world (Marsden, 2003).

Current Western scientific understandings of EWEs are arguably insufficient in isolation. Co-production of knowledge across Indigenous and Western science perspectives, however, requires careful collaboration between Indigenous and non-Indigenous researchers to co-produce knowledge through enduring trustful partnerships (Greenaway et al., 2022). The interweaving of TAM and Eurocentric ontologies and epistemologies means creating and occupying "relational space[s] between Indigenous and non-Indigenous scholars" (Jones et al., 2022, p. e834).

Colonisation and the impact of CC on Indigenous peoples are inextricably linked (Jones, 2019), and, as we address in the results section, unpacking causal factors matters to being able to decolonise institutional arrangements and create adaptation strategies. As Rose (2014) notes, this means paying "due attention to environmental ethics and a re-imagining of the decision-making process in respect of environments and resources" (p. 223). Table 1 demonstrates that, in Aotearoa, considerable steps are being made towards this, as te Tiriti o Waitangi is being used to frame approaches to CC adaptation. The contemporary Aotearoa context offers pathways for new governance and institutional arrangements that support Indigenous knowledge framings and Indigenous-led contributions to CC adaptations. This is because "Treaty considerations are entrenched at every level of government and . . . the legal, scientific, financial, and technical apparatus of the nation" (N. Lewis et al., 2024, p. 155). Te Tiriti is not always appropriately given effect in these spaces, however, as Baker's (2023) experience highlights: "As a Māori, Tiriti-based policy advisor . . . there seems to be a growing understanding of the need for policy and legislation to be Tiriti-compliant, but understandings about what this actually looks like in practice are still worlds apart."

Table 1 shows examples of co-management and co-governance of resources with Māori that are increasingly being incorporated in government frameworks, processes and on-the-ground commitments. It is in this context that we provide advice here that is supportive of TAM framing and can be used to ward against business-as-usual framings.

Methodology: Kaupapa Māori approach

The research team used a Kaupapa Māori approach, which commits to open communication and a willingness to incorporate Indigenous values, practices and expertise (see Table 2). It ensures that Māori retain "conceptual, methodological and interpretive control" over the work (Walker et al., 2006, p. 333).

TABLE 2 Description of interviewees and interviews

Number of interviews	6	Date	2022
Tāne: wāhine	4:2	Iwi	Ngāti Porou
Pūkenga interviewed	Keita Ngata, Daniel/Raniera Proctor (Gisborne) Ngarimu Parata, Mokena/Morgan Reedy, Anaru/Tip Reedy (Wellington) Aroha Mead (online)		
Kōrero length	1–2 hours, at participant's home or agreed location		
Language	Reo rua (dual languages) to discuss concepts accurately and appropriately (e.g., karakia, whakataukī, waiata)		
Generational representation	2 rangatahi, 4 pakeke		
Kaupapa Māori approach	Sensitivities to personal situations, timing, appropriate approaches to individuals, meeting kanohi-ki-kanohi		
Questions to guide the kōrero	How might we explain current phenomena such as the Uawa and Tokomaru flood events of 2018, 2020 and 2021—that is, more frequent and impactful weather events? What can be deduced about the current situation from the environmental changes that have been experienced by our tīpuna in the past 150 years—that is, post-settlement? How does the geographic and geological make-up of Te Tairāwhiti explain what we are experiencing in this specific region of Aotearoa?		

The pūkenga were selected for (a) their knowledge of te reo; (b) being known repositories for mātauranga, tikanga and customary knowledges, with credibility within Ngāti Porou; (c) involvement in efforts to revitalise te reo Māori and taonga tuku iho; and (d), mauri ora: the participants were accessible, alive (many pūkenga are elderly and knowledge can be lost), and willing. Our pūkenga saw themselves as vessels of intergenerational knowledge transfer.

The majority of the authors have whakapapa connections to Ngāti Porou, and pre-existing relationships and hononga with those interviewed, allowing for trust and sharing. This increased the likelihood of participants agreeing to kōrero (Ware et al., 2018). The pūkenga had diverse experiences, from ground-roots working with whānau, hapū and iwi to working with the public sector and internationally, and were both pakeke and rangatahi—crucial to understanding the conceptualisation of te taiao through intergenerational mindsets. The kōrero explored how we might frame the climatically connected EWEs that had occurred in Te Tairāwhiti and identify the key issues associated through a TAM lens. All pūkenga agreed to the recording and sharing of their mātauranga beyond the project; they held trust in the researchers to pass it on in meaningful ways. In addition, their mātauranga is not anonymised as this would reduce the whakapapa link of the information, and therefore its potential validity.

The authors of this article have differing backgrounds. The first-listed author is Tangata Tiriti/Pākehā, and the others all whakapapa to Ngāti Porou. For the former, leaning into the work of others negotiating "becoming Pākehā" has been essential (Bluck, 2022; Makey, 2022). For the Māori authors, this work has been about navigating the dual worlds and expectations of TAM and Eurocentric approaches. Team members also negotiate multiple roles as public sector employees within different disciplines, as researchers, activists, and hapū and iwi members. The collective voice of the article thus contains a diversity of positions and positionalities.

Framework for results: Renewing relationships

The Renewing Relationships Framework is inspired by Whyte's (2017) "renewing relatives" concept, in which he articulates that fostering Indigenous knowledge and reforging connections is a form of empowerment. This involves "renewing relationships with humans and nonhumans and restoring reciprocity among the relatives (that is the parties to the relationships) . . . I call this process *renewing relatives*" (Whyte, 2017, p. 158).

The Renewing Relationships Framework gives a broad overview of relations of key knowledge areas. Figure 1 both outlines the traditional route from a TAM worldview—through conceptualisations and codified knowledges leading to action and strategies—and acknowledges the damage done by colonisation and other causal factors. The broken connections between TAM worldviews and contemporary practices stem from ongoing colonisation: "Colonialism has always included terraforming that tears apart . . . the 'flesh' of human-nonhuman-ecological relationships" (Whyte, 2017, p. 159). As the framework shows, the casual factors (yellow) break the connections between TAM worldviews and any contemporary responses to CC. However, paying attention to the conceptualisations (pink) and knowledges (orange) coming from TAM allows connections to be reforged and strategies for the current context to be reimagined. As the healing blue stripe in Figure 1 implies, nurturing both Western *and* Indigenous knowledges will allow better adaptation strategies and solutions to be determined. As Whyte (2017) observes, Indigenous peoples "often see the renewal of their knowledge systems as a significant strategy for achieving successful adaptation planning" (p. 157). This high-level positioning informs the presentation of this article.

TABLE 3 Key themes

Causal factors	TAM framings and the environment	Indigenous conceptualisations of extreme weather
Mātauranga loss Neoliberalism Tikanga loss Alienation	Balance Atua Māori Mātauranga expressed through codified knowledges	Solutions and strategies for resilience are held in mātauranga-a-iwi Re-indigenised ways of knowing, tools and interventions in community resilience-building to mitigate future risks

FIGURE 1 The Renewing Relationships Framework, showing broken connections and nurturing of te ao Māori conceptualisations

Results

A thematic analysis revealed key themes that reflect a TAM understanding of the kaupapa, as well as its challenges and solutions (see Table 3). A unique dimension incorporated into the Kaupapa Māori research approach in this article involved creating a sequence of original, co-developed visuals to accompany the textual argument. Treated as a storyline, the diagrams depict key aspects of an indigenised approach to CC adaptation and serve as thought prompts in the text. The inspiration for each diagram drew on the interviews with pūkenga. The sequence outlines the steps that underscore the complexity of analysis needed to better comprehend and work with a TAM framing of EWEs.

Our analysis employs key principles of TAM (kaitiakitanga, whakapapa, mauri and mana), along with key TAM practices and norms, and emphasises the importance of dual knowledge systems. When TAM conceptualisations and Western science can be woven together, as sources of truth, then the research can speak to the communities experiencing EWEs as well as decision-makers.

The knowledge gathered and conceptualisations offered are iwi-specific, grounded in place, space and time. While some of these results may possess Aotearoa-wide applicability in policy-making, our key intent with this research is to contribute to more nuanced conversations grounded and situated in place-based adaptation strategies.

Theme 1: Causal factors

The breakdown of intergenerational transfer of mātauranga Māori and Māori conceptualisations more broadly is directly related to colonisation and its associated processes. That loss of knowledge, connections and practices must be acknowledged because reforging these relationships is key to empowering steps forward (see Figure 2).

Mātauranga loss. In pre-contact Aotearoa, tribal knowledge holders were guides in all facets of directing behaviour, such as how to interpret signs in the environment and the ethics of sustainable management. As this knowledge was systemically supressed, the strong directive that privileged the wellbeing of the environment over the needs of people was also suppressed.

> Loss of tōhunga meant a loss of strong direction to follow or rally behind . . . Tōhunga makutu kept
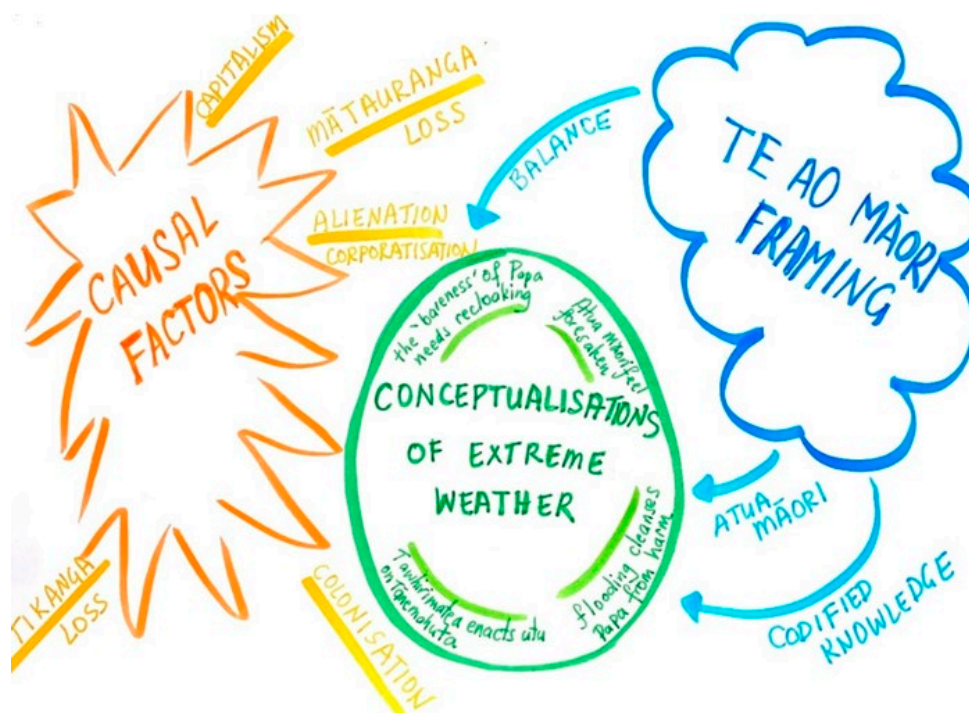
FIGURE 2 Conceptualisations of extreme weather can be found within te ao Māori, but there are factors that hinder these understandings

people accountable to their actions . . . If we think about this today, what are the things that keep us wary about stepping over an invisible line? This has to be enacted in policy and monitoring approaches. (Daniel/Raniera Proctor)

Furthermore, in contemporary society, expertise is now sought from technocratic sources, further marginalising mātauranga Māori in our psyche. What does this mean for hazard management? If we were better in tune with our mātauranga, in terms of interpreting signals in the sky and on the land, this could inform more symbiotic actions to reduce the detrimental impacts of EWEs.

Neoliberalism. The objectives of market-orientated policies run contrary to resource management approaches that enhance the mana of atua Māori and in turn that of our natural ecosystems. Many damaging environmental impacts of disasters can be directly attributed to loss of land ownership, economic development, profit-driven aspirations and neoliberal market ideologies: "At a regional level we focus on economic development at the expense of the environment" (Aroha Mead).

For Ngāti Porou, the most impactful changes have been the loss of mauri within the Waiapu Catchment, and the way Maunga Hikurangi continues to be carved up by weather, climatic occurrences and land use practices:

Through clearing of the whenua for agriculture/forestry, [the Waiapu] is now full of silt. Waka used to be able to travel up the awa. (Keita Ngata)

Land use 150 years ago was primarily totara, kauri and manuka—this had stability and stronghold. Te Kakahu a Papatūānuku was stripped [through deforestation] …[this] instigated flooding and erosion. (Anaru/Tip Reedy)

Tikanga loss. Loss of tikanga knowledge contributes to loss of environmental connection. For example, karakia—the practice of connecting with everything in our environment (with which we share whakapapa)—has diminished over the time and alienated us from Papatūānuku and other ecosystems.

Many have forgotten how to talk to our environment and forsaken our atua Māori in the process . . . Instead of talking to the trees, we are cutting them down . . . What we are experiencing in our environment as a result are the consequences of this. (Mokena/Morgan Reedy)

Alienation. A final barrier for many Māori is not being able to access their ancestral whenua. Present practices of land alienation, corporatisation to organise production, ownership challenges (such as shareholder land) and government-led conservation interests (such as the Department of Conservation) continue to impede access. Many contemporary interventions for reassertion of land ownership are further impacted by historic and/or purposeful legislative mechanisms: "Often access to the whenua is halted by ownership challenges . . . Disentangling shareholder land is a purposefully lengthy and arduous process" (Keita Ngata).

Theme 2: Te ao Māori framings and the environment

A TAM framing of the world involves environmental concepts that are not well understood by the Western world, such as reciprocity, balance, atua Māori and codified knowledge. This is related to how climatic events and their effects are understood in TAM, which codifies historic occurrences into karakia, pūrākau and waiata for intergenerational knowledge transfer.

Balance. Māori conceptualise the frequency and severity of EWEs as evidence that there is an imbalance between people and the environment. This is not a new phenomenon for Māori, and learnings from past experiences are often found in codified knowledge systems. For instance, the importance of balance within the environment is embodied in the coiled pattern of an unfurling fern

frond, or koru. Daniel/Raniera Proctor commented that pūrākau together form a story framework, or storage point of information, which tīpuna used to make sense of their environment and the place of tangata in it: balance and imbalance.

Atua Māori. Localised atua that are guardians of one aspect of an environmental domain are now less recalled in TAM. However, in Te Tairāwhiti there are two prominent atua linked to the waves (Whakiwhakiratau) and tides (Tuawharau), respectively. "Loss of memory and mātauranga of these minor atua has major implications for the environment—that is, loss of how to acknowledge their role in the environment" (Ngarimu Parata).

Mātauranga expressed through codified knowledges. Other forms of knowledge can be found in ingoa Māori, pepeha, karakia, whakataukī, haka and waiata. These are examples of particular codified means of intergenerational knowledge transfer (see Figure 3). To illustrate, an 1864 EWE transformed the Waiapu River, wiped out crops and homes, and led to relocation to higher ground. The ingoa Māori "Waiapu" can be linked to these experiences as the name means "water" (wai) and "to take something with force" (apu). Or, as Ngarimu Parata articulates it, "Ingoa o Waiapu . . . speaks to erosion and the land under stress."

The whakataukī "Waiapu he aku whenua, he aku tangata" ("Waiapu is my land, my people") also acts as a warning and refers to the Waiapu River as the taker of land and the taker of people, as well as as an instruction to kaitiaki:

FIGURE 3 Mātauranga/codified knowledge holds many lessons for contemporary times

Waiapu kōkāhūhua, the Waiapu of many mothers, speaks to a nurturing relationship and the idea that you get out what you put in. (Ngarimu Parata)

Karakia are a way of communicating, of entreating atua. We are descended from all these living things; we need to talk to them [karakia] because they are us. Today we have alienated ourselves [as tangata] from the natural world . . . When you are talking to the trees through karakia, you are being one with them. (Mokena/Morgan Reedy)

The Karakia o Paikea is an example of a localised karakia that refers to surging waves, overturning, spilling and gutting the land, as were caused by Cyclone Bola in 1988. Karakia and pepeha are also formulas for traditional solutions:

[Karakia are] problem-identifying and solution-finding. (Ngarimu Parata)

Pepeha contain whakapapa and relational connection. They recognise the importance of tīpuna—yet we make decisions that are counter to their interests. (Aroha Mead)

The metaphors that are codified within all of these knowledge forms offer guidance and space for reflection on best practices in the contemporary world:

The Raukūmara can be seen as the tāhuhu of Te Tairāwhiti. Similar to the front pillars of a wharenui whose role is to weather the storm, [it's] a framework for protection. The role of the people on the paepae kaiawha is to also weather the storm through coordination and communication—how is this realised under a metaphor framework? (Ngarimu Parata)

Theme 3: Indigenous conceptualisations of extreme weather

One example of framing EWEs from a TAM perspective is to examine the metaphorical nature of atua Māori, and the lessons contained in their conceptualisations:

The Waipuke [flood] is important and symbolic of Papa being cleansed from hara and hea made by he tangata . . . Papa responds by trying to whakatikia herself . . . Rū and other events can be categorised in this same way. (Keita Ngata)

Equally, detrimental weather patterns could be conceptualised as infighting between Ranginui and Papatūānuku's children: "Another understanding for what we are seeing would attribute EWEs to other atua—for example, Tāwhirimātea and Tangaroa enacting utu on Tāne-mahuta as the creator of humans—who have instigated this severe imbalance" (Ngarimu Parata).

Atua Māori represent the inherent mana or awesomeness of our natural environment, which is something bigger than human. Primordial forces battling each other is another way of conceptualising EWEs. Atua Māori exist and are useful when thinking about extreme weather. Conceptualising weather processes in these ways can help people adapt and find means to cope (see Figure 4).

## Discussion: (Re)conceptualise to reframe

Currently, Western scientific conceptualisations of EWE responses dominate. We argue that TAM conceptualisations will frame responses in TAM terms, which makes space for codified knowledges to be accessed, understood and utilised, and that such conceptualisations are most appropriate for Māori communities that are worst affected by EWEs. Conceptualising EWEs from Indigenous perspectives means acknowledging, understanding and privileging the worldviews from which this knowledge is enacted. Such worldviews often involve a holistic system of relational thinking in which the right and the obligation to care is embedded. TAM is about balance, and the kōrero with our pūkenga reflect this in their emphasis on working in reciprocal ways as tangata *with* te taiao.

The TAM conceptualisations and codified strategies discussed above represent a depth of knowledge and expertise that is situated and grounded in place. There are limits to the approach taken, however. Situated knowledge from Te Tairāwhiti cannot directly travel. For example, the tailored and specific knowledge of causal factors is manifested at a local and people level. Codified knowledge relating to Māori tikanga and te reo, for example, can travel as *conceptualisations*, but the actual information about any one place name is situated and specific. Situated knowledge of people and place, of tangata whenua, is highly specific and cannot be applied elsewhere. This article gives voice to Te Tairāwhiti knowledge—grounded, specific and situated. This research helps make sense of it *in that place.*

There are two distinct points to make here. First, as Figure 5 shows, we need to prioritise a way of working that gives space to both TAM worldviews *and* TAM practices. This is a higher-level theoretical framing, one that can travel and
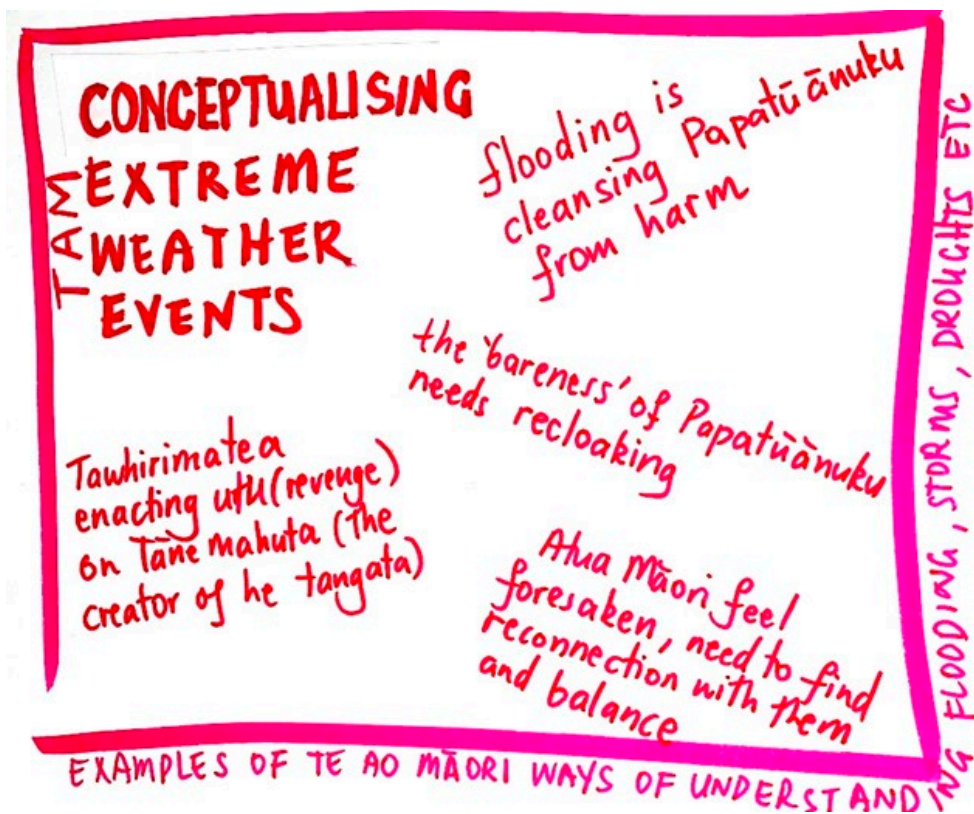
FIGURE 4 Te ao Māori conceptualisations give greater understanding of extreme weather events
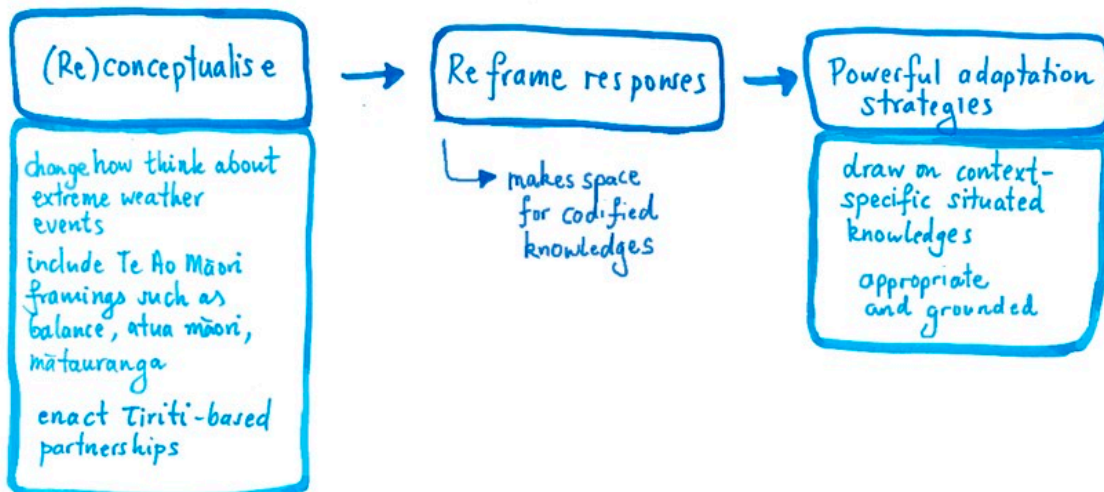
FIGURE 5 Pathway moving from (re)conceptualising EWEs to reframing responses to powerful adaptation strategies

be used in multiple contexts. Secondly, we stress that mātauranga itself is grounded and *does not* travel. The codified knowledges and any strategies developed from them are drawn from a depth of knowledge and expertise that is situated and grounded in place; it is highly specific and cannot be applied elsewhere without appropriate contextualisation.

Following the Renewing Relationships Framework (Figure 1)—which aims to reforge broken connections between TAM worldviews and conceptualisations of EWEs—can lead to the development of indigenised adaptation strategies. The framework is broadly applicable elsewhere in Aotearoa, and even beyond. However, the information that informs each aspect will need to be specific to the place it is being applied to. Developing adaptation strategies for other areas can follow the same pathway, but this will need local engagement and co-production of the strategies to ensure they fit the people and place. Thus, Figure 5 illustrates how (re)conceptualising EWEs allows CC responses to be reframed and enables powerful and fit-for-purpose adaptation strategies to be developed. As Hyslop et al. (2023) recently observed, "Where communities are tightly connected to their natural resources and Te Ao Māori-led ways of thinking and being . . . [then there is] an intimate understanding of interpreting environmental cues and changes" (p. 232), which can be used to inform CC responses.

Conclusion: Indigenous conceptualisations offer future possibilities

The 2023 Cyclone Gabrielle response was a business-as-usual one and was not good enough for all the communities adversely affected. The causes are known, and many of the solutions and strategies are equally well-recognised; the focus must now be on appropriate steps forward. Recovery and resilience efforts need to be reframed from a TAM perspective, so that they do not simply perpetuate the causal factors and harm discussed above.

This article adds to the literature on EWEs and Indigenous approaches to CC in Aotearoa because we provide grounded and place-based examples of what it actually means to think in terms of TAM conceptualisations, and how these offer future possibilities and potentialities to do and be differently in response to EWEs. The connections between TAM worldviews and contemporary responses to CC adaptation should be nurtured. Many are doing amazing work in this area; this article plays its small part by outlining key components of what indigenised CC adaptation strategies might contain.

We began the article with Keita Ngata's whakataukī "Noho tahanga a Papatūānuku, kia whakakorowai i a ia", and we return to it now as it represents a fundamental regrounding of EWEs from a TAM perspective. There are lessons to be learned from the metaphorical nature of atua Māori, and Ngata's proverb describes the problem, shows an understanding of the care needed, recognises relationships and offers a solution—all in a succinct and relatable metaphor. Reconceptualising EWEs in terms of a relational exchange with the environment and its embodied atua Māori, provides a useful and "caring with" approach to adaptation and mitigation of EWEs. Mātauranga embedded in TAM ontologies should not be dismissed but rather included in the knowledge sets of the central and local government, where metaphor, analogy and historic information can be helpful in simplifying, motivating and creating change that makes sense in environmental, spiritual, governance and, above all, practical terms. *Indigenous conceptualisations of EWEs are relational knowledges with practical outcomes.*

Indigenous knowledge has a crucial role to play in CC adaptation. Indigenous situated knowledges are of huge importance to developing local solutions. This article has shown that nurturing connections with TAM worldviews offers insights into how to create place-based, appropriate, meaningful, co-produced and effective adaptation strategies that tie in with both Indigenous worldviews *and* Western science to offer new ways forward.

of this article; or in the decision to submit it for publication.

Glossary

atua Māori	Māori gods; metaphorical representations of ecosystems
awa	river
haka	dances
hapū	local subtribe
hara	harm or wrongdoing
hea	mistakes
he tangata	the people
Hikurangi Maunga	the sacred mountain of Ngāti Porou
hononga	connections
ingoa Māori	Māori names
iwi	extended kinship group, tribe
kaitiaki	guardians
kaitiakitanga	ethic of intergenerational sustainability
kanohi-ki-kanohi	face to face
karakia	incantations
kaupapa	issue, theme
Kaupapa Māori	approach according to Māori principles
kia whakakorowai i a Papatūānuku	restoring the cloak of Papatūānuku
kōrero	talk, speech, interviews
korowai	cloak
koru	spiral shape
mana	respect and (decision-making) authority
Māori	Indigenous people of Aotearoa New Zealand
mātauranga(-a-iwi)	(iwi-specific) experiential knowledge
maunga	mountain
mauri	lifeforce
mauri ora	life and wellbeing
Ngāti Porou	iwi relating to Te Tairāwhiti
paepae kaiawha	orator's bench
Pākehā	New Zealanders of European descent
pakeke	elders
Papa/Papatūānuku	Earth Mother
pepeha	formulaic expressions
pūkenga	knowledge holders
pūrākau	stories that explain history
rangatahi	youth
rangatiratanga	autonomy
Rangi/Ranginui	Sky Father
Raukūmara	mountain range in northern Tairāwhiti that includes Hikurangi Maunga
(te) reo	(the) language
reo rua	dual languages
rū	earthquake
tāhuhu	spine
tāne	man/men
Tāne-mahuta	atua of forest and birds
Tangaroa	atua of sea, lakes, rivers, and creatures that live within them
tangata (whenua)	people (of the land)
Tangata Tiriti	people of the treaty (non-Māori)
taonga tuku iho	treasures handed down
Tāwhirimātea	atua of winds and storms
te ao Māori	Māori world or worldviews
te taiao	natural environment
Te Tairāwhiti	Gisborne region
te Tiriti o Waitangi	the Treaty of Waitangi: founding document establishing rights, responsibilities and relationships between the Crown and tangata whenua signed 6 February 1840
tikanga	practices
tīpuna/tūpuna	ancestors
tōhunga/tōhunga makutu	experts/expert enforcers
utu	revenge
wahine/wāhine	woman/women
waiata	songs
waka	canoe
whakapapa	genealogical connections
whakataukī	proverb(s)
whakatikia	to correct
whānau	family
wharenui	meeting house
whenua	land

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