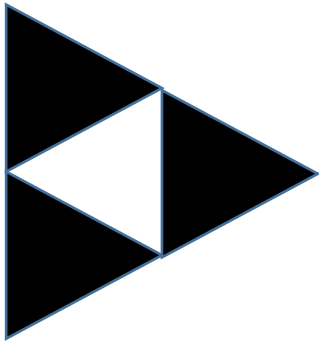




Rapid Review

Māori and Disaster Research

An Annotated Bibliography
8 March 2023

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Overview

This rapid review provides an annotated bibliography of research undertaken on the responses and impacts of natural disasters both in New Zealand and internationally. It is sectioned into literature from researchers within New Zealand, research specific to Māori experiences; Christchurch earthquakes, displacement and international research with a focus on Māori, indigenous and minority group perspectives. The review is a ‘starter’ for those considering the impact and consequences of disasters for Māori.

Given the increasing serious impact of weather events and research work around climate change, researchers should check government agency sites for research reports, strategies, policies etc.

We intend this to be a living document and will appreciate notification of research publications we are unaware of.

To add a work to this bibliography please email info@maramatanga.ac.nz

Aotearoa/New Zealand

Awatere, S., King, D., Reid, J., Williams, L., Masters-Awatere, B., Jones, R., & Jackson, A. (2021). *He huringa āhuarangi, he huringa ao: A changing climate, a changing world*. Report prepared for Nga Pae o te Māramatanga.

<https://www.landcareresearch.co.nz/assets/researchpubs/He-huringa-ahuarangi-he-huringa-ao-a-changing-climate-a-changing-world.pdf>

Abstract Māori governance institutions are increasingly asserting their rangatiratanga to manage climate change risks and safeguard the well-being of whānau/hapū/iwi. However, there is a shortage of guidance specifically for whānau/hapū/iwi on mitigating and adapting to climate change. Most existing guidance targets central and local government agencies. While many Māori organisations have the capacity to manage their own interests and activities, information as well as approaches to understand the implications of climate change for mitigation and adaptation decision-making are often not available or have not been clearly demonstrated. To facilitate more enduring decisions, Māori organisations need a clearer understanding of climate change impacts and their implications for whānau/hapū/iwi interests, development, and well-being. Whānau/hapū/iwi also need guidance to make informed decisions that address climate change in a manner that reflects Māori views and values. By collaborating across multiple entities, including the National Science Challenges, Ngā Pae o te Māramatanga (NPM) has assembled a multidisciplinary team of Māori researchers to explore climate change mitigation and adaption solutions for Māori. This report thereby summarises the latest research and guidance on observed and projected climate change impacts on whānau/hapū/iwi and Māori business in Aotearoa-NZ. It considers the implications of these impacts on diverse interests, and provides commentary about risk and uncertainty, knowledge gaps, and options for mitigation and adaptation. The report is intended to supplement the first National Climate Change Risk Assessment (NCCRA) (AECOM 2020). However, it should not be regarded as an exhaustive summary on this topic, but rather a sweep of recent developments.

Blake D., Becker J., Hodgetts D., Elwood K (2021). *The impact of earthquakes on apartment owners and renters in te Whanganui-a-Tara Wellington Aotearoa... Applied Sciences, 11(15)*, <https://doi.org/10.3390/app11156818>.

Abstract Apartment dwelling is on the increase in many cities in Aotearoa New Zealand, including those in earthquake-prone regions. Hence it is important that people working in disaster management and housing improve their understanding on how the living situations of apartment dwellers influence their disaster management practices. This knowledge is crucial for efforts to promote safety and preparedness. This paper explores what enables and constrains apartment dwellers in their ability to prepare for an earthquake. Eighteen people were interviewed who resided in Te Whanganui-a-Tara (Wellington) two years after the 2016 7.8 magnitude (Mw) Kaikōura earthquake. Of central concern was people's ability to prepare for disasters and access knowledge about building and structural safety and how this knowledge mattered to what apartment dwellers were able to prepare for. We found that the agency to prepare was dependent on whether people owned or rented their dwellings. We report on participant accounts of dealing with body corporations, landlords, emergency kits, other emergency items, and evacuation plans.

Blake, D., Hodgetts, D., Thompson, J., & Johnston, D. (2022). *Mataura flood 2020, Aotearoa New Zealand: A case study highlighting resilience through community spirit*. *International Journal of Disaster Risk Reduction*, 82. doi:[10.1016/j.ijdr.2022.103347](https://doi.org/10.1016/j.ijdr.2022.103347)

Abstract Mataura is a small township in the Southland region of Te Waipounamu (South Island, Aotearoa New Zealand), which displayed the importance of community spirit as people were evacuated during the Mataura River flood of February 2020. The article draws on the case of

Mataura during this event, as conveyed through the vlogs of the person working as the Mataura Community Development Coordinator at that time. The vlogs were analysed through a narrative lens to develop an understanding of how community processes can serve to improve responses and recovery from such disasters. Leveraging insights from previous research, we identify salient issues for communities, including access to practical resources, mental and emotional wellbeing, and the importance of effective communication during evacuations. Presented as a single case study, this article offers a worked exemplar from frontline insights into the mechanisms and functions of a community during times of adversity.

Forsman, X. V. (2018). *Māori Perspectives of Disaster Recovery in Hawke's Bay* (Doctoral dissertation, University of Auckland).

https://auckland.primo.exlibrisgroup.com/permalink/64UAUCK_INST/13vfdcn/alma99265093807902091

Abstract Understandings of disaster recovery are being enhanced by an increasingly diverse range of perspectives. In order to incorporate these perspectives, they must be adopted within a culturally appropriate approach. This thesis presents a series of Māori perspectives on disaster recovery in the context of two significant disaster events in Hawke's Bay, New Zealand. It charts the conceptual evolution of disaster recovery, in doing so recognising that fuller approaches to recovery may be achieved through the use of a cultural context. A Māori world view serves as the cultural context into understanding how indigenous approaches, knowledge bases and motives contribute to making sense of the recovery process.

Gray, N. H., Athy, A. E., & Milfont, T. L. (2022). Climate crisis as a catalyst to advance indigenous rights. *MAI Journal*, 11(2) 103-116. doi: 10.20507/MAIJournal.2022.11.2.2

Abstract Climate change is the most grievous threat of the 21st century and disproportionately affects politically marginalised communities such as Indigenous peoples. As custodians of approximately 80% of the planet's biodiversity, Indigenous cultures have practised sustainable management of ecosystems and resources over millennia providing vital pathways for humanity to better mitigate accelerating climate change impacts. This article argues that a rights-based approach is an important legal avenue to help better protect and advance Indigenous peoples' rights and the biodiversity in their regions. The challenge is to develop a framework that incorporates Indigenous rights into international human rights law while obtaining judicial buy-in by domestic legal systems and nations. Drawing from international legal instruments to better protect and bolster Indigenous rights, and using Aotearoa New Zealand as a case study, this paper identifies how rights of Indigenous communities can be enhanced while serving the global goals of climate change mitigation and adaptation.

Harmsworth, G. R.; Raynor B. (2005). Cultural Consideration in Landslide Risk Perception. Chapter 7 in: Glade, T.; Anderson, M.; Crozier, M. Eds *Landslide Hazard and Risk*. London, John Wiley and Sons Ltd. 219-249.

https://www.researchgate.net/publication/259932014_Harmsworth_G_R_Raynor_B_2005_Cultural_Consideration_in_Landslide_Risk_Perception_Chapter_7_In_Glade_T_Anderson_M_Crozier_M_Ed_Landslide_Hazard_and_Risk_London_John_Wiley_and_Sons_Ltd_219-249

Abstract Cultural groups are often attached to natural environments in ways not usually reflected or addressed by risk assessment. To understand the importance of culture within landslide risk perception, factors need to be identified that constitute cultural characteristics and differences. These factors include traditional beliefs, values, religion, social structure, historical occupation, historical and modern experiences, land tenure, learning, and environmental perspectives. The landslide risk perception of cultural groups is also based on interaction with and dependence on the natural environment for economic and social benefit. Landslide risk perception is investigated

for two examples: from an indigenous Maori perspective in Aotearoa-New Zealand, and from an indigenous and community perspective in Pohnpei, Micronesia.

Harmsworth, G. R. (1991). *No. 9-A review of selected storm damage assessments in New Zealand*. DSIR Land Resources.

<https://digitallibrary.landcareresearch.co.nz/digital/collection/p20022coll18/id/11>

Abstract A knowledge of the frequency, intensity and pattern of storm damage, together with information on costs, is necessary when assessing whether particular land use and management regimes are sustainable. For this reason, storm damage assessments should be an essential requirement after 'significant' storms. This report summarises and collates information from selected published and unpublished storm damage assessments which have been documented during the last 20 years in New Zealand. Those selected all describe erosion damage to land, and are similar in that each involved fieldwork, employed a methodology, and produced a quantifiable result. This study reveals that through the 20-year period, storm damage assessments have become progressively more objective and pragmatic in design. However, the present body of knowledge is inadequate, both in terms of an understanding of the erosion response of the many New Zealand physiographic environments to a range of storm intensities, and also in terms of assessment methodologies.

Henwood, W., Brockbank, T., Barnes, H. M., Moriarty, E., Zammit, C., & McCreanor, T. (2019). Enhancing drinking water quality in remote Māori communities. *MAI Journal*, 8, 97-109. doi: 10.20507/MAIJournal.2019.8.2.1

Abstract This article reports the findings of a two-year transdisciplinary research project that explored the implications of climate change for the security and safety of drinking water supplies in three communities in Te Hiku o te Ika in Aotearoa New Zealand. In this region, potable water comes mainly from "roof and tank" systems. The project was designed as integrative Kaupapa Māori research utilising climate science, microbiology and social science to develop community-oriented approaches for dealing with the complex issues at the nexus of climate change. Evidence-based advice and practical suggestions tailored to specific locations were developed by drawing on climate change projections, local mātauranga Māori and drinking water studies. Interviews with kaumātua surfaced long-standing knowledge and experience of the climate and its variations in Te Hiku. Computer-based scenario modelling—using both automated and community-collected data on precipitation and temperature—produced 80-year climate change projections of water security. Health-focused *Escherichia coli* studies revealed the current water quality and used climate data to predict future water quality. Overall, this research reinforces arguments in the literature that the findings of transdisciplinary studies can provide more explanatory power than single-discipline research.

McLachlan, A. D., & Waitoki, W. (2022). Collective action by Māori in response to flooding in the southern Rangitikei region. *International Journal of Health Promotion and Education*, 60(1), 15-24. <https://doi.org/10.1080/14635240.2020.1843188>

Abstract The capacity of Indigenous communities to respond collectively to crises consistently shows the importance of shared traditions values and practices and genealogical ties. Government responses to traumatic events that affect whole communities tend to be generic in their scope overlooking the significant strengths and resources held by Indigenous peoples. This study presents a Kaupapa Māori case study of collaborative efforts to respond to traumatic events between several communities of local tribes, immigrant tribes, and tau-iwi (non- Indigenous people). Concentrated on a rural community prone to flooding, this study examined community efforts to provide support for those affected by flooding in the Southern Rangitikei area of New Zealand. Key informants included 10 Indigenous community leaders (ICL), and 22 health and social service community practitioners. Four key themes were identified: Collective aspirations mobilise in traumatic events; genealogical relationships bring people together; collective leadership drives the vision; and

Indigenous values inform responses to traumatic events. A salient outcome was that shared historical connection, and shared aspirations for cultural regeneration activated Indigenous communities to engage in collective action. Key barriers and enablers to collective action between Māori and tau-iwi are presented. Recommendations for analysing further responses to trauma in Indigenous communities are proposed.

Masters-Awatere, B., Young, P., & Graham, R. (2022). State agencies and researchers engaging with Indigenous communities on climate change adaption planning. *MAI Journal*, 1(1). doi: 10.20507/MAIJournal.2022.11.1.1

Abstract This systematic review centres planning, policy and/or strategic developments and implementation of climate change adaptation with Indigenous groups in Australia, Pacific Islands, Canada and the United States. We used PRISMA protocols to search five databases. The search was organised around three core areas: Indigenous people groups, climate change strategic planning, and Indigenous knowledge and active participation. A total of 6,338 articles from five databases were identified. Records were screened by title and abstract, leaving 87 articles that were assessed by full text. A total of 22 studies were included. The He Pikinga Waiora Implementation Framework was used as a matrix to analyse included articles. While studies included Indigenous groups in their research, most did not score highly for active inclusion of Indigenous knowledge, integrated knowledge translation or systems change. In general, studies had mediocre processes of inclusion that resulted in average responses and modest influence in decision-making forums.

Proctor, E. M. (2010). *Toi tu te whenua, toi tu te tangata: A holistic Māori approach to flood management in Pawarenga* (Doctoral dissertation, University of Waikato). https://auckland.primo.exlibrisgroup.com/permalink/64UAUCK_INST/3mftp2/cdi_springer_books_10_1007_978_94_007_6916_8_9

Abstract This thesis is a study of how tikanga Māori principles could be used in practice in the management of natural hazards and in particular flooding in a rural area, Pawarenga. The aim was to investigate and document Te Uri O Tai Hapū preferred strategies for reducing flood risk in Pawarenga and to consider opportunities to use tikanga Māori principles and values in emergency response. The identification of key concepts and principles of tikanga Māori customs and their connections to whānau and hapū of Te Uri O Tai is key to this study.

Rijnink, A., Blake, D., Groot, S. & Brough, C. (n.d.). Accessing needle exchange services in disasters for remote areas of Aotearoa New Zealand. *Harm Reduction Journal*, 19(1). <https://doi.org/10.1186/s12954-022-00709-2>

Abstract Needle Exchange Programme (NEP) mobile outreach services in Aotearoa New Zealand distribute injecting equipment to people who inject drugs (PWID) living in remote regions. In disasters, continued access to such services is imperative for the health and wellbeing of PWID. Disasters can compound existing inequities, particularly in regions characterised by poor or limited infrastructure, smaller populations, and challenging socioeconomic conditions. To gain insight into the barriers that prevent access to NEP harm-reduction services and understand the needs of PWID prior to and during disasters, this study foregrounds the voices of PWID based on the West Coast of the South Island, Aotearoa New Zealand.

Torstonson S, Blake D, Hodgetts D, Johnston DM. (2021). The role of “not for profits” (NFPs) in disaster preparedness in Aotearoa New Zealand. *Disaster Prevention and Management: An International Journal*, 30, 384-399. <https://doi.org/10.1108/DPM-10-2020-0332>

Abstract The purpose of this research is to highlight the role of not-for-profit (NFP) organisations in enhancing disaster preparedness. The authors set out to understand their perspectives and practices in regard to disaster preparedness activities to support people who live precarious lives, especially those who live as single parents who are the least prepared for disasters.

Yumagulova, L., Phibbs, S., Kenney, C. M., Yellow Old Woman-Munro, D., Christianson, A. C., McGee, T. K., & Whitehair, R. (2021). The role of disaster volunteering in Indigenous communities. *Environmental Hazards*, 20(1), 45-62.
<https://doi.org/10.1080/17477891.2019.1657791>

Abstract Drawing on Māori (Aotearoa-New Zealand), First Nations (Canada), and Navajo Nation (U.S.), case studies and practitioners' experiences, this article addresses a gap in our understanding of the role of volunteers in emergencies and disasters in Indigenous communities. Enablers and challenges to effective volunteering in these Indigenous communities are discussed. Cultural enablers of volunteering include building capacity during non-emergency times, using all senses when volunteering, and supporting locally emergent psychosocial recovery institutions that are based on cultural understanding and trust. Resolving systemic barriers to volunteering would require institutional and organisational changes through governance, coordination and training. Practical recommendations for supporting volunteer management in Indigenous communities are made.

Christchurch Earthquakes

Blake, D., Fraser, C., & Groot, S. (2022). Sex workers' experiences following the Canterbury earthquakes: Recovery and rebuild. *Journal of Disaster Risk Reduction*, 77. <https://doi.org/10.1016/j.ijdr.2022.103038>

Abstract The social and occupational stigma that impacts on sex workers' resilience following a significant disaster has received little to no attention. To remedy this gap, this paper explores how experiences of stigma have impacted sex workers lives following the 2010-2011 Canterbury earthquakes in Aotearoa New Zealand. We set out to understand how stigma enabled and constrained sex workers' ability to respond to and recover from the earthquakes. We coalesce knowledge from across the domains of sex work, social stigma and disaster management. Semi-structured, in person interviews were held with sex workers who worked during or after the time of the Canterbury earthquakes in Ōtautahi (Christchurch). Additional interviews were conducted with stakeholders who worked with or continued to support sex workers in Christchurch. From across these interviews, narrative tropes were identified, including the risks of divulging sex work in the aftermath of a disaster; navigating intersectional stigma and accessing help; addressing sex workers' unique needs following the earthquakes; and media as a site of stigma. This research aims to combat the negative effects of stigma by encouraging disaster management officials and associated services to attend to the needs of precariat communities during adverse events.

Brown, C., Stevenson, J., Giovinazzi, S., Seville, E., & Vargo, J. (2015). Factors influencing impacts on and recovery trends of organisations: evidence from the 2010/2011 Canterbury earthquakes. *International Journal of Disaster Risk Reduction*, 14, 56-72

Abstract In 2010 and 2011, the Canterbury region of New Zealand was struck by a series of earthquakes, the most serious of which was a magnitude M=6.3 earthquake on the 22nd of February 2011 centred near the heart of Christchurch city. This earthquake led to the cordoning of the central business district due to safety concerns, with parts of the city remaining closed to the public for more than two years following the earthquakes. With large numbers of organisations needing to relocate and being faced with ongoing infrastructure disruption, and significant concerns for staff welfare, the February 2011 Canterbury earthquake provides a valuable case study for enhancing understanding of how businesses are affected by and recover from disasters. In this paper, using data from 541 organisations affected by the Canterbury earthquakes, some of the main findings from the international literature are reassessed. In particular, the paper addresses which types of impact were more disruptive for organisations than others; and whether or not organisational demographics, including age, size, sector and property ownership, are predictors of an organisations' level of impact and recovery following a significant disaster. The paper finds that

human / organisational issues, in particular ‘Customer Issues’ impacts were most disruptive for organisations. Furthermore, this paper finds that, contrary to much current literature, organisational age and size do not strongly predict disaster impact and recovery success. Sector was found to be a predictor of both impact and recovery. Organisations that rented recovered slightly more effectively than those that owned their properties.

Fiona Cram (2021) Mahi aroha: Māori work in times of trouble and disaster as an expression of a love for the people, *Kōtuitui: New Zealand Journal of Social Sciences Online*, 16(2), 356-370. doi: 10.1080/1177083X.2021.1879181

Abstract In 2010 and 2011 the Canterbury earthquakes prompted expressions of mahi aroha – work done by Māori (Indigenous peoples of Aotearoa New Zealand) out of a love for the people – in the emergency context of a natural disaster. Similarly, the Covid-19 level 4 lockdown that began in the last week of March 2020 showcased Māori caring for one another in the context of a pandemic. Whether people were paid or unpaid, out in their communities as essential workers or broadcasting via the internet from their living rooms and kitchens, Māori around the country engaged in mahi aroha. While celebrating the capacity of Māori to move swiftly and effectively to care for others, the past two decades have seen an overall decline in the time Māori have been able to devote to mahi aroha, particularly voluntary work. It is proposed here the decline in Māori home ownership and access to secure, affordable housing is a key challenge to Māori capacity for mahi aroha. It is therefore timely to consider Māori responsiveness during times of crisis and how access to housing might help ensure that this capacity continues into the future.

Kenney, C., & Phibbs, S. (2014). Shakes, rattles and roll outs: The untold story of Māori engagement with community recovery, social resilience and urban sustainability in Christchurch, New Zealand. *Procedia Economics and Finance*, 18, 754-762.
<https://www.sciencedirect.com/>

Abstract On September 4, 2010 a 7.1 magnitude earthquake struck the Canterbury region of New Zealand, heralding a sequence of earthquakes, which included a fatal 6.2 earthquake centred under Christchurch City on February 22, 2011. In response, local Māori recovery initiatives were collaborative, effective and shaped by cultural values, including the principle ‘aroha nui ki te tangata’ (extend love to all). Disaster sector stakeholders are increasingly recognising the value of community-led initiatives that facilitate social resilience. In contrast, cultural approaches to facilitating community resilience receive minimal acknowledgement. The Māori response to the Christchurch earthquakes and subsequent recovery process constitutes an exemplar of best practice. The Joint Centre for Disaster Research in partnership with the Christchurch Iwi (tribe) Ngāi Tahu, conducted research to identify, and document the ways Māori cultural factors facilitated community resilience in response to the earthquakes. A Māori qualitative research methodology has shaped the community-based participatory research design. Māori research participants views were ascertained through semi-structured and focus group interviews. Dialogical and narrative interviewing approaches were used to foster community engagement, as well as capture Māori understandings and practices associated with disaster management, recovery and resilience. Data analysis drew on social theories, risk perspectives and indigenous epistemological concepts. Analysis of the results suggest that New Zealand’s disaster response policies may be enhanced by the integration of Māori approaches to facilitating disaster risk mitigation, community recovery and social resilience. This paper documents the different levels of support that were extended to whānau (families), communities and responding agencies. The cultural principles that underpin the extension of support are examined in relation to Bruno Latour’s theories about how technologies shape action and Putnam’s ideas on social capital. The impact of cultural support strategies on social resilience is addressed and the relevance to national and local authority disaster recovery strategies outlined.

Lambert, S. J. (2013). Initial demographic and economic changes for Maori in a post-disaster landscape. *A working paper. Lincoln University.*

<https://researcharchive.lincoln.ac.nz/bitstream/handle/10182/10261/Working%20Paper%2013-02.pdf?sequence=1&isAllowed=y>

Abstract The city of Ōtautahi/Christchurch experienced a series of earthquakes that began on September 4th, 2010. The most damaging event occurred on February 22nd, 2011 but significant earthquakes also occurred on June 13th and December 23rd with aftershocks still occurring well into 2012. The resulting disaster is the second deadliest natural disaster in New Zealand's history with 185 deaths. During 2011 the Canterbury earthquakes were one of the costliest disasters worldwide with an expected cost of up to \$NZ30 billion. Hundreds of commercial buildings and thousands of houses have been destroyed or are to be demolished and extensive repairs are needed for infrastructure to over 100,000 homes. As many as 8,900 people simply abandoned their homes and left the city in the first few months after the February event (Newell, 2012), and as many as 50,000 may leave during 2012. In particular, young whānau and single young women comprised a disproportionate number of these migrants, with evidence of a general movement to the North Island. Te Puni Kōkiri sought a mix of quantitative and qualitative research to examine the social and economic impacts of the Christchurch earthquakes on Māori and their whānau. The result of this work will be a collection of evidence to inform policy to support and assist Māori and their whānau during the recovery/rebuild phases. To that end, this report triangulates available statistical and geographical information with qualitative data gathered over 2010 and 2011 by a series of interviews conducted with Māori who experienced the dramatic events associated with the earthquakes. A Māori research team at Lincoln University was commissioned to undertake the research as they were already engaged in transdisciplinary research (began in the May 2010), that focused on quickly gathering data from a range of Māori who experienced the disaster, including relevant economic, environmental, social and cultural factors in the response and recovery of Māori to these events. Participants for the qualitative research were drawn from Māori whānau who both stayed and left the city. Further data was available from ongoing projects and networks that the Lincoln research team was already involved in, including interviews with Māori first responders and managers operating in the CBD on the day of the February event. Some limited data is also available from younger members of affected whānau. Māori in Ōtautahi/Christchurch City have exhibited their own culturally attuned collective responses to the disaster. However, it is difficult to ascertain Māori demographic changes due to a lack of robust statistical frameworks but Māori outward migration from the city is estimated to range between 560 and 1,100 people.

Lambert, S. J. (2014). Māori and the Christchurch earthquakes: the interplay between Indigenous endurance and resilience through urban disaster. *MAI Journal* 3(2), 165-180.

https://researcharchive.lincoln.ac.nz/bitstream/handle/10182/7285/MAI_Jrnl_V3_iss2_Lambrt.pdf?sequence=1&isAllowed=y

Abstract The disastrous earthquakes that struck Christchurch in 2010 and 2011 seriously impacted on the individual and collective lives of Māori residents. This paper continues earlier, predominantly qualitative research on the immediate effects on Māori by presenting an analysis of a survey carried out 18 months after the most destructive event, on 22 February 2011. Using a set-theoretic approach, pathways to Māori resilience are identified, emphasising the combination of whānau connectivity and high incomes in those who have maintained or increased their wellbeing post disaster. However, the results show that if resilience is used to describe a “bounce back” in wellbeing, Māori are primarily enduring the post-disaster environment. This endurance phase is a precursor to any resilience and will be of much longer duration than first thought. With continued uncertainty in the city and wider New Zealand economy, this endurance may not necessarily lead to a more secure environment for Māori in the city.

Mamula-Seadon, L., & McLean, I. (2015). Response and early recovery following 4 September 2010 and 22 February 2011 Canterbury earthquakes: Societal resilience and the role of governance. *International Journal of Disaster Risk Reduction*, 14, 82-95. www.elsevier.com/locate/ijdrr

Abstract This paper examines changes to governance introduced during the response and the recovery following 4 September 2010 and 22 February 2011 Canterbury earthquakes and discusses how post-disaster “time compression” can highlight the strengths and weaknesses of disaster management processes and governance frameworks. The paper focuses on some of the fundamental principles of sustainable risk management and societal resilience, namely integrated planning and creation of empowering settings for affected communities and analyses the effectiveness of the newly introduced arrangements in respect to those principles. The paper concludes that large scale disasters challenge decentralised, integrated planning environments based on bottom-up approaches. Disasters can overwhelm local capacity whilst putting intense pressure on central government to deliver. This may generate creative solutions for known weaknesses, but at the same time the need for immediacy can jeopardise practice that fosters resilience. The paper concludes that the question of central control versus local empowerment remains as yet unanswered in New Zealand. Understanding the implications of large-scale disasters on devolved, bottom-up approaches based on integrated planning merits further study. In particular, understanding the mechanisms for integration and empowerment of local communities is essential for effective recovery and resilience.

Phibbs, S., Kenney, C., & Solomon, M. (2015). Ngā Mōwaho: An analysis of Māori responses to the Christchurch earthquakes. *Kōtuitui: New Zealand Journal of Social Sciences Online*, 10(2), 72-82. doi: 10.1080/1177083X.2015.1066401

Abstract Since September 2010, a series of earthquakes have caused widespread social, financial and environmental devastation in Christchurch, New Zealand. Anecdotal evidence suggests that local Māori responded effectively to facilitate community recovery and resilience. However, the form, content and extent of that response has not been adequately recognised or documented. This qualitative research project, conducted in partnership with Te Rūnanga o Ngāi Tahu, has documented the way in which Māori cultural factors have facilitated disaster risk reduction and management in response to the earthquakes. This paper explores sets of understandings about marginalisation and inclusion within the narratives of 70 Māori community members who contributed to this research. Forms of marginalisation expressed in participants’ narratives include delayed linkages to the formal emergency management infrastructure, difficulties integrating Māori volunteers into the mainstream response as well as enduring barriers to Māori engagement within Civil Defence, illustrated in a lack of Māori representation as well as tikanga Māori within emergency planning. We argue that the knowledge, principles and practices embedded within Māori responses to the Christchurch earthquakes may be contextually relevant for national and regional policy development in the area of disaster risk management, response and recovery.

Displacement

Brand, D., & Nicholson, H. (2016). Public space and recovery: learning from post-earthquake Christchurch. *Journal of Urban Design*, 21(2), 159-176. <https://doi.org/10.1080/13574809.2015.1133231>

Abstract How might the urban structure and public space of Christchurch change as a result of the 2010 and 2011 earthquakes? This paper will look at council and community led post-earthquake urban space projects in Christchurch, New Zealand, to investigate the potential reconfiguration of urban public space and structure and the balance of top-down and bottom-up design processes for

the delivery of these projects. This will be achieved by comparing the performance of the urban public space and structure of the city during the post-earthquake emergency and recovery phases, with a view to understanding the contribution that these elements can make to the resilience of Christchurch. The paper will argue that Christchurch's nineteenth century urban structure served the population well during the emergency phases of the disaster and that post-earthquake community-led initiatives model innovative capabilities which may enhance urban design practice in the future.

Carter, J. (2022). To Linger in Post-Earthquake Christchurch: The Responsibility of Waiting. *Sites: A Journal of Social Anthropology and Cultural Studies*, 19(2), 73-93.

<https://doi.org/10.11157/sites-id523>

Abstract Following natural disasters in urban environments, those who remain are left not only to occupy an unfamiliar space but also to experience a painfully drawn out temporality: the time of waiting. A decade after earthquakes struck Christchurch city, some residents are still inhabiting a time of limbo, awaiting decisions on the fate of their homes and businesses. In this paper, I examine various creative projects that appeared in exposed and vacant sites in post-earthquake Christchurch. These projects turned such sites into dwelling spaces in which passers-by are encouraged to hesitate and linger. Such sites thus encourage people to experience the temporality of waiting, but in a different and I argue more enabling way. This paper examines the ethical possibilities that emerge from lingering before such sites. Drawing on the notion that ethics is not so much a normative procedure and more an impetus that opens up the space of the encounter, I argue that when Cantabrians tarry before such sites, they recognise a world which is not constituted by replaceable objects, but, instead, in their responsiveness, they experience a self that is constituted by its immersion in the world.

Hobbs, M., Ahuriri-Driscoll, A., Kingham, S., Wiki, J., Marek, L., Dionisio, M. R., ... & Mackenbach, J. D. (2022). A city profile of Ōtautahi Christchurch. *Cities*, 121, 103481.

<https://doi.org/10.1016/j.cities.2021.103481>

Abstract This city profile provides a transdisciplinary story of Ōtautahi Christchurch, Aotearoa New Zealand. We take a socio-cultural history approach to describe multiple disruptions that have led to the city's current urban form and community resilience, with a specific emphasis on the experiences of Māori since colonisation. Ōtautahi Christchurch is the ancestral home of Ngāi Tahu people who exercise mana whenua - Indigenous sovereignty with respect to land, derived from genealogy and occupation. The area was colonised in the early 1800s and the city's strong colonial English ties are still visible in the city's layout, public spaces, urban representations, and architecture. Te Waipounamu South Island lies in an active fault zone resulting in high seismic activity. The Canterbury Earthquake Sequence 2010-2012 had a significant impact on the health of local communities, infrastructure and economies across the region. Subsequent recovery and long-term regeneration strategies across the region have been developed and partly implemented to date. Citizens embrace collaborative temporary urban projects to bridge the gap between emergency response and urban recovery with a return of Māori influence post-quake. This type of place-making contributes to the re-establishment of a sense of place in Ōtautahi Christchurch and a continuous engagement focused in reconnecting the citizens with the city. With this city profile we contribute to the field of critical geographies by sharing the cultural lessons learnt on indigenous resilience to disaster's recovery, which may be of relevance to other cities facing ecological and cultural disruptions.

Love, T. (2011). Population movement after natural disasters: a literature review and assessment of Christchurch data. *Sapere Research Group, Wellington.*
<https://srgexpert.com/wp-content/uploads/2018/02/Population-movement-after-natural-disasters-a-literature-review-and-assessment-of-Christchurch-data.pdf>

Abstract The seismic event of 22 February 2011 resulted in a number of residents of Christchurch city moving to alternative accommodation. The reasons for moving include damage to a main residence making it uninhabitable; broken support infrastructure (such as water and sewage systems); unavailability of important social services (such as schools); or a desire to avoid the continuing experience of aftershocks. Shortly after the event, the Mayor announced to a press conference that 70,000 people had left Christchurch, a figure that became widely quoted in the media and fuelled speculation of a long-term population boost for provincial centres in the South Island. The likely magnitude and duration of population movement after the disaster is an important piece of information for future health planning, informing decisions about future demand and the recovery of services and facilities. This review considers the evidence from research on previous disasters in developed countries and places the Christchurch experience in that context. It seeks to estimate the likely magnitude and duration of population movements out of Canterbury after the February 22 earthquake. Relatively little research has been conducted on population movements after natural disasters in developed countries. A search of literature published in English found direct population data for only three events: Hurricane Andrew, the Kobe earthquake, and Hurricanes Katrina and Rita. A much greater volume of literature considers the economic impact of disasters and the phases of the recovery process but does not present empirical data on population movements. There is a considerable literature on evacuation in hurricane events, but this is largely directed towards the efforts of persuading a population to leave before an event, and to return on a specifically planned timetable after the event (for example Smith and McCarty 2007). There appears to be very little literature in the English language on the experience of earthquakes and population movement in Italy, although that is a developed country which experiences a large number of seismic events. English language research on Italian earthquakes appears to be much more focussed upon the geotechnical aspects than social impact.

International

Baussan, D., & Peterson, M. (2015). Lessons from the storm: Climate displacement three years after Hurricane Sandy. *Center for American Progress.*
Retrieved from <https://cdn.americanprogress.org/wp-content/uploads/2015/10/27135335/SandyClimateDisplacement-summary.pdf>

Abstract Just weeks ago, the New York City metropolitan region faced the threat of a severe hurricane nearly three years to the date after Hurricane Sandy devastated areas of New York and New Jersey. As government agencies began preparing for expected flooding, New York Gov. Andrew Cuomo (D) told a radio show, “I have learned the hard way it’s better to prepare for the worst. I’ve learned not to say we’re prepared for whatever comes our way because you can never be prepared for whatever comes our way.” Hurricane Joaquin subsequently moved eastward, sparing New York and New Jersey from significant flooding. Still, the storm was a stark reminder of the region’s vulnerability to extreme weather. On October 29, 2012, Hurricane Sandy swept up the Atlantic Seaboard, wreaking unprecedented damage in coastal areas of New York and New Jersey. U.S. damage estimates rose to \$67 billion, and 159 deaths were directly linked to the storm. When the water receded, New York and New Jersey faced a housing and employment crisis. More than 650,000 residences were damaged or destroyed, and unemployment claims increased from 35,000 to more than 100,000 for up to three weeks after the storm. The combination of lost or damaged housing and decreased economic security resulted in major climate displacement—a growing issue for climate resilience planners—with as many as 776,000 people displaced from their communities in the wake of Hurricane Sandy. The scale of the housing crisis, coupled with the not-so-distant

memory of the 1.5 million people displaced by Hurricane Katrina, prompted government and community organizations to focus on programs that would not only rebuild communities, but also curb climate displacement in the region. Policymakers and community organizers quickly developed plans that sought to reduce the housing, economic, and health impacts on the climate displaced. Despite some successes, as many as 39,000 people still remain displaced today from Hurricane Sandy. Although official displacement numbers do not exist for other extreme weather events, it is clear that thousands of people are forced to relocate from their homes, either permanently or temporarily, every year.

Baussion, D. (2015). When You Can't Go Home, The Gulf Coast 10 Years After Katrina. Retrieved 6, March 2023 from <https://www.americanprogress.org/article/when-you-cant-go-home/>

Abstract In Hurricane Katrina's 10-year wake, there is still much to learn about the effects and frequency of climate displacement. Although nearly a decade has passed since Hurricane Katrina wreaked havoc across the U.S. Gulf Coast, signs of its fury are still clearly visible. Nothing speaks more directly to Katrina's destructive power than the tens of thousands of rotted, weed-choked vacant buildings—some still branded with the crosses painted on their exteriors by search and rescue teams from the Federal Emergency Management Agency, or FEMA—that dot the Gulf Coast. These abandoned houses are a stark reminder of residents who struggled and yet failed to return home. In the 10 years that have passed, many of these former residents are part of an underreported but growing population of the domestic climate displaced. A decade after Katrina, thousands of the hurricane's victims have yet to return to home. In 2005, an estimated 1.5 million people from Alabama, Mississippi, and Louisiana fled their homes in the face of Katrina. Roughly 40 percent of the people who left, particularly those from Louisiana, were not able to return to their pre-Katrina homes. Only 25 percent of Katrina evacuees relocated within a 10-mile radius of their previous county of residence; another 25 percent relocated more than 450 miles away; and 10 percent relocated to areas at least 830 miles away. These data for Hurricane Katrina victims exist, in part, because of the large number of people who were forced to flee. The Katrina exodus was the largest U.S. movement of people forced to migrate because of a climate event since the Dust Bowl of the 1930s. The scope of the Katrina tragedy and the vast and unprecedented need for federal assistance underscored the necessity of identifying where people moved and what services they needed. Extreme weather continues to displace people, but despite the passage of 10 years since Katrina, it is no easier today to determine just how many climate-displaced people there are in the United States or where they are located.

Blake, D., Thompson, J., Chamberlain, K., Hudson-Doyle, E., Kearns, N. (2022). "I need to have a plan in place": Accessing medications and health treatments during a disaster for people with long-term health conditions. *Journal of Disaster Risk Reduction*, 83. <https://doi.org/10.1016/j.ijdrr.2022.103411>

Abstract In times of disasters, access to medications and health treatments are extremely important in order to sustain health and wellbeing. As such, it is vital to explore how people living with long-term health conditions (LTCs) understand and enact disaster preparedness planning. The aim for this research was to increase knowledge about what enables and constrains disaster preparedness practices for people with LTCs and how that might influence disaster preparedness actions. Semi-structured interviews were conducted with 20 participants with a range of LTCs. The transcripts were analysed using an interpretive approach. Findings document a range of views and activities that focused on social networks and support, preparedness, regulations and organisational issues, professional networks, and technology. From this, we propose a series of recommendations for improving disaster preparedness planning for people with LTCs. These include targeted education messaging that attends to the specific and different needs of people with LTCs, and collaborative disaster planning that includes healthcare providers, family and friends.

Blake, D., Adams-Hutcheson, G., Gibbs, L., & Quinn, P. (2022). Post-disaster residential mobility: Considerations for Aotearoa New Zealand. *Australasian Journal of Disaster & Trauma Studies*, 26(3).

http://trauma.massey.ac.nz/issues/2022-3/AJDTs_26_3_Blake.pdf

Abstract A range of hazards such as earthquakes and fires can propel people and communities to flee or seek safety to protect or rebuild their lives. These forms of residential mobility can encompass temporary and permanent displacement, relocation, and return. They also impact on individuals, relationships, and experiences of security. Here, residential mobility research is examined with a specific focus on two events in Aotearoa New Zealand and Australia to highlight the need for ongoing consideration of residential mobility in preparation for and recovery from a disaster. Applying a push/pull lens, this article outlines critical drivers for people's movements after a disaster. Areas of interest are noted as well as considerations for future research. How and why people relocate is complex and contextual, and influences community recovery and wellbeing. As such, greater knowledge about residential mobility is essential to assist people and communities to recover well.

Gabe, T., Falk, E. H., Mason, V. W., & McCarty, M. (2005, November). Hurricane Katrina: Social-demographic characteristics of impacted areas. *Congressional Research Service, Washington, DC, The Library of Congress*.

<https://gnocdc.s3.amazonaws.com/reports/crsrept.pdf>

Abstract On the morning of August 29, 2005, Hurricane Katrina made landfall on the Gulf Coast between the major cities of New Orleans, Louisiana, to the west, and Mobile, Alabama, to the east. Along the Gulf Coast and inland in the swath of the storm, Hurricane Katrina hundreds of thousands of families in three states (Louisiana, Mississippi, and Alabama) and contributed to the deaths of more than 1,000 people. While Common Reporting Standards (CRS) estimates that 5.8 million people in three states may have experienced hurricane-force winds, the majority rode out the storm safely. Property damage, loss of life, and sizeable displacement of the population appear to have been largely concentrated along the Gulf Coast within a 100-mile radius of where the storm made landfall. Within this area, damage due to high winds and storm surge resulted in significant devastation, but flooding, largely resulting from breached levees and flood walls, affected the greatest number of people, with much of New Orleans flooded. CRS estimates that 700,000 or more people may have been acutely impacted by Hurricane Katrina, as a result of residing in areas that flooded or sustained significant structural damage. This estimate is based on geographical analysis of Federal Emergency Management Agency (FEMA) flood and damage assessments and year 2000 Census data. The estimates in this report are subject to the methods and assumptions used. Other agencies and organizations are conducting assessments using alternative and complementary methodologies; estimates may differ depending upon the specific methodologies used. In the case of this analysis, the estimates reflect the numbers and characteristics of people, families, and households in 2000, who lived in areas that suffered damage or flooding from the hurricane in 2005. The analysis shows that the Louisiana parishes of Orleans and St. Bernard were especially hard hit by flooding, with an estimated 77% of Orleans' population affected, and nearly all residents of St. Bernard. In Mississippi, 55% of Hancock County's population is estimated to have been affected by flooding and/or structural damage, and in the more populous Harrison County, about 19% of its population. In Louisiana, an estimated 645,000 people may have been displaced by the hurricane (based on 2000 Census data), and in Mississippi, 66,000. Hurricane Katrina had varying impacts on the population. CRS estimates that of the people most likely to have been displaced by the hurricane, about half lived in New Orleans. Due to the city's social and economic composition, the storm impacted heavily on the poor and African Americans. CRS estimates that one-fifth of those displaced by the storm were likely to have been poor, and 30% had incomes that were below 1½ times the poverty line. African Americans are estimated to have accounted for approximately 44%

of the storm victims. An estimated 88,000 elderly persons (age 65 and older), many with strong community ties, may have been displaced, along with 183,000 children, many of whom were just starting the school year when the storm struck. Katrina's impact on individuals, families, and communities will be felt for years to come, and will take time to fully comprehend. This report will not be updated.

Hori, M., & Schafer, M. J. (2010). Social costs of displacement in Louisiana after Hurricanes Katrina and Rita. *Population and environment*, 31, 64-86. <https://doi.org/10.1007/s11111-009-0094-0>

Abstract Hundreds of thousands of Louisiana citizens were displaced from their homes as a result of Hurricanes Katrina and Rita. Of those displaced within Louisiana some relocated to other parishes, some to other residences within the same parish, and others were able to return to their pre-storm residence. This article draws upon data gathered by the 2006 Louisiana Health and Population Survey to examine the social costs of displacement across 18 Louisiana parishes approximately 1 year after the hurricanes. Specifically, we examine how displacement affected housing, economic, and health outcomes for individuals and families. Further, we compare the implications of two types of displacement (1) internal displacement—within-parish relocation versus (2) external displacement—relocation across parish lines. We found that the displaced had lower odds of owning their homes, living in detached housing, and retaining access to primary health care facilities. The displaced were also more likely to be unemployed and exhibit symptoms consistent with severe mental illness. The externally displaced suffered income declines. These trends are critically important for understanding both the short- and long-term ramifications of displacement after disaster. Our findings have implications for theories, policy makers, and planners considering the larger social costs of disaster and large-scale displacement.

Hori, M., Schafer, M. J., & Bowman, D. J. (2009). Displacement dynamics in southern Louisiana after Hurricanes Katrina and Rita. *Population research and policy review*, 28, 45-65. <https://doi.org/10.1007/s13524-014-0284-y>

Abstract Using individual data from the restricted version of the American Community Survey, we examined the displacement locations of pre-Hurricane Katrina adult residents of New Orleans in the year after the hurricane. More than one-half (53 %) of adults had returned to—or remained in—the New Orleans metropolitan area, with just under one-third of the total returning to the dwelling in which they resided prior to Hurricane Katrina. Among the remainder, Texas was the leading location of displaced residents, with almost 40 % of those living away from the metropolitan area (18 % of the total), followed by other locations in Louisiana (12 %), the South region of the United States other than Louisiana and Texas (12 %), and elsewhere in the United States (5 %). Black adults were considerably more likely than nonblack adults to be living elsewhere in Louisiana, in Texas, and elsewhere in the South. The observed race disparity was not accounted for by any of the demographic or socioeconomic covariates in the multinomial logistic regression models. Consistent with hypothesized effects, we found that following Hurricane Katrina, young adults (aged 25–39) were more likely to move further away from New Orleans and that adults born outside Louisiana were substantially more likely to have relocated away from the state.

Jones, D. M., & Doberstein, B. (2022). Encouraging co-benefits in climate-affected hazard adaptation: Developing and testing a scorecard for project design and evaluation. *International Journal of Disaster Risk Reduction*.

<https://www.sciencedirect.com/journal/international-journal>

Abstract Hazard risk is evolving with climate change. Many climate-affected hazards are becoming more common, more severe, and less predictable. As a result, strengthening community resilience is more important than ever. Recognizing that many factors impact vulnerability, hazard adaptation should seek to address vulnerability on all fronts. This is where co-benefits become valuable. Here,

the term ‘co-benefits’ is defined as the secondary or unintended goals of a hazard adaptation project that are additional to the project’s primary function, but complementary to its objective of increasing community resilience. Co-benefits strengthen communities both by addressing hazard impacts and by increasing their capacity to cope with risks. To encourage the integration of co-benefits into more adaptation projects, this paper presents decision-makers with a tool to systematically consider project co-benefits. A scoping literature review following best practices provided insight into the current conceptualization of co-benefits in the scholarly hazard’s literature. It found that co-benefits help projects cope with uncertainty, that they are most valuable in situations where hazard adaptation has to compete with other pressing needs for limited resources, and that they are most commonly achieved through green concept projects (e. g., nature-based solutions). Building on this synthesis, the co-benefits identified in this review were then used to create a co-benefits scorecard. The scorecard provides insight for project design and evaluation, giving decision-makers a systematic way to consider different kinds of co-benefits and the degree to which a project pursues those benefits.

Khan, S., Mishra, J., Ahmed, N., Onyige, C. D., Lin, K. E., Siew, R., & Lim, B. H. (2022). Risk communication and community engagement during COVID-19. *International Journal of Disaster Risk Reduction*, 74. <https://www.sciencedirect.com/journal/international-journal>

Abstract In today’s information age, both excess and lack of information can cause a disaster. COVID-19 pandemic not only highlighted the significance of risk communication but also pointed out several unintended and distressing consequences due to information gaps and miscommunications. Despite facing a common threat, the local communities suffered differential impacts during the pandemic. This paper classifies the nature of risk communications experienced across different countries into three categories, namely: inadequate, ideal, and infodemic risk communication that influenced the local perceptions and responses. It further argues that inadequately planned risk communications tend to create new risks and compromise the efforts towards managing a disaster. As global risks are responded to locally, there is a need for more inclusive and engaging risk communication that involves communities as responsible stakeholders who understand, plan, and respond to risks to increase their propensity for resilience during disasters and crisis situations.

Samuel, G., Mulalu, M. I., Moalafhi, D. B., & Stephens, M. (2022). Evaluation of national disaster management strategy and planning for flood management and impact reduction in Gaborone, Botswana. *International Journal of Disaster Risk Reduction*, 74. <https://www.sciencedirect.com/journal/international-journal-of-disaster-risk-reduction>

Abstract Floods and droughts are the most common natural disasters that have and continue to result in huge economic losses and loss of life across southern Africa. Flood disasters come about due to intersection of flood waters with areas that are unprepared to deal with flooding, mostly due to poor physical planning and layout of developments and corresponding storm drainage networks especially in urban areas. With the case of Botswana, this is further exacerbated by ineffective disaster management strategies which are limited in providing comprehensive and proactive guidelines for mitigation and adaptive measures. Further, failure of the Botswana disaster management strategy is as a consequence of it being used as an all-purpose disaster management framework that does not recognize that different types of disasters have their individual unique challenges. This study, therefore, used the disaster management cycle to evaluate Botswana’s generic national disaster management strategy and planning program in Gaborone. In evaluating the strategy, planning and policy, a mixed method approach was adopted at which key informant interviews were purposefully implemented with process evaluation through document review to

identify and determine whether the strategies and plans meet intended goals following Risk Management Performance Index (RMI) criteria.