Build Back Better Aotearoa New Zealand Ltd

Survey Report

K. Maxwell, Prof. S. Wilkinson,
Prof. R. Potangaora

CLIMATE CHANGE IMPACTS ON MARAE

Build Back BETTER
Aotearoa New Zealand

He aha te tikanga o te marae ki ahau?

Ko te marae tētahi wahanga o taku tikanga me aku taonga tuku iho.

Kei reira ngā whanau, ngā hapu me ngā Iwi e huihui tahi ana ki te whakanui i ngā oranga o ngā reanga maha.

A, ki te kite i te huarahi anga whakamua mō te katoa.

Ko te marae te huihuinga tāngata.

What does the marae mean to me?

The marae is a part of my culture and my heritage.

It is where whānau, hapu and iwi come together to celebrate the lives of many generations and to discern a collective way forward.

The marae is where people gather.

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> ... I and our whānau, hapu, welcome this project. One of the key issues that were raised by our whānau affected (by Cyclone Gabrielle) was we were on our own, so one of the things we need to address is to have our own disaster plan in place, as well as a Recovery Plan.
>
> Straight after the cyclone, we assessed the damage and then looked at how the flood gained access into the building, straight away we were able to pinpoint those areas.
>
> As we are looking at a rebuild we need to look at how we can make the marae safe. We are aware this will happen again. So we have to cover all angles, our environment, what changes are being done to our river, and what other man made issues are impacting on us.
>
> We still have a long way to go, but at least we have started.

In this report, you will find quotations from whānau, hapū, and iwi, which are indicated by the use of quotation marks.

1 | Foreward

Toitu te kupu; toitu te mana; toitu te whenua

Hold fast to our culture for without our language; without the land; without the spirit of being tangata whenua; our essence would be diminished

Climate change is one of the greatest challenges Aotearoa will ever face. It poses an existential threat to our culture, our whakapapa, our economy, and our natural environment.

Many marae are situated in close proximity to waterways or coastal regions, rendering them susceptible to the adverse effects of climate change. With projections indicating increased frequency and severity of flooding, landslides, wildfires, and rising sea levels, the resilience of marae faces unprecedented challenges, necessitating urgent efforts to adapt and enhance climate resilience.

The research team have completed a major research initiative to delineate risks, comprehend challenges, and collaboratively devise solutions with whānau, hapu and iwi to fortify and preserve their marae for future generations.

Commencing in July 2022, the 'Climate Change Impacts on Marae' research project marks the first comprehensive survey of all marae, generously funded by the Building Research Levy. Led by Kiri Maxwell of Build Back Better Aotearoa New Zealand, the project benefits from the expertise of co-Directors Professor Suzanne Wilkinson and Professor Regan Potangaroa.

In close collaboration with iwi and marae, the team identified challenges and decision-making processes that are often shouldered in isolation by whānau and hapū residing on their marae. Central to this research is the preservation, conservation, and reverence for the buildings and cultural heritage embodied within our marae—a cornerstone principle guiding the research.

Concluding in early 2024, the project aims to make a positive impact to the wellbeing, resilience, and sustainability of marae, which stand as the heart of Māori culture. It seeks to empower whānau, hapū, and iwi in identifying, adapting, and safeguarding marae and its taonga (treasures) against the adverse effects of climate change.

2 | Introduction

Whāia te mātauranga hei oranga mō koutou

Seek after wisdom for the sake of your wellbeing

In the unique geographical landscape of Aotearoa New Zealand, natural phenomena such as earthquakes, volcanic eruptions, floods, tsunamis, and landslides have played a dual role—shaping the country's physical features while also posing significant challenges and risks to its inhabitants. These hazards are intricately linked to New Zealand's location along major seismic fault lines, its volcanic activity, and its susceptibility to both local and distant tsunami events.

In Aotearoa, flooding stands out as a recurrent and devastating natural calamity, inflicting widespread damage across various fronts. Beyond the immediate destruction of buildings and infrastructure, flooding disrupts communities, jeopardises livelihoods, and disrupts the delicate ecological balance.

Adding to the complexity, the growing impact of climate change worsens the intensity and frequency of these occurrences. This is evidenced by the noteworthy 1.1˚C increase in the Earth's surface temperature since the pre-industrial period, underscoring the urgency of addressing climate-related challenges to mitigate future disasters [1].

Scientific projections, including those from the Intergovernmental Panel on Climate Change (IPCC) and the Ministry for the Environment, warn of intensified climate-related events such as droughts, heavy rainfall, and flooding [1] [2]. This heightened risk underscores the urgent need for policies favouring climate-resilient, net-zero development, energy efficiency, and clean renewable energy [3].

In response to these pressing concerns, the New Zealand government declared a climate emergency in December 2020, vowing to achieve carbon neutrality in the public sector by 2025 [4]. The then Prime Minister, Jacinda Ardern, likened this declaration to the "nuclear-free moment" of the current generation, underscoring the gravity of the climate crisis and its implications for future generations [5].

The recent occurrence of events such as Cyclone Gabrielle serves as a stark reminder of the strain imposed by climate change on the nation's infrastructure, livelihoods, and communities. With projections indicating a future marked by more frequent and severe events [6], the urgency to address these challenges is paramount, as they pose a significant threat not only to the nation's cultural heritage but also to its economic wellbeing and environmental sustainability.

Despite these challenges, there remains a critical gap in research concerning the vulnerability of climate change to Aotearoa's cultural essence, marae. This knowledge gap exposed the need for comprehensive research efforts to identify at-risk sites, assess potential impacts, and develop adaptive strategies to safeguard these invaluable cultural assets.

To address this, a pioneering research project has undertaken the task of compiling a comprehensive database of all marae and conducting a nationwide survey of Aotearoa's marae to climate change impacts. This report underscores marae's challenges, the urgent need for assistance, and the imperative to act swiftly. Subsequent study phases will entail detailed analysis with selected iwi and marae nationwide, identifying cost-effective and pragmatic solutions to safeguard marae – our tūrangawaewae (place of belonging).

3 | Research methodology

This report presents the findings of the Climate Change Impacts on Marae Survey, which aimed to address the question of how komiti marae (marae committees) and marae trusts—comprising members from whānau, hapū, and iwi—are responding to the challenge of climate change.

To conduct this comprehensive national survey of marae, the following steps were methodically executed:

1. Development of a national marae database
    a. A nationwide database encompassing all marae across the motu (country) was developed using diverse public sources.
    b. Developing the database focused on creating an exhaustive list of marae, assigning each marae a unique code for identification purposes.
    c. Current contact details and email addresses for each marae were sourced from various public databases.
2. Preparation and refinement of survey questions
    a. A series of questions were methodically developed and refined through discussions with subject-matter experts. (Refer to Appendix 1 for the survey questions).
    b. A delivery mechanism for disseminating the questionnaire was devised utilizing the Build Back Better Aotearoa New Zealand website (buildbackbetter.co.nz).
    c. The survey underwent rigorous independent review and approval by the New Zealand Ethics Committee to ensure compliance with ethical standards. (See Appendix 2 for ethics approval).
    d. Researchers adhered to Te Ara Tika [7] —the ethical guidelines for conducting research with hapori Māori (Māori communities).
3. Outreach and engagement
    a. Marae with verified current email addresses were contacted, with follow-up procedures in place.
    b. For marae lacking email addresses, alternative methods such as outreach through social media profiles were employed to ensure comprehensive coverage.
4. Data collection and analysis
    a. Responses garnered from the survey were meticulously recorded and organised within a centralised database.
    b. Rigorous analysis of the responses was conducted, employing a climate reference framework to contextualise and interpret the findings.

This systematic approach facilitated the compilation of invaluable insights into the responses and strategies adopted by marae kaitiaki (guardian)[1] in addressing the multifaceted challenges posed by climate change. The findings gleaned from this survey provide a foundational understanding of the current landscape, paving the way for informed decision-making and targeted interventions to bolster the resilience and sustainability of marae communities in the face of climate change impacts.

[1] Within this report, komiti marae (marae committee) and marae trust/board etc. will be referred to as marae kaitiaki (guardian).

4 | Research results qualified

The team has curated the most comprehensive database of marae, complete with detailed contact information and precise locations, available in Aotearoa. As articulated in the introduction, this invaluable resource will be shared with other research entities, governmental bodies, and public groups, facilitating future endeavours and informed decision-making processes.

Our database initiative commenced with an analysis of Māori Maps, which initially identified 738 marae across the country. However, our meticulous analysis unearthed an additional 38 marae not documented on Māori Maps, enriching our database to encompass a total of 778 marae.

For each of these 778 marae, we commenced our data collection journey with the contact details provided on Māori Maps, which typically included physical addresses and a combination of phone and/or email contacts. While some marae possessed generic email addresses associated with titles such as "marae," "chair," "trustees," or "secretary," the majority featured personal contact information, albeit many of which had become outdated due to changes in marae kaitiaki.

To bolster our dataset, we conducted extensive searches across other public databases, including social media platforms, ultimately verifying a total of 409 valid email addresses. Direct communication via email was initiated with these verified contacts, supplemented by outreach efforts to an additional 158 marae via website or social media channels. In total, we engaged with 567 of the 778 marae in our database.

However, 211 marae remained uncontacted for a variety of reasons, including non-operational status, absence of email or phone contact details (with only a postal address provided), or invalid email addresses (e.g., undeliverable or multiple marae sharing the same email address).

Of the 567 marae contacted, 100 responded with completed surveys at the time of our analysis, with responses still trickling in as the survey remains open. Late responses will be duly incorporated into subsequent analyses. For the remaining marae, we tracked email engagement, noting unopened emails, partial responses, and declines, with reasons ranging from ongoing events such as tangi (funerals) or significant anniversary celebrations to leadership transitions.

It's noteworthy that a significant portion of respondents—over half—reported experiencing damage from natural hazards, while almost half cited climate-related events. This observation suggests that marae directly impacted by hazards and climate change were more inclined to engage with the survey, underscoring the importance of their perspectives in shaping our insights.

The insights gleaned from the 100 responding marae provide invaluable understanding of the nuanced impacts of climate change, as well as the diverse attitudes and strategies adopted at the individual marae level—a wealth of information crucial for informing future climate adaptation and resilience-building efforts.

5 | The impacts of climate change on marae

I orea te tuatara ka puta ki waho

A problem is solved by continuing to find solutions

Our findings shed light on the profound effects of climate change, and natural hazard events on marae across the motu (country). Situated predominantly in coastal or rural areas, many marae are inherently more susceptible to the impacts of natural hazards, including storms, flooding, and cyclones. Of particular concern are the detrimental effects of coastal and river erosion and storm surges, which pose significant threats to the integrity of marae structures and surrounding landscapes.

> Our marae is situated on land, which is just above sea level, but lower than the sand dunes that may prevent floodwaters going out to sea. As such, our marae is at risk of flooding. We are currently undertaking a feasibility study on upgrading marae facilities and may need to consider relocating the marae to higher ground, as building regulations would be too restrictive in the current location (need to be built 2.7 metres above ground).

The shifting climate patterns, characterised by increased frequency and severity of storms, rising sea levels, and altered rainfall patterns, further exacerbate the vulnerabilities faced by hapori Māori. These changes, as reported in our survey, have tangible impacts on marae, ranging from structural damage to disruptions in essential services and daily activities.

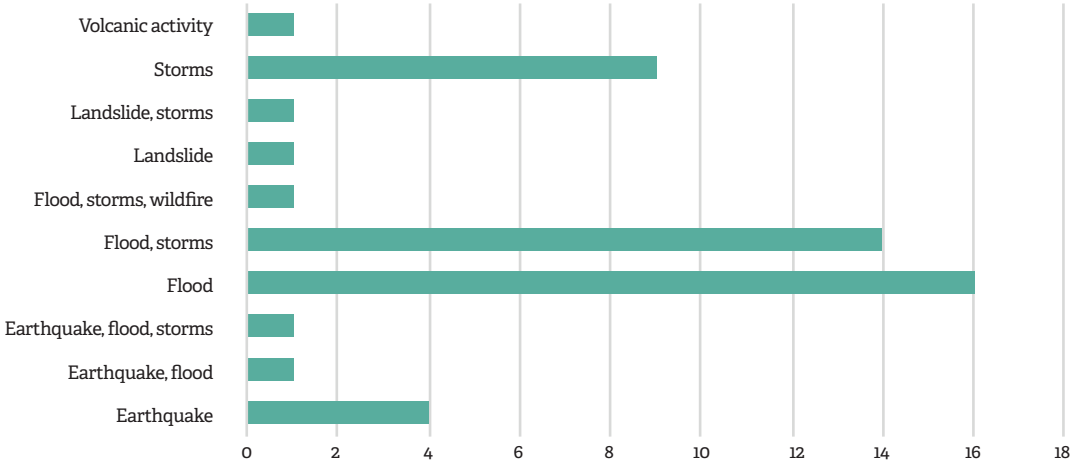
The escalating risks posed by climate change and natural hazards necessitate urgent action to enhance the resilience of hapori Māori. Strategies focused on risk mitigation, adaptation, and preparedness are crucial for safeguarding the tūrangawaewae of Māori. By implementing proactive measures and fostering community resilience, marae communities can effectively navigate the challenges posed by changing environmental conditions and ensure the sustainability of their ancestral lands for future generations.

6 | Are marae being damaged by natural hazard events?

The survey findings strongly indicate that marae are vulnerable to a range of natural hazards. The survey vividly portrays the significant damage that marae have suffered and highlights the subsequent impact on hapori Māori.

Has your marae been damaged by a natural hazard event?	
No	47
Yes	53
Total	**100**

This evidence underscores the urgency of acknowledging and addressing the vulnerabilities faced by marae in the face of natural hazards. It prompts a closer examination of the resilience strategies and adaptive measures necessary to safeguard the integrity and continuity of marae amidst the ever-evolving challenges posed by environmental forces.



6.1. THE IMPACTS OF CYCLONE GABRIELLE ON MARAE

Cyclone Gabrielle left its mark on numerous marae across the surveyed rohe. Within the scope of this survey, a total of 28 marae disclosed being directly impacted by the ferocity of the cyclone. These impacts varied in nature and severity, ranging from structural damage to disruptions in essential services and facilities. Such firsthand accounts exposed the real and immediate threats posed by extreme weather events like Cyclone Gabrielle, highlighting the urgent need for proactive measures to enhance resilience and mitigate the adverse effects of future climate-related disasters on marae communities.

> Due to Cyclone Gabrielle we have recognised we require a Civil Defence Plan, which we are currently working on, however it's the funding to get our marae as well as our community prepared to adequately assist whānau the next time an event like the cyclone hits again.

As 'flood', 'landslides' and 'storms' have impacted your marae, was your marae impacted by Cyclone Gabrielle?	
No	28
Yes	16
Total	**44**

6.2. THE SCALE AND IMPACTS OF CLIMATE-RELATED DAMAGE

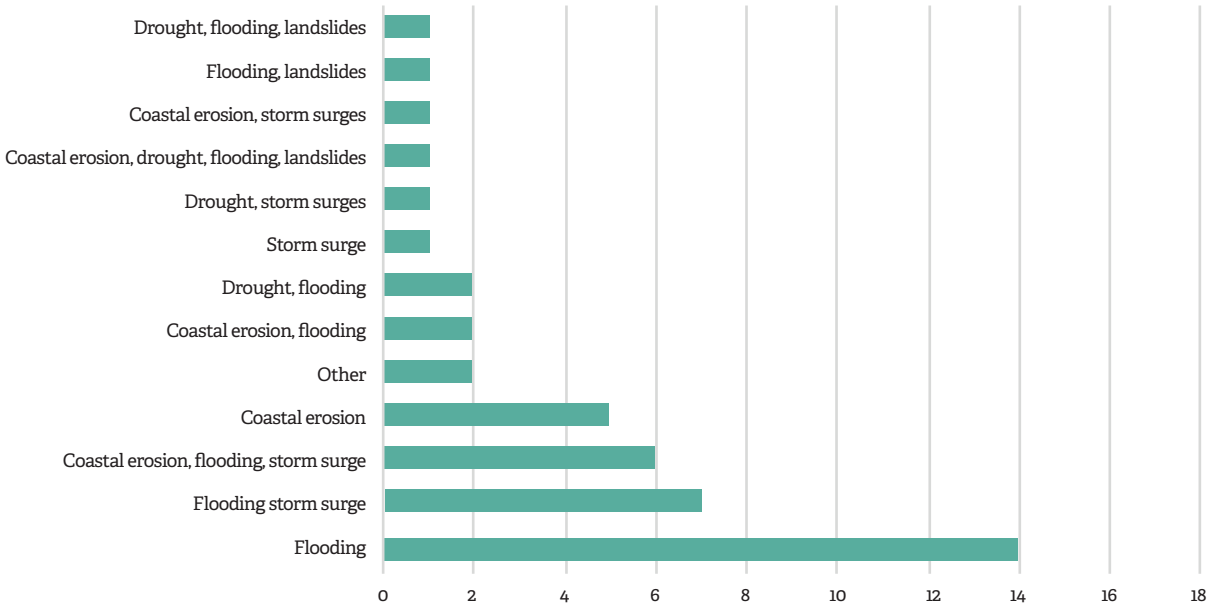
Many marae are experiencing the detrimental effects of climate-related damage, which manifest in a variety of issues. Among these challenges, flooding stands out as a major concern, often exacerbated by the marae's proximity to waterways.

Has your marae been damaged by the effects of climate related events?	
No	56
Yes	43
Total	**99**

The frequency and severity of flooding incidents highlight the vulnerability of marae communities to this particular hazard. Whether situated near rivers, streams, or coastal regions, marae are susceptible to inundation during periods of heavy rainfall or storm surges. The damage not only impacts physical structures but also interrupts vital services and everyday operations.

> We have the (name) river and the (name) river by our Marae so if there are floods, we are stuck in the middle with no way out either side.

Given the recurring nature of flooding, it is crucial to implement proactive measures to enhance marae resilience. Strategies such as improving drainage systems, elevating buildings, and implementing flood-resistant landscaping can mitigate the impact of flooding on marae infrastructure. Additionally, community-led initiatives focused on raising awareness and enhancing preparedness are essential for effectively managing the risks associated with flooding and other climate-related challenges.



6.3. FREQUENCY OF FLOOD DAMAGE

Flooding emerges as the predominant consequence of climate change, affecting a significant portion of marae. According to the findings, approximately one-third of marae are grappling with flooding, with many experiencing these incidents annually or even more frequently. Moreover, marae are confronted with recurrent impacts from various other climate-related events, with some occurrences documented on a yearly basis.

The data reveals a troublingly high frequency of climate-related events, particularly concerning flooding, storm surges, and coastal erosion. This recurrence highlights the need for proactive measures to address these challenges and enhance the resilience of marae communities against the escalating impacts of climate change.

How frequently is your marae impacted by Floods?	
Recurring e.g., every year or sometimes more than once a year	12
20-50 years	7
5-10 years	5
0-5 years	5
10-20 years	2
50+ years	2
Same as it's always been (please specify)	1
Total	**34**

6.4. FREQUENCY OF STORM SURGE DAMAGE

Similar to flooding, storm surge damage poses a significant threat to marae communities, with reports indicating frequent occurrences on an annual basis or even more frequently. Storm surges, characterised by the abnormal rise of water levels during severe weather events such as tropical storms or cyclones, can inflict extensive damage to coastal areas, including marae situated in close proximity to the shoreline.

How frequently is your marae impacted by storm surge?	
Recurring e.g., every year or sometimes more than once a year	6
0-5 years	3
5-10 years	3
10-20 years	2
20-50 years	2
Total	**16**

The repetitive nature of storm surge damage stresses the vulnerability of marae to the impacts of climate change, necessitating proactive measures to mitigate risks and enhance resilience. Strategies aimed at fortifying infrastructure, implementing coastal protection measures, and improving early warning systems are essential for safeguarding marae against the adverse effects of storm surges and ensuring the long-term sustainability of these vital places of cultural identity.

6.5. FREQUENCY OF DAMAGE FROM COASTAL EROSION

For marae nestled along the coastline, the relentless force of coastal erosion looms as a pressing concern. According to the findings, a significant number of marae experience the unsettling reality of coastal erosion on an annual basis or even more frequently. This gradual yet relentless process, driven by the ceaseless battering of waves and the erosive forces of nature, poses a threat to the stability and longevity of marae structures and surrounding landscapes.

The recurrence of coastal erosion underscores the urgent need for proactive measures to mitigate its impact and bolster the resilience of coastal marae communities. Solutions such as implementing shoreline stabilisation techniques, restoring natural coastal habitats, and fostering community engagement in coastal management initiatives are imperative for safeguarding the cultural heritage and ecological integrity of marae. By confronting the challenges of coastal erosion directly, marae communities can strengthen their defences against this threat and safeguard the preservation of their whenua papatipu (ancestral lands) for generations to come.

How frequently is your marae impacted by coastal erosion?	
Recurring e.g., every year or sometimes more than once a year	7
0-5 years	3
20-50 years	3
50+ years	2
Total	**15**

6.6. FREQUENCY OF DAMAGE FROM DROUGHT

While not prevalent as a significant impact, drought has nonetheless made its presence felt among a minority of marae, with reports indicating its occurrence on a frequent basis. Though less conspicuous compared to other climate-related challenges, such as flooding or storm surge, drought poses its own set of challenges for affected marae communities.

How frequently is your marae impacted by drought?	
Recurring e.g., every year or sometimes more than once a year	2
0-5 years	2
20-50 years	0
50+ years	0
Total	**4**

The persistent recurrence of drought events highlights the vulnerability of these communities to fluctuating weather patterns and climatic disturbances. Prolonged periods of dryness can strain water resources, jeopardise agricultural productivity, and exacerbate socio-economic disparities within affected areas. Moreover, the compounding effects of drought, coupled with other climate-related stressors, can further exacerbate existing vulnerabilities and heighten the need for adaptive strategies.

While the prevalence of drought may be less pronounced compared to other environmental hazards, its persistent occurrence highlights the importance of incorporating drought resilience measures into broader climate adaptation strategies. Initiatives such as water conservation efforts, sustainable land management practices, and diversified livelihood strategies can help bolster the resilience of marae communities against the impacts of drought and ensure their long-term sustainability in the face of evolving climatic conditions. By proactively addressing the challenges posed by drought, marae communities can better prepare for and mitigate the adverse effects of this climate-related hazard, safeguarding their taonga tuku iho (heritage) and enhancing their resilience to future challenges.

6.7. FREQUENCY OF DAMAGE FROM LANDSLIDES

Landslides, though reported by a limited number of marae, emerge as a recurrent hazard with notable frequency. Despite being less common compared to other environmental perils, the occurrence of landslides poses a significant threat to the stability and safety of affected marae communities.

How frequently is your marae impacted by landslides?	
Recurring e.g., every year or sometimes more than once a year	2
0-5 years	1
20-50 years	0
50+ years	0
Total	**3**

The repetitive occurrence of landslides draws attention to the dynamic nature of the landscape surrounding marae. Factors such as steep terrain, heavy rainfall, and soil instability can contribute to the susceptibility of certain areas to landslide events, putting marae at risk of potential damage and disruption.

The impacts of landslides can be severe, resulting in structural damage to buildings, infrastructure, and surrounding vegetation, as well as posing risks to human safety and wellbeing. Moreover, landslides can have far-reaching consequences, including disruptions to transportation networks, loss of access to essential services, and adverse effects on local ecosystems.

Given the inherent risks associated with landslides, it is imperative for marae communities to implement proactive measures to mitigate these hazards and enhance resilience. Strategies such as slope stabilisation measures and vegetation placement and management can help reduce the risk, and minimise their impact on affected communities [8].

7 | Loss of land

> Wahi tapu would be a place of significance as well as we have urupā on the hill. Our history on our coastline has significant wahi tapu subject to erosion on the hills as well as along our coastline.

7.1. LOSS OF LAND DUE TO COASTAL EROSION

When investigating the impact of climate-related events on the loss of land for marae, the findings unequivocally affirm that land loss is occurring. Coastal erosion emerges as a significant concern affecting marae, with some experiencing a loss of over 100 meters of land due to this phenomenon.

The root cause of coastal erosion lies in rising sea levels, which intensify the erosion process along coastlines. Beyond the loss of land, coastal erosion poses additional threats such as damage to infrastructure, disruption of ecosystems, and heightened vulnerability of coastal marae communities to storms and other natural disasters.

Is your marae or the surrounding rohe, affected by loss of land from erosion of the coastline?	
None at all	59
Yes	40
Total	**99**

How much land has been lost due to coastal erosion?	
Not exactly sure how much	16
Less than 50 metres of land loss	10
Over 100 metres of land loss	7
50 - 100 metres of land loss	7
Total	**40**

7.2. LOSS OF LAND DUE TO RIVER EROSION

Likewise, river erosion poses a significant threat to marae communities. An analysis of the impact of erosion from rivers reveals a concerning trend of land loss affecting marae. Mirroring the findings on coastal erosion, the results reveal that land is indeed being lost due to river erosion. In some instances, marae have already experienced the loss of over 100 meters of land due to this phenomenon.

River erosion, much like coastal erosion, presents multifaceted challenges for marae. Beyond the immediate loss of land, the erosion process can have far-reaching implications, including the degradation of surrounding ecosystems, disruption of habitats, and increased susceptibility to flooding.

Is your marae or the surrounding rohe (area) affected by loss of land from erosion from rivers?	
Yes	53
None at all	47
Total	**100**

To address the impacts of coastal and river erosion, marae communities can implement several strategies. Marae communities can consider installing physical barriers such as seawalls or revetments to reduce the erosive force of waves and protect vulnerable shoreline areas. Additionally, planting native vegetation along coastal and riverbank areas can stabilise soil, absorb water, and strengthen soil structure with root systems, thus mitigating erosion.

Furthermore, marae communities may opt for beach nourishment by adding sand or sediment to eroded beaches to replenish lost sediment and restore natural coastal processes. It's essential

to engage in land use planning by implementing zoning regulations and measures to restrict development in erosion-prone areas, minimising exposure to erosion hazards and protecting valuable ecosystems.

Community engagement plays a crucial role, involving local stakeholders, authorities, and communities to raise awareness about erosion risks and develop collaborative strategies for erosion management and adaptation. Establishing monitoring programs to track erosion rates and water levels enables marae communities to anticipate and respond to erosion threats effectively [9].

> Our marae is on a hilltop. Concerns of erosion. Need to support the hill with retaining walls.

How much land has been lost due to river erosion?	
Less than 50 metres of land loss	16
Not exactly sure how much	16
50 - 100 metres of land loss	13
Over 100 metres of land loss	8
Total	**53**

Finally, integrating erosion resilience into broader climate adaptation plans helps marae communities anticipate future erosion risks and develop proactive strategies to enhance resilience and adapt to changing environmental conditions. Through these measures, marae communities can effectively address erosion impacts and ensure the long-term sustainability of their marae.

8 | Is climate change affecting access to mahinga kai?

The repercussions of climate change is exacerbating the loss of land for marae communities, extensively impacting their food sources and overall livelihoods. Beyond the direct loss of land, marae face a myriad of challenges, including access to mahinga kai (traditional food gathering areas) and agricultural practices due to climatic events.

One notable consequence is the destruction of crops caused by floods and storms, exemplified by the devastation wrought by events like Cyclone Gabrielle. Such disasters not only result in immediate crop loss but also have long-term implications for food security and agricultural sustainability.

Furthermore, marae communities may experience losses in livestock during extreme weather events such as cyclones, compounding the economic and social impacts of climate change. The destruction of infrastructure and habitats caused by these events can disrupt traditional livestock rearing practices, further exacerbating food insecurity [10].

Has your access to mahinga kai been (garden, food-gathering place) been compromised or changed over time?	
Yes	63
No	37
Total	**100**

Over how many years have you noticed a change?	
Over 20 years	24
Between 5 - 10 years	14
Between 2 - 5 years	13
Between 10 - 20 years	11
Over the last 2 years	1
Total	**63**

In addition to terrestrial food sources, marine ecosystems are also affected, leading to altered fish populations and species compositions. Changes in water temperature, acidity, and nutrient levels can disrupt marine habitats, affecting the availability and distribution of fish stocks vital for sustenance and Māoritanga.

Moreover, climate-induced disruptions can compromise the safety and quality of food and water sources, leading to contamination and health risks for marae communities. Pollution from floodwaters, sedimentation, and chemical runoff can contaminate freshwater sources, jeopardising both human health and ecosystem integrity.

The observation of a significant and regular change in access to mahinga kai by marae communities is deeply concerning. This shift reflects the tangible impacts of environmental degradation and climate change on the availability and accessibility of vital food resources [11].

For marae, which have long relied on these natural ecosystems for sustenance, cultural practices, and community wellbeing, the disruption in access to mahinga kai signifies a threat to tikanga Māori. The frequency and severity of these changes underscore the urgent need for concerted efforts to address climate change and its impacts, safeguarding the sustainability of mahinga kai resources for present and future generations of marae communities.

In summary, the impacts of climate change on marae extend beyond the loss of land, encompassing disruptions to food sources, agricultural practices, and overall community wellbeing. Addressing these challenges requires comprehensive strategies that prioritise adaptation, resilience-building, and sustainable resource management to ensure the long-term viability and resilience of marae communities in the face of a changing climate.

9 | What marae are doing to mitigate climate change?

Whaowhia te kete mātauranga

Fill the basket of knowledge

Are you, your whānau or iwi doing any work to reduce, or adapt to, the impacts of climate change on your marae?	
Yes	86
No	14
Total	**100**

Efforts are underway to enhance the resilience of marae, encompassing measures such as improved planning, bolstering infrastructure against specific hazards, and considering relocation of vulnerable structures from high-risk zones. Marae face heightened vulnerability due to their reliance on traditional construction methods and materials, which may render them more susceptible to damage during natural hazard events. Additionally, financial constraints often limit the maintenance of marae structures, further exacerbating their susceptibility to damage. These factors highlight the importance of prioritising investments in maintenance and upgrading of marae infrastructure to mitigate the impacts of future natural disasters.

> Our marae has relocated on two previous occasions and whilst we do not have evidence, we believe it was due to the rising lake levels as the marae was situated adjacent to the lake. Both our marae and wahi tapu sit on the edge of the (name) stream. Flood waters are diverted further upstream from (name) stream, (name) and (name) rivers. Further erosion along the banks of that river would be disastrous as there could be potential for the wahi tapu foundations to be gouged out and our loved ones disturbed. Furthermore we have no other place to relocate our marae to.

9.1. MARAE ARE TAKING A RANGE OF CLIMATE CHANGE ACTIONS

The survey showed that marae are taking a range of climate change actions. These actions are required because of the risks and vulnerabilities being seen by the marae. However, the results showed that there was uncertainty about the best options to take.

> Back in the 70's (name) came up with a river straightening programme.
>
> Our marae and affiliated whānau lost land and our whare had to be relocated. (name) township is on the other side of the river. I have no doubt that if the river got too high the 'powers that be' would blow our side of the bank to save (name).
>
> That would take our whare out and I suspect that our urupā would be damaged and graves and contents could be exposed. We have some housing in the area as well.

What are you doing?	
We have started talking about climate change, but we are not sure what next steps to take	43
We have been talking about climate change for some time, we know what we need to do	18
We have a climate change plan, but funding is an issue	15
Other (please specify)	8
We have a climate change plan and funding is not an issue	2
Total	**86**

9.2. MARAE ARE WORKING WITH A RANGE OF EXPERTS

Marae are actively collaborating with a diverse array of experts to tackle the challenges posed by climate change. These collaborations involve primarily working within their own whānau, hapu and iwi with collaboration with local government and experts from the science and research community, universities, and climate change consultants. By leveraging the expertise and insights of these professionals, marae communities are developing innovative strategies to adapt to changing environmental conditions, mitigate the impacts of climate change, and foster resilience within their communities. This collaborative approach underscores the importance of interdisciplinary cooperation in addressing the complex and interconnected issues arising from climate change, ensuring that marae are well-equipped to navigate the uncertainties of a rapidly changing world.

Who are you working with?	
Within our whānau, hapu and iwi	37
Within our whānau, hapu and iwi; With our local or regional council With experts from the science and research community or universities	13
Within our whānau, hapu and iwi; With our local or regional council	12
With our local or regional council	4
Within our whānau, hapu and iwi; With private consultants	3
Within our whānau, hapu and iwi; With our local or regional council Other – please name if appropriate	3
Within our whānau, hapu and iwi With experts from the science and research community or universities	3
With private consultants	2
Within our whānau, hapu and iwi; Other – please name if appropriate	2
With experts from the science and research community or universities	2
Within our whānau, hapu and iwi; With our local or regional council With experts from the science and research community or universities With private consultants; Other – please name if appropriate	1
Within our whānau, hapu and iwi; With private consultants Other – please name if appropriate	1
Within our whānau, hapu and iwi With our local or regional council With experts from the science and research community or universities With private consultants	1
Other – please name if appropriate	1
Total	**86**

9.3. REASONS FOR MARAE WHO WERE NOT DOING ANYTHING TO ADAPT TO CLIMATE CHANGE

Insufficient knowledge emerged as a prevalent barrier for marae who are not doing anything to adapt to climate change, with reasons such as uncertainty about where to begin, and a lack of prior discussion among the whānau, hapu and iwi. Additionally, some marae expressed the need for support in formulating effective climate change processes and strategies. One marae highlighted the challenge of identifying optimal approaches to mitigate climate change impacts.

Several marae reported being unaffected by climate change consequences, leading them to prioritise other concerns. For instance, one marae indicated that climate change wasn't an urgent issue on their agenda. Another cited their geographical advantage, situated on a hill and having rebuilt in 2011, as factors mitigating potential impacts. Similarly, another marae emphasised their historical lack of direct impacts from climate change.

For certain marae, the emphasis has shifted towards fostering sustainable practices, encompassing initiatives like recycling programs, installation of solar panels, establishment of orchards, and the development of farms. However, the commitment to addressing climate impacts varied among marae.

Two marae disclosed that either no residents were currently residing on the premises or there weren't sufficient inhabitants to warrant a dedicated focus on climate impacts. Additionally, one marae cited financial constraints, noting unsuccessful attempts to secure funding, stating, "We've applied for funding and been declined."

> We are probably the better off of the 16 marae in our traditional rohe, as we are so far from the coastline, where all of our marae are being impacted way more than us. If anything, they'll probably move inland by us (if they were interested in relocating that is).

10 | Concerns for relocation

We see a need to relocate our marae one day due to the increasing prevalence of rising waters and flooding. However, we do not have the land to move it too.

Please explain how this would be possible?

The issue of relocating marae is fraught with controversy and complexity. It necessitates making challenging decisions that can have profound cultural, social, and practical implications. The survey results revealed that various options for relocation were being contemplated, indicating the nuanced nature of the decision-making process. They results also highlighted the pressing need for specialised expertise and support to navigate the intricacies involved in such a significant undertaking.

Is the relocation of your marae, or other places of significance, a concern for you?	
Yes	56
No	35
I don't know	9
Total	**98**

It's all about your whakapapa to the whenua. We build on the land our ancestors left us

10.1.ARE ANY RELOCATION DECISIONS BEING MADE?

Several marae indicated that they were in the midst of discussions regarding the possibility of relocating their premises, with initial decisions starting to take shape.

In instances where decisions have been finalised to relocate, the prevailing approach often entails a transition to higher ground.

We have had discussions on whether one: we move the marae or two: build the ground up. At this present time we are no closer to a solution.

The whanau and hapu have decided to 'lift' and 'shift' the marae to higher ground.

10.2.WHY ARE MARAE CONCERNED ABOUT RELOCATION?

The decision to relocate marae elicited diverse responses among stakeholders. While there was acknowledgment of the potential necessity for relocation due to environmental factors, the deep cultural significance attached to these sites imbued the decision-making process with deep-seated concern and unease among marae communities.

> I intend to suggest to our people that we consider relocating our whare and maybe even our urupā to higher ground now rather than go through pain should the worst happen.“

10.3.CULTURAL CONCERNS

A critical concern surrounding relocation efforts centred on the implications for culturally significant land and taonga (treasures). The land holds immense spiritual significance for Māori communities, rendering the prospect of abandoning it untenable. For these marae, departing from ancestral land is simply not an option. Consequently, there is a need to implement mitigation measures aimed at averting the potentially devastating consequences of climate change in order to safeguard these invaluable cultural and spiritual assets for future generations.

> My marae is on a wahi tapu and in the foreseeable future see no reason to relocate it.

> It is a historical point and so moving is not an option for us nor our marae

11 | Other concerns raised in the survey

11.1. LOCAL GOVERNMENT

Due to the necessity of obtaining council consent for construction projects, marae frequently find themselves engaged with local councils and various government agencies in decision-making processes. These decisions not only influence the accessibility and upkeep of marae infrastructure but also have broader implications for the community they serve. However, marae encounter challenges in navigating the procedural intricacies and practices of councils, particularly concerning their infrastructure requirements. As a result, there is a need for improved communication and collaboration between marae and relevant authorities to streamline processes and ensure that the unique needs of marae are effectively addressed within regulatory frameworks.

> Council obligations are fraught with lack of funding especially concerning our coastlines roading infrastructure as we lose more of the coastline road to erosion.

Local councils play a crucial role in supporting marae communities, which includes not only recognising, but also effectively responding to their infrastructure requirements. The aftermath of Cyclone Gabrielle highlighted a significant failure in infrastructure resilience and a lack of collaboration between councils and marae in comprehending and addressing these needs.

> Our greatest concern is council infrastructure which has caused climate change to impact more on coastal communities both inland and coastal. Council never really gave much thought to what infrastructure they put in place. Water culverts during Cyclone Gabrielle caused blockages and loss of land at our (name) river.

During crises such as natural disasters like Cyclone Gabrielle, it becomes clear that the current infrastructure systems were insufficient to withstand such difficult challenges. Moreover, there was a failure to engage with marae communities to fully understand their specific infrastructure needs, leaving them vulnerable and underserved during emergencies.

This emphasises the importance of proactive engagement and collaboration between councils and marae to ensure that infrastructure planning and response efforts are tailored to the unique requirements of marae communities. By fostering a deeper understanding of these needs and working in partnership, councils can better support marae in enhancing their resilience and safeguarding their cultural and community assets in the face of future challenges.

11.2. LACK OF FINANCE AND RESOURCES

Addressing the impacts of climate change necessitates adequate financial resources and appropriate resourcing. Survey responses highlighted significant challenges in this regard, with many marae expressing concerns over the lack of financial support and resources to effectively address climate change impacts.

For example, one marae indicated that while they had initiated planning efforts, they were hindered by insufficient funding. This sentiment reveals a recurring theme within marae communities, where despite acknowledging the pressing nature of the issue, they encounter limitations in mobilising the required financial resources to enact mitigation and adaptation measures. The lack of financial resources not only impedes the implementation of proactive strategies but also undermines the resilience of marae communities in coping with climate-related challenges. Thus, there is an urgent need for increased financial support and resource allocation to empower marae to effectively address climate change impacts and safeguard their cultural heritage and community wellbeing.

> Like most rural marae the human and financial resources to tackle such things as the effects of climate change on our marae are limited and focus is probably more on the social and economic aspects that many are facing.

12 | What assistance is required to help understand the impacts of climate change on marae?

The survey findings indicated a widespread need for assistance among marae. It became evident that various forms of support were necessary, reflecting the diverse challenges faced by these communities. However, a predominant theme emerged: the crucial requirement for access to useful and focussed information that could aid marae in addressing the complex challenges posed by climate change.

> Our whānau trustees need advice on how to go about the process of relocation...we are surrounded by flood zoning.

What assistance (or information) do you need to help you to understand, reduce or adapt to the impacts of climate change to your marae?	
We know what we need to do, but we need assistance and information	39
We do not know what we need to do, we need assistance and information	36
Other	15
We already have sufficient assistance and information	8
Total	**98**

12.1.PROVISION OF INFORMATION TO HELP MANAGE CLIMATE CHANGE IMPACTS.

The survey showed an overwhelming number of marae would like information to help them adapt to climate change. Providing this information requires specific assessments of marae and options for marae to continue to function under climate change conditions.

Would you like us to provide you with information to help you adapt to the impacts of climate change to your marae?	
Yes	88
No	9
Total	**99**

13 | Conclusions

Our survey findings indicate the tangible impacts of climate change on marae communities. These effects include flooding and coastal erosion, leading to land loss along coastlines and rivers. Additionally, compromised food sources and heightened concerns about the necessity of relocation further emphasise the urgency of addressing climate-related challenges. Events like Cyclone Gabrielle serve as stark reminders of the ongoing need to confront these issues.

The cultural ramifications of marae loss extend far beyond physical structures, encompassing profound changes to cherished taonga passed down through generations (taonga tuku iho), the fundamental principles and values of Māori society (kaupapa Māori), and the intricate genealogical connections that bind individuals and communities (whakapapa). Despite ongoing efforts to address climate change, our survey highlights significant barriers to adaption to climate change, including a lack of knowledge and financial resources, as well as apprehensions surrounding relocation.

Moving forward, our focus will be on exploring diverse options for marae communities confronted with various impacts. This includes developing adaptations and resilience-building strategies to protect and preserve the cultural significance of marae for future generations.

14 | Next Steps

Our team has embarked on an in-depth analysis, often referred to as a "deep dive," focusing on several marae within the Waikato rohe. This initiative aims to comprehensively understand the specific climate change impacts affecting these marae and explore a spectrum of potential options available to address these challenges effectively.

> I appreciate the efforts of those who are developing research components to help better understand the ever evolving weather environment we are currently facing.
>
> So horrifying when you actually get to first-hand experience these impacts.

In order to ensure a strategic and purposeful selection process, our team developed a comprehensive rubric to guide the identification of marae for our research endeavour. This systematic framework facilitated the selection of marae that not only closely aligned with our research objectives but also promised to yield the most valuable insights.

As part of our commitment to supporting marae communities, we are actively engaging with selected marae to explore potential avenues for addressing the impacts of climate change. Through collaborative partnerships and leveraging local expertise, our aim is to co-develop strategies (kete mātauranga) that can help marae effectively navigate climate-related challenges and enhance their resilience for the benefit of future generations. By fostering dialogue and sharing knowledge, we seek to empower marae communities to identify and pursue adaptive measures that align with their cultural values and aspirations.

15 | References

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