Manaaki Whenua
Landcare Research

Recovering well: a brief report on promoting disaster recovery in Aotearoa New Zealand

Prepared for: Resilience to Nature's Challenges National Science Challenge

October 2024

Recovering well: a brief report on promoting disaster recovery in Aotearoa New Zealand

Manaaki Whenua – Landcare Research Contract Report: LC4537

Suzanne Vallance

Manaaki Whenua – Landcare Research

Julia Becker

Joint Centre for Disaster Research, School of Psychology, Massey University

John Hopkins

Faculty of Law, University of Canterbury

Sulaiman Sarwary

Faculty of Law, University of Canterbury

Simon Markham

Simon Markam Consulting

Reviewed by:

Peter Edwards
Senior Researcher – Environmental Social Science
Manaaki Whenua – Landcare Research

Approved for release by:

Suzie Greenhalgh
Portfolio Leader – Society, Culture & Policy
Manaaki Whenua – Landcare Research

Contents

Summary

Many definitions of disaster recovery emphasise restoring or improving social, environmental and economic systems and functions, as well as equitably reducing further and future risk.

The literature is clear that investing in disaster risk reduction (DRR) and pre-disaster recovery planning (PDRP) pays off. Investments in DRR and PDRP reduce recovery costs and disaster losses, and they can also proactively enhance well-being. This is referred to as the 'resilience dividend'. Resilience and recovery can be considered 'emergent properties' (Faulkner et al. 2018) of a functional system, whereby the whole is more than the sum of its parts. However, political-economic, social-cultural, and environmental recovery work often operate in silos. General DRR may be delivered through existing business-as-usual (BaU) mechanisms, but PDRP is more targeted. Specialisation in PDRP may add depth, but it may also divert resources away from the unfinished business of equitable DRR. Finally, increased separation of BaU planning and DRR may lower the chances of recovering well.

A key socio-political theme is 'good governance', which addresses coordination, collaboration, and partnerships. An issue raised in the academic literature, but largely absent in the practitioner-focused recovery frameworks, is disaster justice, which covers a such considerations as equity and equality. This cleansing of politics and ideology from recovery frameworks may leave practitioners unprepared for the realities of disaster recovery. Investing in – and practising – place-based deliberative and participative planning in peacetime may help improve post-event recovery plans and processes.

A cross-cutting environmental theme is whether the pre-disaster land use and infrastructure planning processes and programmes are fit for purpose. Post-disaster impacts on the built and natural environment can be anticipated and, to some extent, prepared for through strategic spatial planning and BaU urban development strategies.

From economics a tension emerges between new flows of financial assistance that enable building back better and the inevitable constraints. There is never enough funding, but who gets what, when, and where requires careful deliberation, often in the context of the need for urgent action.

There are some research gaps relating to how recovery is measured and monitored. Other gaps include coordination, where, too often, recovery work remains siloed, with the 'whole' reduced to its parts. Another gap relates to transitioning into and out of recovery. This gap may reflect a historical lack of interest in recovery: while many disaster 'responses' have been evaluated, similar analyses of recoveries are missing.

Finally, this review revealed the need to develop recovery guidance fit for Aotearoa - New Zealand that acknowledges Te Tiriti - the Treaty of Waitangi, mātauranga Māori, and the unique strengths, contributions, and requirements of tangata whenua.

1 Background

In 2023 the Resilience to Nature's Challenges (RNC)[1] National Science Challenge held a symposium in Wellington to showcase a decade of collaborative research and consider future research in this area. One of the signals was that although disaster readiness, response, and reduction were better understood, recovery had received less attention.

In response, social scientists associated with RNC subsequently met online to discuss 'recovering well'. Some of the issues identified were:

- How can recovery lessons be translated into legislation or other enduring settings?
- Does the current legal framework hinder or enable community participation in recovery decision-making?
- How useful is the current planning framework? How do 'decide, announce, defend' and 'engage, deliberate, decide' work in recovery settings?
- How can we expect business as usual (BaU) arrangements to work for recovery?
- How can 'topic agnosticism' be addressed? Very few are interested in disaster recovery but many care about certain things. How can recovery practitioners connect with those things?
- What are 'communities'? Are they geographically defined? Interest groups?
- Why have we not learned to put community at the heart of recovery?
- How do we bring community voices into recovery? What are the barriers?
- How can recoveries be locally led, regionally connected, and nationally supported?
- How can community leadership be supported and enabled?
- Without resources, only those already positioned to 'recover' and participate in recovery can/will do so. How can disaster justice be addressed?

While some of these issues are explored in this report, what follows is the result of an initial and, of necessity, brief review of the academic and grey recovery-focused literature on recovering well from disasters.

2 Introduction: defining recovery

Disaster recovery was, for a long time, largely ignored, and our knowledge of this phase consequently 'seriously lagging' (Kapucu 2014; Shaw, 2014). However, the last 10 years has seen an increasing interest in this phase of disaster management and a number of recovery-focused frameworks have been developed. These define recovery in various ways.

Global Facility for Disaster Reduction and Recovery (GFDRR) [2]

[1] https://resiliencechallenge.nz/

[2] https://www.gfdrr.org/sites/default/files/publication/DRF%20Guide.pdf (revised version March 2020).

The GFDRR defines 'recovery' as:

> Restoring or improving of livelihoods and health, as well as economic, physical, social, cultural and environmental assets, systems, and activities, of a disaster-affected community or society, aligning with the principles of sustainable development and 'build back better', to avoid or reduce future disaster risk. Generally, 'reconstruction' is focused on the medium- and long-term rebuilding and sustainable restoration of resilient critical infrastructures, services, housing, facilities, and livelihoods required for the full functioning of a community or a society affected by a disaster, aligning with the principles of sustainable development and 'build back better' to avoid or reduce future disaster risk. 'Resilient recovery' builds resilience during recovery and promotes resilience in regular development. Resilient recovery is a means to sustainable development" (GFDDRR, 2020, p. 7).

Australian Disaster Resilience Community Recovery Handbook (AIDR 2018)

According to the Australian Institute for Disaster Resilience:

> Recovery is the process of coming to terms with the impacts of a disaster and managing the disruptions and changes caused, which can result, for some people, in a new way of living. Being 'recovered' is being able to lead a life that individuals and communities value living. Recovery is a long-term, multi-layered social and developmental process that is more than simply the replacement of what has been destroyed and the rehabilitation of those affected. At its centre, recovery is the complex process of individuals and communities who have been impacted by a disaster working to resolve the impacts that the event has had on the trajectory of their lives (AIDR, 2018, p, 4).

UN International Strategy for Disaster Reduction

The definition here encompasses:

> Restoring or improving the livelihoods and health, as well as the economic, physical, social, cultural and environmental assets, systems, and activities, of a disaster-affected community or society, aligning with the principles of sustainable development and 'build back better', to avoid or reduce future disaster risk (https://www.undrr.org/terminology/recovery).

US Federal Emergency Management Authority's National Disaster Recovery Framework (NDRF)

In the NDRF, recovery extends beyond simply repairing damaged structures. It includes:

> The continuation or restoration of services critical to supporting the physical, emotional, and financial well-being of affected community members. Recovery also includes the restoration and strengthening of key systems and resource assets that are critical to the economic stability, vitality, and long-term sustainability of the communities themselves. These include health and human services capabilities and networks, public and private disability support and service systems, educational systems, community social networks, natural and cultural resources, affordable and

> accessible housing, infrastructure systems, and local and regional economic drivers. Together these elements of recovery contribute to rebuilding resilient communities equipped with the physical, social, cultural, economic, and natural infrastructure required to meet future needs (FEMA, 2016, pp. 1-2).

New Zealand's civil defence and emergency management [3]

'Recovery' means the coordinated efforts and processes to bring about the immediate, medium-, and long-term holistic regeneration and enhancement of a community following an emergency (from the Civil Defence Emergency Management Act 2002). Recovery should support the cultural and physical well-being of individuals and communities; minimise escalation of the consequences of the disaster; reduce future exposure to hazards and their associated risks (i.e. build resilience); and take opportunities to regenerate and enhance communities in ways that will meet future needs (across the social, economic, natural and built environments). The Act also defines recovery activity that includes an ongoing monitoring of the needs of a community affected by the emergency, new measures to reduce risks from hazards and build resilience, as well as measures to enable community participation in recovery planning, among other aspects. The Act's definition of 'recovery activity' essentially focuses on activities undertaken before a disaster.

Key themes central to all these definitions are restoring or improving social, environmental, cultural and economic systems and functions, and equitably reducing further and future risk.

2.1 Pre-disaster 'disaster risk reduction' and 'pre-disaster recovery planning'

Recovering well requires both disaster risk reduction (DRR) to lessen the likelihood and/or impact of an event, and post-disaster recovery planning (PDRP), which reduces the impact of the event and, ideally, by building back better reduces subsequent risk.

2.1.1 Disaster risk reduction

Writing on the business case for risk reduction, the United Nations Office for Disaster Risk Reduction[4] note that:

> Investments in DRR [disaster risk reduction] not only curb disaster losses. They also yield economic, social and environmental benefits that enhance the well-being and resilience of countries and communities. The benefits of adaptation investments are often larger than the "avoided losses" that accrue when disaster does strike; this is what's called the triple dividend of resilience[5].

[3] https://www.civildefence.govt.nz/cdem-sector/the-4rs/recovery).

[4] https://www.preventionweb.net/understanding-disaster-risk/business-case-for-DRRInvestments

[5] https://www.preventionweb.net/publication/triple-dividend-building-climate-resilience-taking-stock-moving-forward

This is encompassed in the idea of 'building back better', as per the United Nations Office for Disaster Risk Reduction (UNDRR) Sendai Framework, Priority 4.[6]

'Investments' can be diverse. A New Zealand Productivity Commission report[7], for example, notes the benefits of being 'proactive in our efforts to invest beforehand in anticipation, preparation, and learning' and build a resilient economy through:

- strengthening relationships and networks focused on resilience and innovation
- building institutions and policy settings to support more effective information sharing
- implementing more effective supply-chain management
- promoting focused innovation
- establishing effective, bottom-up decision-making in times of disruption.

Other investments might involve adopting risk-based (land-use) planning[8] (Kirk & Vallance 2024), infrastructure provisions that reduce risk (e.g. seawalls, sand dunes), or community development approaches that seek to promote equity and reduce vulnerability. As Akerkar and Fordham (2017) argue, 'Vulnerability [to natural hazards] is better understood as embedded in social processes and relations that lead to differential impacts', with disasters often amplifying pre-disaster trends and disparities. 'Disaster justice' is an emerging field of research, exploring such themes as the distribution of harm and safety, and the privatisation of risk management (Lukasiewicz 2020; Tuhkanen 2023; Raikes et al. 2019).

Gender is an example of potential disaster injustice (see Vallance & Hatami 2024;[9] Masselot & Gunn 2023; Masselot & Hayes 2020; Masselot 2022; and the Special Issue of the Australian Journal of Emergency Management, 2023[10]) through infrastructural–structural bias. Neumayer and Plumper (2007) analysed disasters occurring between 1981 and 2002 in 141 countries and found that 'natural disasters' tend to kill more women than men, and kill them at a younger age. More recent analyses support their findings, even in the context of wealthier countries. Ardagh et al. (2013) compared fatalities in the 24 hours following the Christchurch, New Zealand, earthquake of 2011 and found that of the 182 deaths, 35% were male and 65% female[11]. They found similar figures for hospitalisations. True's (2013) analysis of the same disaster showed that, during earthquake reconstruction, funds were directed to the rebuilding of homeowner (rather than rental) units, which women are less able to afford.

---

[6] Sendai Framework for Disaster Risk Reduction 2015-2030 | UNDRR

[7] https://www.treasury.govt.nz/publications/improving-economic-resilience-productivity-commission-inquiry-material-2022-2024

[8] Risk-based planning has three parts: 1) assessments of likelihood, 2) assessments of impact and c) a connection to land-use planning where development in hazardous areas is avoided. This departs from historical reliance on infrastructure (seawalls, stopbanks, etc.) – to mitigate risk.

[9] See also YouTube https://www.youtube.com/watch?v=uelGVX6gGns

[10] Australian Journal of Emergency Management | AJEM | July 2024 (aidr.org.au)

[11] One may point out a possible distortion based on the fact that 115 fatalities occurred in the CTV building, 18 in the PGC building and 8 on the 702 bus. Yet, as other studies have found, women tend work in and occupy older, less safe buildings and are more likely to take public transport due to the environmental benefits or because they are less likely to have access to a private car (Perez, 2019).

Single mothers faced discrimination in the rental market, at times forcing them to stay with violent and abusive partners (True, 2013).

'Recovering well' – building back better – must therefore consider how to address pre-existing inequities and inequalities that will not only be exacerbated by disasters, but, because they are struggling even harder, will prevent disadvantaged groups from participating in recovery conversations and activities. Yet, addressing the pernicious drivers of vulnerability and inequality is not often explicitly connected to 'disaster recovery', and more research is needed to identify strategies for disaster risk reduction that promote effective and equitable recovery for all (Ferreira et al. 2023). Lessons could be extracted from the 'transformative resilience' literature that is concerned to explore why disaster recovery rhetoric and practice talk about building back better, but often result in similar – if not worse – outcomes than before (Lorenz 2010; Cretney 2014).

Those interested in recovery could also usefully draw on business as usual (BaU) planning theory, which has a long and strong history of engaging with issues of power, politics, land use, and infrastructure (e.g. Harvey 2012; Forester 1989; Flyvbjerg 1998). This may shed light on the ways in which everyday planning succeeds and fails, and how these insights may travel to recovery settings (Porter & Davoudi 2012; Shaw 2012). Another intersection pertains to the transition from, and to, recovery and BaU.

2.1.2 Pre-disaster recovery planning

With a much tighter focus, pre-disaster recovery planning (PDRP) has started to gain recognition. As outlined in the NDRF (FEMA, 2016, p. i), this places 'emphasis on preparing for recovery in advance of disaster' through preparedness by 'coordinating with whole community partners, mitigating risks, incorporating continuity planning, identifying resources, and developing capacity to effectively manage the recovery process, and through collaborative and inclusive planning processes'. Pre-disaster recovery planning lays out a 'scope and vision' for dealing with recovery activities such as defining leadership and governance for post-disaster recovery; identifying and embedding local responsibilities for community and built environment issues, and promoting 'broad involvement in both the process and products' of pre-recovery planning, despite the expense this incurs in terms of resources, communications, coordination, training, monitoring, and feedback loops (Johnson et al. 2023).

The frameworks and literature reviewed here do note a number of other areas and actions that can be taken, pre-event, to facilitate recovery:

- gather baseline data and promote FAIR (findable, accessible, interoperable, re-useable) and CARE[12] (collective benefit, authority to control, responsibility, ethics)
- develop financial instruments, funding and support for recovery (such as the Earthquake Commission/Natural Hazards Commission levy) – different funding

[12] https://research-hub.auckland.ac.nz/guide-to-managing-research-data/ethics-integrity-and-compliance/care-principles-for-indigenous-data

mechanisms might be needed for low-frequency/high-impact versus high-frequency/low-impact events (GFDRR 2020)
- plan for emergency management considerations, including early warnings (UNDRR)
- invest in resilient built environments and infrastructure (UNDRR; Phillips 2013)
- promote food, housing, and employment security (UNDRR)
- consider nature-based solutions and the preservation of natural ecosystems such as mangroves, dunes, and forests (UNDRR)
- highlight risk-based, strategic spatial planning (Grieving and Mouat, 2014; Saunders et al. 2013; Becker et al. 2010; Schwab et al., 1998).

2.1.3 Recovering well

When identifying recovery themes there were a number of different approaches used and various considerations highlighted. Alignment with the United Nations Sustainable Development Goals was not uncommon (Saunders et al. 2020). As noted above, definitions of recovery often included restoring or improving social, environmental, cultural and economic capitals (see, for example, ReCap)[13], systems and functions, as well as equitably reducing further and future risk. The report is therefore largely arranged around these established themes:

- social: politics, governance, organisation and authority
- social: psycho-social, cultural and community recovery
- social: coordinating public, private, and third sector services
- environment (built): residential, commercial, infrastructural, and industrial reconstruction
- environment: land use/re-use
- environment: natural
- economic: funding and finance
- monitoring.

While these themes are fairly typical, we note that 'recovery' like 'resilience' can be considered an emergent property of a system where the whole is more than the sum of its parts. Finding ways to work across and integrate social, cultural, environmental and economic spheres to address siloed thinking is a key recovery challenge.

[13] https://recoverycapitals.org.au/aotearoa-nz-recap-guide#c05c9196-1ec1-459d-8b9a-6218a967125c

3 Literature review

3.1 Social: politics, governance, organisation, and authority

Skrimizea et al. (2021) note that institutions of governance play a significant role in creating and exacerbating disasters. In their comparative study of Christchurch, Groningen, and the Greek island of Rhodes, they noted that technical and structural challenges often hampered institutions' adaptiveness, and they identified institutional logics that created maladaptive lock-in effects. The logics and lock-ins they identified were situated within an ideological context that prioritised 'i) governance for economic growth, ii) framing of disasters as technical and technocratic problems and of vulnerability as an "outcome", and iii) the non-labelling of human-induced disasters as "disasters"'. Other 'logics' that hamper recovering well include the 'replace' but 'no betterment' tags to recovery funding, and an emphasis on upfront cost minimisation and seeing recovery as a cost not an investment (Insurance Council of New Zealand, 2024).

Lucas and Booth (2020) and Tuhkanen (2023) note that many governments are turning to insurance companies to mitigate their risk. Rather than adopting risk-based planning, insurance premiums send signals about risk to the homeowner, and this incentivises adaptations like retrofitting or drainage. When premiums become too high, housing is devalued and retreat from the hazardous location should occur. However, Lucas and Booth (2020) found that social and technocratic constructions of risk used by insurance companies are poorly matched. This also reduces collective discourses and practices (like risk-based planning and public infrastructure) that mitigate risk.

In exploring another trajectory of disaster governance, Blackman et al. (2023) argue that recovery (configured as well-being as an emergent property) in Christchurch stalled because the governance configuration fell into three 'traps'.

1 The first trap is 'shifting the burden to the intervenor', whereby the work of recovery is given to outsiders who have a poor understanding of local needs and conditions. As an example, they explain that the Canterbury Earthquake Recovery Authority (CERA) attempted to 'direct and carry out the city rebuild without really understanding what the challenges were, what type, where or when resource was most needed or, in fact, what 'successful recovery' looked or felt like for those affected' (p. 8).

2 'Success to the successful' is a trap involving competition for resources, which means 'winning' brings further advantage and 'losing' promotes disadvantage. As Blackman et al (2023, p. 9) explain, 'Access to resources immediately post-earthquake determined, to a large degree, whether one's trajectory was set in a positive or negative feedback loop and, without equalizing measures (regulation) set into the system, these trajectories were difficult to break'.

3 'Seeking the wrong goal' is a third trap characterising the Christchurch recovery. This is where goals are poorly defined, poorly communicated or irrelevant. The Central City Recovery Plan or 'Blueprint[14]' is cited as an example.

There can also be an uneasy tension between 'patch protection' and a 'race to the bottom' for shared responsibilities and funding.

Displacement, trauma, and dysfunction characterise disasters, but this should not create the assumption that new legal frameworks are required as a result. This has, to some extent, become 'the norm' here in AoNZ since the Canterbury earthquakes and the creation of CERA in 2011. The use of novel and 'bespoke' frameworks created by Acts of Parliament and Orders in Council emerges from a lack of legal preparedness, and the consequences of such an approach can be profound. Rushed legal frameworks fail to fully consider the legal processes necessary for effective and efficient recovery and have worked on the assumption that unstructured executive discretion is the best means of promoting recovery. However, bespoke structures created in the post-disaster context often remove the scaffolding that helps recovery entities, including local government, to do their work. Over-reliance on an individual decision-maker's discretion risks poor recovery outcomes (Hopkins 2016).

As Mukherji et al. (2021) note, new governance structures such as CERA can also create delays while they are being established, confusion over roles, tasks and jurisdictional authority, and confusing relationships with local government. This is further complicated by the failure of the AoNZ legal system to distinguish between response and recovery. This failure means that the exceptional powers needed during response (usually described as 'emergency powers' in a New Zealand context) are often carried forward into the recovery without consideration of their appropriateness. As such 'exceptional' powers have been utilised by the AoNZ executive for many years after the initial response ended (Hopkins 2021). The possible result of this is that legal recovery frameworks are unsuited to the task required and made possible only by the weakness of the AoNZ constitutional framework (Mueller 2016).

These contributions from Blackman et al. (2023), Skrimizea et al. (2021) and Mukherji et al. (2021) lend a critical edge to what often appears in official recovery frameworks as largely unproblematic issues of leadership, mandate, participation, and inclusion. The NDRF (2016, p. 6), for example, notes that 'Successful recovery requires informed and coordinated leadership throughout all levels of government, sectors of society, and phases of the recovery process'. Experience suggests this might not be easy to achieve, particularly in a post-disaster context.

Other 'complexities' that will present governance challenges noted by the ADRF (2022) framework include:

- diverse disaster impacts and consequences
- the likelihood and further impact of subsequent and cascading events
- pre-existing community dynamics, strengths, and vulnerabilities

[14] https://www.dpmc.govt.nz/our-programmes/greater-christchurch-recovery-and-regeneration/recovery-and-regeneration-plans/christchurch-central-recovery-plan

- natural tensions between community-led recovery and government processes
- work that spans multiple levels and areas of government
- funding and timelines not aligning with community priorities
- the need for coordination across large numbers of organisations, each with different mandates, goals, and resources
- the importance of embedding disaster risk reduction into recovery planning and action.

On this basis, the ADRF (2022) has developed the following principles for recovery.

- Understand the context.
- Recognise complexity.
- Use community-led approaches.
- Coordinate all activities.
- Communicate effectively.
- Build capacity.

3.2 Social: psychosocial, cultural, and community recovery

The recovery guides and literature often refer to putting people and/or communities at the centre of recovery. This is often emphasised in various diagrams, such as that shown in ADR 2022 (p. 6, see Figure 1), or in the community focus developed as part of the Recovery Capitals (ReCAP[15]) guidance, which uses an adapted version of the Community Capitals Framework (Campbell & Blake 2021). As the point around which recovery activities are mobilised, 'the community' is clearly important, but largely misunderstood. 'Social' recovery can be conceptualised in many different ways (individual, communities of place, interest or 'affected') using various metrics and measures (e.g. WHO 5, which covers well-being, satisfaction, quality of life, at different scales, etc.).

[15] https://recoverycapitals.org.au/aotearoa-nz-recap-guide

Figure 1. Recovery domains with community at the centre. (Source: ADR 2022, p. 6)

Each has implications for the kinds of programmes and policies that could be deployed to achieve different outcomes. A 'mental health' focus, for example, will require different resources and skills compared to a 'community development' approach (Vallance & Carlton 2015). A 'capacities' approach (Faulkner et al., 2018) to community resilience focussing on place attachment, leadership, community cohesion and efficacy, community networks, and knowledge and learning will look different again.

In AoNZ, frameworks have been developed to provide guidance on aspects such as psychosocial recovery (e.g. Ministry of Health 2016), but these need to be updated. Psychosocial support involves easing psychological, social, and physical difficulties for individuals, families, whānau, and communities, through accounting for aspects such as social support, participation, and empowerment in recovery, and by providing specific support mechanisms.

Examples of such support were prominent following the Canterbury earthquakes and during the Covid-19 pandemic (Mooney et al. 2021; McDonald et al. 2021) but have been somewhat intermittent following other more recent events (e.g. the 2023 flooding and Cyclone Gabrielle). Given the gaps that still exist in providing support for effective social and community recovery, this raises questions about the 'social infrastructure' (Klinenberg 2019; Vallance et al. 2019; e.g. Figure 2) that should be given priority in recovery.

Figure 2. Temporary library in Kaiapoi post-quake (Photo: author)

It has also been shown that different genders, ethnicities or other groupings might have different preferences in this regard: Māori have their own needs and approaches to dealing with recovery in ways that are effective for their own well-being (Lambert 2015; Campbell & Blake 2021; Ministry of Health 2016; Kenney & Phipps 2015), and that meet the needs of their whānau, hapū, iwi, and rūnanga. Quinn et al. (2022), for example, explore an indigenous-informed healing framework that is better able to address collective trauma from disasters.

Regarding gender, Akerkar and Fordham's (2017) analysis of the UK's Tewkesbury and Morpeth floods showed that men's recoveries were predicated on restoring a sense of control and confidence in their ability to deal with the situation, whereas women's recoveries were promoted by re-establishing their emotional relationships with their community and feeling at home in their neighbourhood.

It is also necessary to consider how recovery trajectories change over time. CERA's (2016) research showed a substantial decrease in feelings of community connectedness for those red zoned before, just after and 5 years after moving (Figure 3).

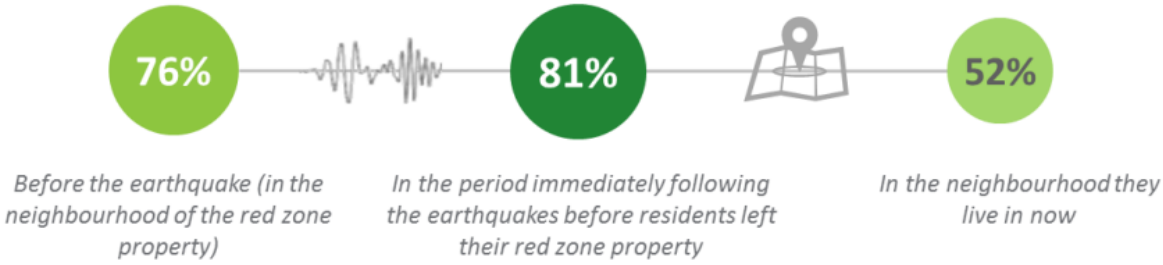

Figure 3. Community connectedness over 5 years. (Source: CERA 2016, p. 17)

Observing different effects among genders and ethnicities suggests 'community recovery' needs further nuance. Whie it is well established that community participation is essential for successful recovery initiatives (Collins et al. 2011; Aldrich 2012; Love & Vallance 2013; Vallance & Carlton 2015; Aoki 2018; MacAskill 2019). Rudkevitch (2022) argues that we rarely pay sufficient attention to what 'communities' do, how they form, or how they are maintained or ruptured. If 'community' is poorly defined, so too is its role in recovery, which can be left to the discretion of recovery officials. Despite a number of frameworks (Arnstein's (1969) Ladder and the IAP2[16]), making distinctions along a spectrum of participation – from information, consultation, through collaboration and involvement to empowerment – these terms are often conflated.

Part of the challenge lies with the legal framework. The Civil Defence Emergency Management Act 2002 (CDEM Act) focuses on public communication and consultation aspects in relation to community engagement during recovery. Although the CDEM Plan 2015, which operationalises the CDEM Act[17], does envisage community to be at the heart of a recovery (as illustrated in Figure 2), how this works in practice is not always clear. The National CDEM Plan does not offer any specific opportunities for public engagement, nor have the recommendations proposed by McClean et al. (2012) been adopted. These included revising the Crisis Information Management System and Christchurch Response Centre structures to (a) include a senior position responsible for all welfare and logistic issues, (b) provide adequate arrangements for linkage with community groups and with business, and (c) rename 'welfare' 'community well-being' (McClean et al. 2012).

The National CDEM Plan effectively carries forward the public communication focus from the act to the plan. For example, the CDEM Plan specifically mentions 'community engagement' but only offers public information mechanisms, such as raising awareness, as in the CDEM National Public Education Strategy 2006–2015, which seeks 'increased individual and community awareness and acknowledgement of all hazards, and improved preparedness to cope in an emergency as well as increased community awareness, understanding, and participation in CDEM' (s56(a)(b)). Again, though the term 'participation' is used, the actual focus continues to be on public communication and raising awareness.

[16] https://www.iap2.org/mpage/Home

[17] https://www.legislation.govt.nz/regulation/public/2015/0140/latest/DLM6486453.html?src=qs%20

3.3 Social: coordinating public, private, and third sector services

As noted above, the cost, magnitude of dysfunction, and need to coordinate public, private, and third sector activities may or may not prompt the development of a new recovery governance entity. The United Kingdom's Cabinet Office's Emergency Response and Recovery Guidance[18] website emphasises subsidiarity as a key recovery principle, noting that:

> *Decisions should be taken at the lowest appropriate level, with co-ordination at the highest necessary level. Local agencies are the building blocks of the response to and recovery from an emergency of any scale.*

This guidance also lists key players whose activities are likely to need coordinating:

- police, fire, and rescue services
- health bodies
- HM Coroners
- local councils
- government agencies and other non-departmental public bodies
- the armed forces
- the private sector
- the voluntary sector
- the community.

Missing from this list is the research and scientific community. After a disaster there is an urgent need for expertise (e.g. Berryman 2012; Beaven et al. 2017; Quigley et al. 2020) to inform decisions. Knowing who knows what *before* an event could be a useful way of facilitating recovery. In addition, as we have seen post-quake and during Covid, scientists can be called upon to explain quite complex phenomena to the public. Robust scientific evidence can help depoliticise recoveries, or it can fuel distrust and antipathy if the evidence is not seen as credible or relevant to populations, or people feel there is a hidden agenda.

Critical analyses of Hurricane Katrina have not only exposed the ways in which the devastating effects of the disaster were so unfairly distributed,[19] but also how recovery was confounded by a confusing array of recovery programmes and strategies, conflicted and conflicting leadership, and massive uncertainty over the viability of levees. Importantly, without adequate engagement with those affected by the 'evidence-informed decisions', the

---

[18] https://www.gov.uk/guidance/emergency-response-and-recovery#principles-of-effective-response-and-recovery

[19] Approximately 80% of the city was submerged and 1,600 people lost their lives, most of whom were socio-economically disadvantaged. Many were African-Americans who were less likely to have adequate insurance and more likely to rely on public transport, which became a huge problem when mass evacuation was required. They also tended to live in the low-lying areas of low-cost housing worst affected by the storm; consequently, this human-induced disaster was interpreted by some as nothing less than ethnic cleansing (CERD Shadow Report, *Hurricane Katrina: Racial Discrimination and Ethnic Cleansing in the United States in the Aftermath of Hurricane Katrina*, 2008. http://www.ushrnetwork.org/resources-media/hurricane-katrina-racial-discrimination-ethnic-cleansing-united-states-aftermath#sthash.M1CCvvgf.dpuf.

'technical' debate over whether to rebuild or retreat from the most vulnerable areas – areas that were home to many African Americans – looked like an attempt to 'transform the racial and political power of the city' (Olshansky & Johnson 2010, pp. 10–11).

The role of, and relationships with, media is also important with social media gaining significance as a source of news, information and updates, though these are not always reliable.

3.4 Environment (built): residential, commercial, infrastructural, and industrial reconstruction

In their review article, Rouhanizadeh et al. (2020) identify 63 barriers to effective post-disaster recovery, sorted into five themes: financial and economic; social, infrastructure and housing reconstruction; environment; coordination; and resources. Infrastructure and housing reconstruction was found to have the highest number of recovery barriers. Certainly housing construction, matching supply and demand and sourcing labour and materials is difficult enough in the best of circumstances and is likely to be even more difficult post-disaster (Chang et al, 2010) particularly for low-income groups (Hamideh et al, 2021).

There is a decent literature detailing the materials, technologies, capacity, and capability that will be required to undertake the reconstruction of physical assets and infrastructure (including IT) along supply chains with, potentially very limited access (Liu et al, 2024). This shows it is possible to 'borrow' from other industries and sections. As one example, Fonterra milk trucks were used to cart water to parts of Christchurch to help identify where there were significant leaks in town water supplies. Other examples document how temporary fixes (e.g. portaloos) can help prevent displacement and enable people to stay in their homes or neighbourhoods.

There are also innovations to BaU; for example, the Waimakariri District Council coordinated infrastructure repairs not just 'to the boundary' (as per their legal requirement) but beyond (Vallance 2015). Another example is the creative 'adaptive urbanism' (Vallance et al. 2014) funding pathways for the reactivation of commercial districts, such as that provided by the Christchurch City Council to support, for example, Gap Filler, Greening the Rubble, and Life in Vacant Spaces.

3.5 Environment: land use/re-use

As the Canterbury quakes illustrated, disasters can leave large tracts of land unfit for their pre-disaster purpose: 8,060 residential houses in greater Christchurch were 'red zoned' (7,346 on the flat and 714 on the Port Hills (CERA 2016)). This example also shows the value of strategic spatial planning undertaken before disasters (see also Greiving and Angignard, 2014). As Saunders et al. (2015) describe, in a pre-quake process initiated in 2004 by Canterbury Regional Council (ECan), the Greater Christchurch Urban Development Strategy (UDS) (Greater Christchurch 2013) was the result of 3 years of collaboration between stakeholders and communities. Based on over 3,250 submissions, the UDS sought to provide a framework for future growth management taking into account risk assessments, transportation, housing demand, and so on. The UDS had already signalled areas in the region suitable for future growth when the earthquakes and subsequent red zoning decision

displaced almost 8,000 households. The comprehensive planning behind the UDS allowed for a fairly rapid appraisal of land that could be made available to accommodate the demand for new housing. However, the UDS was designed to be implemented over a period of 30 years and was considered inadequate for the post-quake context.

Consequently, in November 2012 the Minister for Canterbury Earthquake Recovery directed ECan (at their request) to prepare a Draft Land Use Recovery Plan through a collaborative multi-agency approach involving all of the earthquake recovery strategic partners (including the three local councils, Ngāi Tahu, and the New Zealand Transport Agency), with input from key stakeholders and the wider community. So, while subject to updating and some revision, the pre-existing UDS enabled at least some land-use decisions to be made fairly quickly.

If pre-event plans and strategies do require significant changes, recovery planners will be faced with some key challenges. The obvious need to act with urgency must be balanced against deliberative, inclusive, and participatory processes that are often seen as costly in terms of time and other resources. An example concerns the demolition of damaged, and therefore hazardous, buildings versus the preservation of valued and meaningful heritage sites. 'Participation' refers to the notion that engineers, for example, while experts in determining structural safety, may not be best placed to identify a community's iconic buildings or to assess a building's importance. Given the non-linear nature of recovery, Finucane et al. (2020) have argued that an iterative approach to recovery with refresh points is appropriate.

Despite obvious advantages for disaster recovery, strategic spatial planning (even with a risk-based planning element) occupies an ambivalent position in New Zealand, with some seeing any type of land-use control as interfering in the market. As Glavovic et al. (2010, p. 683; but see also Memon 2002; McDermott 1998; Gunder & Mouat 2016; Vallance 2015b) have argued,

> *because economic growth, corporate interests and 'new development' are viewed as pre-eminent societal imperatives, and private property rights are held virtually sacrosanct … it is difficult to realise the full potential of land-use planning to reduce hazard risks, and there is still a tendency to rely on structural measures to control hazards … and to expect rescue and relief in the aftermath of an event.*

With such inconsistent positions vis-à-vis planning and the market, it is difficult to assess the likely uptake of (risk-based) strategic spatial planning delivering on its potential to mitigate hazard risk and promote recovery.

3.6 Environment: natural

Recovery of and through the 'natural' environment after disasters is not addressed particularly well in the recovery guides. This is an interesting omission given there is often significant damage to the natural environment, as seen in Hawke's Bay after Cyclone Gabrielle, with significant forestry slash and erosion that fundamentally altered the productive capacity and ecological integrity of land. Destructive wildfires, which are becoming more common, also have consequences for both flora and fauna. What to do with land no longer 'fit' for its pre-disaster purpose is problematic (Tait et al. 2016). In the absence

of any significant body of work detailing wildlife recovery, pre-disaster frameworks such that from the Canadian Government can serve as a guide.[20]

Other effects on the landscape result from increased waste to landfill, burst sewerage mains, and other sources of contamination. As with the economic and socio-cultural domains, likely scenarios and potential partners can be considered in advance of disasters to promote environmental recovery. Other aspects of the natural environment and recovery worth considering are the role of green spaces after disaster (Miller 2020), and nature-based solutions (Dunlop et al. 2024) and their return on investment (European Investment Bank 2023[21]), particularly in urban areas.

3.7 Economic recovery, funding, and finance

The GFDRR (2020, p. 58) highlights five major challenges for recovery authorities:

1 to quickly quantify the economic costs of the disaster

2 to develop recovery budgets

3 to identify the sources of financing as well as financing gaps

4 to coordinate and allocate financial resources

5 to set up the mechanisms to manage and track funds.

They note additional challenges relating to the overlap or public and private asset recovery funding (Figure 4) and various funding mechanisms that might be available over the short-term (cat bonds, contingency funding), medium-term (external loans, reallocation on internal budgets), and long-term (capital budget realignment, tax increase) timeframes.

	Public goods	**Private goods**
Public finance	Roads Schools Rail Hospitals	Housing Livelihoods
Public/Private partnership		
Private finance	Hospitals Schools	Hotels and restaurants Housing

Figure 4. Recovery needs and funding sources. (Source: GFDRR 2020, p. 60)

[20] E.g. from Canada https://www.dfo-mpo.gc.ca/species-especes/sara-lep/recovery-retablissement-eng.html).

[21] Investing in nature-based solutions (eib.org): Investing in nature-based solutions: state-of-play and way forward for public and private financial measures in Europe.

Restoring private sector functionality and supporting the restoration of livelihoods is also a critical part of recovery (Fountain and Craddock-Henry, 2020; Craddock-Henry et al, 2018; Stevenson et al, 2017). The NDRF (2016, p. 14) notes that the

> *private sector, while often affected by disasters, can also be a major resource to the community. The resilience of the private sector in providing infrastructure services, other essential commodities, critical employment, or the color and character of a community plays the key role in the current and future viability of a community. The resilience of the private sector in the affected area works hand in hand with an effective community recovery.*

3.8 Monitoring

A key part of the adaptive planning cycle is monitoring and review. Monitoring requires baseline data and an iterative process that can be shaped by ongoing data collection and analysis. Horney et al. (2018) provide a list of 79 recovery metrics for monitoring recovery, though there are many other monitoring methods and methodologies that are more topic- or theme- specific, such as CERA's Wellbeing Index.[22] Monitoring can be difficult when bespoke institutions, departments or teams created during recovery are disbanded. This makes repositories such as the Canterbury Earthquakes Digital Archive (CEISMIC, https://www.ceismic.org.nz/) an incredibly important resource, particularly in medium- to long-term recovery.

Ryan et al. (2016) further note that there is a distinct lack of evaluation of post-disaster recovery, and that 'where evaluations have been conducted, they are mostly process- rather than outcomes-based'. In other words, despite significant investment in disaster recovery programmes, their effectiveness is rarely evaluated and we lack a comprehensive framework for doing so (though see Zhou et al. 2022). Lessons could be taken from non-disaster planning to inform/refine recovery frameworks, paying attention to distinctions between performance (did the plan have an effect?) and conformance (did the plan have the intended effect?) of recovery plans and policies (Limb et al. 2021; Bafarasat et al. 2023).

4 Conclusions

We undertook this review of recovery literature and selected recovery frameworks used by the United Nations, United States, United Kingdom, Australia, Canada, and New Zealand to identify distinct challenges associated with recovering well. This phase of disaster management has been largely neglected in the past, though a growing number of case studies are contributing to an improved understanding of the challenges and opportunities. There are some important insights that could be drawn from both the resilience literature and planning theory and practice, but the material reviewed for this report focused on 'disaster recovery'.

[22] https://www.canterburywellbeing.org.nz/site-information/about

Many definitions of disaster recovery emphasise restoring or improving social, environmental, cultural, and economic systems and functions, as well as equitably reducing further and future risk. It was not uncommon to see community recovery at the centre of social, cultural, economic, and environmental work. However, this does raise questions about siloed thinking and how to promote a functional 'whole' that is more than the sum of its parts.

Key (but potentially siloed) disaster recovery themes identified in a review of recovery frameworks and academic literature included:

- social: politics, governance, organisation, and authority
- social: psycho-social, cultural and community recovery
- social: coordinating public, private, and third sector services
- environment (built): residential, commercial, infrastructural, and industrial
- environment: land use/re-use
- environment: natural
- economic: funding and finance
- monitoring.

The literature is clear that investing in risk reduction pays off across the social, cultural, environmental, and economic spheres. Investments in disaster risk reduction (DRR) and pre-disaster recovery planning (PDRP) reduce recovery costs and disaster losses, and promote other economic, cultural, social, and environmental benefits that proactively enhance well-being. These investments are sometimes referred to as generating a 'resilience dividend'. Resilience and recovery can be considered 'emergent properties' of a functional system, whereby the whole is more than the sum of its parts. But coordinating capacities are not well understood. The economic, cultural, social and environmental spheres often operate in siloes.

General DRR may be delivered through existing business-as-usual (BaU) mechanisms, but PDRP is more targeted. Specialisation in PDRP may add depth, but it may also divert precious resources away from the still-unfinished business of equitable DRR. Increased separation of BaU planning and DRR may exacerbate rather than mitigate risk reduction and lower the chances of recovering well. BaU 'town planning' has been concerned with risk reduction through improved sanitation, flood and fire management, etc., and many lessons – about funding, equity and equality, communities, participation, infrastructure provision, etc. – have been learned and documented in planning theory and practice (Vallance 2014). It is important that these lessons do not have to be relearned.

A key socio-political theme was 'good governance', which addresses coordination, collaboration, and partnerships. An issue raised in the academic literature, but largely absent in the practitioner-focused recovery frameworks, is disaster justice, which covers diverse themes such as ideological politics and positioning, disaster capitalism, who pays for what, the ambivalent role of markets and regulation, the privatisation of risk management, when disasters exceed local governance capability, etc. This cleansing of ideological and political considerations from recovery frameworks may leave practitioners unprepared for the realities of disaster recoveries. It may also reduce the chances of developing effective and equitable bipartisan solutions pre-disaster and amplify vulnerability post-event.

Another key theme is that social and cultural recovery need greater nuance. 'The public' is incredibly diverse, with different communities of interest and geography working with and through different strengths and vulnerabilities. Community-development and psychosocial approaches can be used to build resilience and facilitate recovery. Recoveries cannot be gender- or colour-blind, and there is a need to refine recovery guidance fit for Aotearoa - New Zealand that acknowledges the Te Tiriti – the Treaty of Waitangi, mātauranga Māori, and the unique strengths, contributions, and requirements of tangata whenua.

A cross-cutting environmental theme is whether the pre-disaster land use and infrastructure planning processes and programmes are fit for purpose. Post-disaster impacts on the natural environment – landfill, contamination, habitat loss – can be anticipated and, to some extent, prepared for through strategic spatial planning and BaU urban development strategies.

From economics, a tension emerges between new flows of financial assistance that enable building back better and the inevitable constraints. There is never enough funding, but who gets what, when, and where requires careful deliberation, often in the context of the need for urgent action. Investing in – practising – deliberative and participative planning in peacetime may improve the flow of different capital post-event.

There are some research gaps relating to how recovery is measured and monitored, through which units of analysis, at what scale, and over what timeframes. Other 'gaps' include coordination across the social, cultural, economic and environmental spheres and sectors. Too often, recovery work remains siloed, with the 'whole' reduced to its parts. Another gap relates to transitioning into and out of recovery: 'response' phases are often declared 'over' with a blanket return to BaU initiated.

While there is a reasonable body of academic literature focused on recovery, the practitioner frameworks reviewed here are all fairly recent. This adds weight to claims that recovery is the least well understood of the 4Rs (reduction, recovery, readiness, and response). While many disaster 'responses' have been evaluated, both here and overseas, similar analyses of recoveries are limited. We have made a start here, but further work is needed to facilitate recovering well from the next disaster.

5 Acknowledgements:

This brief review was funded through the Resilience to Nature's Challenges National Science Challenge.

6 References

Akerkar S. Fordham M 2017. Gender, place and mental health recovery in disasters: Addressing issues of equality and difference. International Journal of Disaster Risk Reduction 23: 218-230.

Aldrich D 2012. Building Resilience: Social Capital in Post-Disaster Recovery. University of Chicago Press.

Aoki N 2018. Sequencing and combining participation in urban planning: The case of tsunami-ravaged Onagawa Town, Japan. Cities. 72: 226–36. https://doi.org/10.1016/j.cities.2017.08.020

Ardagh M Standring S Deely J Than M 2013. A sex disparity among earthquake victims. Disaster Medicine and Public Health. 10(1): 1–

Arnstein S (1969) A ladder of citizen participation. American Planning Association Journal. 35: 216-224.

Australian Institute for Disaster Resilience 2018. Australian Disaster Resilience Community Recovery Handbook. Accessed on 30/9/2024 from https://knowledge.aidr.org.au/media/5634/community-recovery-handbook.pdf

Bafarasat A Cheshmehzangi A Ankowska A. 2023. A set of 99 healthy city indicators for application in urban planning and design. Sustainable Development. 31(3): 1978-1989

Beaven S Wilson T Johnston L Johnston D Smith R. 2017. Role of boundary organization after a disaster: New Zealand's natural hazards research platform and the 2010–2011 Canterbury Earthquake Sequence. Natural Hazards Review. 18(2): 05016003.

Becker J Saunders W Hopkins L Wright K Johnston D. 2010. Preplanning for recovery. Community Disaster Recovery and Resiliency: Exploring Global Opportunities and Challenges, edited by: Miller, DS and Rivera, JD. Boca Raton, USA: Taylor and Francis Group, 525-550.

Berryman K 2012. Geoscience as a component of response and recovery from the Canterbury earthquake sequence of 2010–2011. New Zealand Journal of Geology and Geophysics. 55(3): 313-319.

Blackman D Prayag G Nakanishi H Chaffer J Freyens 2023. Wellbeing in disaster recovery: Understanding where systems get stuck. International Journal of Disaster Risk Reduction. 95: https://doi.org/10.1016/j.ijdrr.2023.103839

Campbell E Blake D 2021. Guide to Disaster Recovery Capitals (ReCap). In P Quinn L Gibbs D Blake E Campbell D Johnston and G Ireton G. Wellington, Aotearoa New Zealand: Bushfire and Natural Hazards Cooperative Research Centre; July 2021

CERA 2016. Residential Red Zone Survey. https://www.dpmc.govt.nz/sites/default/files/2017-03/cera-rrz-surveyreport-feb2016.pdf

Chang Y Wilkinson S Potangaroa R Seville E. 2010. Resourcing challenges for post-disaster housing reconstruction: a comparative analysis. Building Research & Information. 38(3): 247–264.

Collins S Glavovic B.Johal S Johnston D 2011. Community engagement post-disaster: Case studies of the 2006 Matata debris flow and 2010 Darfield earthquake, New Zealand. New Zealand Journal of Psychology. 40(4): 17–25.

Cradock-Henry N Fountain J Buelow F 2018) Transformations for Resilient Rural Futures: The Case of Kaikōura, Aotearoa-New Zealand. Sustainability. 10(6): 1952+

Cretney R 2014. Resilience for Whom? Emerging Critical Geographies of Socio-ecological Resilience. Geography Compass. 8/9: 627–640.

Dunlop T Khojasteh D Cohen-Shacham E (2024). The evolution and future of research on Nature-based Solutions to address societal challenges. Communication of Earth Environment. 5(132):

European Investment Bank (2023). Investing in nature-based solutions State-of-play and way forward for public and private financial measures in Europe. Accessed 5 10 2024 from EIB Investing in nature-based solutions (eib.org).

Faulkner L K Brown T Quinn.2018. Analyzing community resilience as an emergent property of dynamic social-ecological systems. systems. Ecology and Society. 23(1): 24

Ferreira R Davidson T Buttell F Contillo C. M Leddie C Leahy C Nuñez-Dune C Lent B Simkins M Jerolleman A Eide C Glaude M Thomas J Leiv D Awbrey M Friedman R 2023. Barriers to equitable disaster recovery in the United States: A research summary brief. Consortium for Equitable Disaster Resilience. Accessed 5 10 2024 from https://cedrhub.org/publications/

Finucane M Acosta J Wicker A Whipkey K 2020. Short-Term solutions to a long-term challenge: Rethinking disaster recovery planning to reduce vulnerabilities and inequities. International Journal of Environmental Research and Public Health. 17(2): 482+.

Flyvbjerg B 1998. Power and Rationality. University of Chicago Press.

Forester J 1989. Planning in the Face of Power. University of California Press

Fountain J Cradock-Henry N 2020. Recovery, risk and resilience: Post-disaster tourism experiences in Kaikōura, New Zealand. Tourism Management Perspectives. 35 https://doi.org/10.1016/j.tmp.2020.100695

Glavovic B Saunders W Becker J 2010. Land-use planning for natural hazards in New Zealand: the setting, barriers, 'burning issues' and priority actions. Natural Hazards. 54: 679–706.

Global Facility for Disaster Risk Reduction 2020. Disaster Recovery Framework Guide. Accessed 30/09/2024 from https://www.gfdrr.org/sites/default/files/publication/DRF%20Guide.pdf

Greiving S Angignard M 2014. Disaster mitigation by spatial planning. In Van Asch, T., Corominas, J., Greiving, S., Malet, JP., Sterlacchini, S. (eds). Mountain Risks: From Prediction to Management and Governance: Advances in Natural and Technological Hazards Research, 34. Dordrecht: Springer.

Gunder M Mouat C 2016. Symbolic violence and victimization in planning processes. Planning Theory. 1(2): 124–145

Harvey D 2012. Rebel cities : from the right to the city to the urban revolution. New York: Verso

Hopkins W 2016 The First Victim: Administrative Law and Natural Disasters. New Zealand Law Review. 1: 189-211

Hopkins W 2021 Law, Luck and Lessons (Un)Learned: New Zealand Emergency Law from Canterbury to Covid-19 Public Law Review. 31(4): 371-376

Horney J Dwyer C Smith G 2018. Measuring successful disaster recovery. International Journal of Mass Emergencies & Disasters, 36(1):

Insurance Council of New Zealand (ICNZ) 2024. Cost of natural disasters - Cost of natural disasters - ICNZ | Insurance Council of New Zealand – Accessed 1 July 2024 from https://www.icnz.org.nz/industry/cost-of-natural-disasters/.

Johnson L Ripley S Miles S Neely D 2023. Formalization of local pre-disaster recovery planning: comparison of local approaches in the United States and New Zealand. In J. Kushma and J Slick (Eds). Case Studies in Disaster Recovery, pp. 173-198. Butterworth-Heinemann.

Kapucu N 2014. Collaborative Governance and Disaster Recovery: The National Disaster Recovery Framework (NDRF) in the U.S. In: Shaw, R. (eds) Disaster Recovery. Disaster Risk Reduction. Tokyo, Springer.

Kenney C Phibbs S 2015. A Māori love story: Community-led disaster management in response to the Ōtautahi (Christchurch) earthquakes as a framework for action. International Journal of Disaster Risk Reduction. 14: 46–55

Kirk N Vallance S 2024. Natural hazard planning by New Zealand's local government: A review of regional policy statements and district plans. Accessed 5 10 2024 from https://resiliencechallenge.nz/outputs/natural-hazard-planning-by-new-zealands-local-government-a-review-of-regional-policy-statements-and-district-plans/

Klinenberg E 2019. Palaces for the People: How Social Infrastructure can Help Fight inequality, Polarisation and the Decline of Civic Life. Penguin

Lambert S 2015. Indigenous communities and disaster research: Maori and the Christchurch earthquakes of 2010-2011. Third Sector Review. 21(2): 31–48.

Limb M Grodach C Donehue P Mayere S 2021. When plans are used to no effect: Considering implementation performance of greater Brisbane's compact activity centre policies. Environment and Planning B: Urban Analytics and City Science. 48(7): 1860-1875.

Liu K Chang-Richards A Costello S L'Hermitte C Trent N Li N 2024. Challenges in construction material supply for post-disaster transport infrastructure recovery: a case study of the 2016 Kaikōura earthquake in New Zealand. Disaster Prevention and Management. Accessed 5-10-2024 from https://www.emerald.com/insight/content/doi/10.1108/DPM-10-2023-0259/full/html

Lorenz D 2010. The diversity of resilience: contributions from a social science perspective. Natural Hazards. 67(1): 7–24.

Love R Vallance S 2013. The role of communities in post-disaster planning a Diamond Harbour case study. Lincoln Planning Review. 5(1/2): 3-9.

Lucas C and Booth K 2020. Privatizing climate adaptation: How insurance weakens solidaristic and collective disaster recovery. Wires Climate Change. 11(6)

Lukasiewicz A 2020. The emerging imperative of disaster justice. In: Lukasiewicz, A., Baldwin, C. (eds). Natural Hazards and Disaster Justice. Palgrave Macmillan, Singapore.

MacAskill K 2019. Public interest and participation in planning and infrastructure decisions for disaster risk management. International Journal of Disaster Risk Reduction. 39 https://doi.org/10.1016/j.ijdrr.2019.101200

MacDonald C Mooney M Johnston D Becker J Blake D Mitchell J . . . Naswall K 2021. Supporting community recovery: COVID-19 and beyond. (Report No. 2021/02). Wellington: Massey University http://hdl.handle.net/10179/16783

Masselot A 2022. Feminist perspective on natural disasters responses: Lessons from the Canterbury Earthquakes'. New Zealand Women's Law Journal. 6: 24-42.

Masselot A Gunn J 2023. Gendering employment law in the wake of the Covid-19 Pandemic, 47(2) New Zealand Journal of Employment Relations. Early Online file://file/Usersa$/ama214/Home/Downloads/139-Article%20Text-208-1-10-20231212.pdf

Masselot A Hayes M 2020. Exposing gender inequalities: Impacts of Covid-19 on Aotearoa New Zealand Employment. New Zealand Journal of Employment Relations. 45(2): 57-69 doi.org/10.24135/nzjer.v45i2.21

McLean I Oughton D Ellis S Wakelin B Rubin C 2012. Review of the Civil Defence Emergency Management Response to the 22 February Christchurch Earthquake. A Review contracted by the Director of Civil Defence and Emergency Management with Ian McLean Consultancy Services Ltd on 24 November 2011. Accessed 30/09/24 from https://www.networked.ac.nz/pluginfile.php/763/mod_book/chapter/59/Review%20of%20CDEM%20Response%20Christchurch%20Earthquake%202011.pdf

McDermott P 1998 'Positioning Planning in a Market Economy', Environment and Planning: A. 30: 631–46.

Memon A 2002. Reinstating the Purpose of Planning within New Zealand's Resource Management Act. Urban Policy and Research. 20(3): 299–308.

Miller S 2020. Greenspace after a disaster: The need to close the gap with recovery for greater resilience. Journal of the American Planning Association. 86(3): 339–348.

Ministry of Health 2016. Framework for Psychosocial Support in Emergencies. Wellington: Ministry of Health. Accessed 5- 10- 2024 from https://www.health.govt.nz/publication/framework-psychosocial-support-emergencies

Mooney M MacDonald C Becker J Blake D Gibbs L Johnston D, . . . Alefaio S 2021. Updated psychosocial support: Evidence base in the COVID-19 context. (Report No. 2021/01): Massey University Accessed 5 – 10- 2024 from http://hdl.handle.net/10179/16782

Mueller S 2016. Turning Emergency Powers Inside Out: Are Extraordinary Powers Creeping into Ordinary Legislation? Flinders Law Journal. 18(2): 295-319.

Mukherji A Ganapati N Manandhar B 2021. Panacea or problem: New governance structures for disaster recovery. International Journal of Disaster Risk Reduction. 52 https://doi.org/10.1016/j.ijdrr.2020.101960

Neumayer E Plümper T 2007. The gendered nature of natural disasters: The impact of catastrophic events on the gender gap in life expectancy, 1981–2002. Annals of the Association of American Geographers. 97(3): 551–566.

Olshansky R Johnson L 2010. Clear as Mud: Planning for the Rebuilding of New Orleans. Washington: APA Planners Press.

Perez C 2018. Invisible Women. London: Penguin.

Phillips B 2013. Pre-event planning for post-event recovery. International Journal of Mass Emergencies & Disasters. 31(3): 403-408.

Quigley M Saunders W Massey C Van Dissen R Villamor P Jack H Litchfield N 2020. The utility of earth science information in post-earthquake land-use decision-making: the 2010–2011 Canterbury earthquake sequence in Aotearoa New Zealand. Natural Hazards and Earth System Sciences Discussions. 1-35.

Quinn P Williamson B Gibbs L 2022. Indigenous-informed disaster recovery: Addressing collective trauma using a healing framework. Progress in Disaster Science. 16 https://doi.org/10.1016/j.pdisas.2022.100257

Raikes J Smith T Jacobson C Baldwin C 2019. Pre-disaster planning and preparedness for floods and droughts: A systematic review. International Journal of Disaster Risk Reduction. 38 https://doi.org/10.1016/j.ijdrr.2019.101207

Rouhanizadeh B Kermanshachi S Jahan Nipa T 2020. Exploratory analysis of barriers to effective post-disaster recovery. International Journal of Disaster Risk Reduction. 50 https://doi.org/10.1016/j.ijdrr.2020.101735

Rudkevitch A 2022. Shaking ground and shifting collectives: Understanding community resilience in Kaikōura, Aotearoa New Zealand : A thesis submitted in partial fulfilment of the requirements for the Degree of Doctor of Philosophy at Lincoln University. Accessed 5-10-2024 from https://hdl.handle.net/10182/15314

Ryan R Wortley R Ní Shé É 2016. Evaluations of post-disaster recovery: A review of practice material. Evidence Base: A Journal of Evidence Reviews in Key Policy Areas. (4): 1–33.

Saunders W Beban J Kilvington M 2013. Risk-based approach to land use planning. GNS Science Miscellaneous Series 67.

Saunders W Vallance S Mamula-Seadon L 2015. Land-use planning following an earthquake disaster. In M. Beer E. Patelli I Kougioumtzoglou S Au (Eds.). Encyclopaedia of Earthquake Engineering. Berlin: Springer, pp. 1-20,

Saunders W Kelly S Paisley S Clarke L 2020. Progress toward implementing the Sendai framework, the Paris agreement, and the sustainable development goals: Policy from Aotearoa New Zealand. International Journal of Disaster Risk Science. 11(2): 190-205.

Schwab J Topping K Eadie C Deyle R Smith R 1998. Planning for Post-disaster Recovery and Reconstruction. Washington, DC: FEMA/American Planning Association.

Shaw K 2012. Reframing" resilience: challenges for planning theory and practice. Planning Theory & Practice. 13(2): 308–312.

Skrimizea E Bakema M McCann P Parra C 2021. Disaster governance and institutional dynamics in times of social-ecological change: Insights from New Zealand, the Netherlands and Greece. Applied Geography. 136 https://doi.org/10.1016/j.apgeog.2021.102578

Stevenson J Becker J Cradock-Henry N Johal S Johnston D Orchiston C Seville E 2017. Economic and social reconnaissance: Kaikōura earthquake 2016. Bulletin of the New Zealand Society for Earthquake Engineering. 50(2): 343–351.

Tait P Vallance S Rutherford P 2016. Expanding the conversational terrain: A Choice Experiment exploring residents' preference for future use of the Avon River Residential Red Zone. Land Use Policy. 55: 275 – 284.

Tuhkanen H 2023. Shifting power through participation in post-disaster recovery: A scoping review. International Journal of Disaster Risk Reduction. 97 https://doi.org/10.1016/j.ijdrr.2023.104041

Federal Emergency Management Authority (2016) National Disaster Recovery Framework). Accessed 30/09/24 from www.fema.govt/emergency-managers/national-preparedeness/frameworks/recovery

Vallance S 2014. A history of planning through the broken lens of disaster. In Barnaby Bennett, James Dann, Emma Johnson and Ryan Reynolds (Eds.). Re-Imagining Recovery. Freerange Press: Christchurch, pp. 74-84

Vallance S Reynolds R Moore T Sherow B Carlton S Davis D [Thorpe, A. to Komene, W.]. 2014. A Report on the International Congress of Adaptive Urbanism. http://www.lincoln.ac.nz/Documents/LEaP/adaptive%20urbanism%20report%202014.pdf

Vallance S 2015a. An Evaluation of the Waimakariri District Council's Integrated and Community-Based Recovery Framework Following the Canterbury Earthquakes: Implications for Urban Resilience. Urban Policy and Research. 33 (4): 433 - 451

Vallance S 2015b. Community participation as disaster recovery: Lessons from the Shaky Isles. Natural Hazards. 75(2): 1287-1301.

Vallance S Carlton S 2015. First to respond, last to leave. International Journal of Disaster Risk Reduction. 14 (1): 27-36

Vallance S Edwards S Conradson D Karaminejad Z 2019. Soft Infrastructure for Hard Times. National Science Challenge: Building Better Homes, Towns and Cities. This report is available from: http://www.buildingbetter.nz/resources/publications.html

Vallance S Hatami B 2024. Manmade Disasters? The Role of Women in Disaster Recovery. A poster presented at the Resilience to Nature's Challenges Symposium Te Tai Whanake - Growing a stronger, more resilient Aotearoa. Te Papa Wellington, 13th and 14th June

Zhou B Zhang H Evans R 2022. Build back better: A framework for sustainable recovery assessment. International Journal of Disaster Risk Reduction. 76 https://doi.org/10.1016/j.ijdrr.2022.102998