Rural community resilience to natural hazards: promoting grassroots resilience in a coastal New Zealand community

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Introduction

Aotearoa New Zealand's vulnerable low-lying coastal communities face imminent threat from coastal hazards and the consequences of climate change. There is an urgent need to understand how community resilience, adopted in international and national policy, can enhance societal resilience across the emergency management cycle of risk reduction, preparedness, response and recovery. This report presents findings from a study of a coastal community in southern New Zealand that is exposed to a range of climate-related hazards. This paper brings together academic perspectives on community resilience theory and presents an adapted framework that considers the contextual factors (social, political, environmental, economic and physical domains) that are recognised as complex and interacting drivers of resilience.

Resilient communities

Communities have a range of attributes and resources, underpinned by the critical roles that individuals and community groups play to enhance their resilience. At the same time, external institutional or political factors shape the local community context and influence how they operate. Resilience often develops at the grassroots level through locally driven resilience-building actions. Here, a disparity emerges, where top-down institutional support through policy and resourcing can have significant influence on grassroots efforts to build community resilience.

The rationale behind this research is to understand how effective grassroots community resilience can be supported and enabled by local government emergency management and broader planning activities. Specifically, how local governments can support communities to be resilient given the interconnected and complex nature of community resilience.

Researching rural coastal communities

Research targeting hazard management, risk reduction and resilience in the rural context addresses gaps in the literature. Urban environments have larger populations, infrastructure and economic importance and are exposed to the greatest potential losses from future disasters. Thus, hazard management research has tended to focus on large towns and cities. According to Spector et al. (2019), rural communities are often more exposed to natural hazard events due to factors including geographic and social isolation, lower incomes, lack of resources and vulnerable infrastructure. A heightened focus on urban centres also exists in the application of formal planning processes that leave small coastal communities marginalised.

Recent hazard events, particularly the Kaikōura magnitude 7.8 earthquake in 2016 and Cyclone Gabrielle in 2023, revealed how important it is to focus on the resilience of rural communities (Spector et al. 2019). The Kaikōura earthquake and its wide-ranging economic and societal effects re-affirmed that rural events can have significant

consequences at the national scale. The New Zealand *National Disaster Resilience Strategy*[1] emphasises the need to implement effective hazard management, risk reduction and resilience-building initiatives across all communities. In addition, Spector et al. (2017) called for a greater focus on rural resilience research in the natural hazard context.

This study addresses this gap in rural resilience research by investigating how the support and facilitation of community resilience by local government and other planning arrangements can help rural coastal communities to prepare, respond and recover from hazard events. To achieve this, the rural coastal township of Waikouaiti was examined. It is located approximately 40 km north of Dunedin in the South Island. Waikouaiti is a low-lying community in the coastal zone and is vulnerable to risks associated with climate change.

Rural community resilience: the case study of Waikouaiti

This study received ethics approval from the University of Otago Ethics Committee (low risk human ethics, approval number D23/155 UOHEC).

Primary data for this study was collected between June and August 2023 using semi-structured interviews with community members in Waikouaiti and officials from local governments. Community participants were selected based on their local leadership roles and involvement with resilience focused initiatives. In particular, representatives from the Community Board and members of the Progress of Waikouaiti Area (POWA) community group. POWA initiates and facilitates community-led actions for the benefit of the community.

A snowball[2] method reached other community leaders and residents and a total of 9 interviews were conducted. Participant observation was undertaken at community meetings. This helped to build a picture of the attitudes and perceptions of local residents about emergency management in Waikouaiti as well as their views on building community resilience. Local government participants were selected based on their expertise in natural hazard planning, emergency management and community resilience initiatives.

This article heavily references the 'water scare event', which occurred in 2021 and involved the detection of high levels of lead in the Waikouaiti water supply. The high levels of lead were alerted to council, however, it took 3 months before this alert was detected and actioned. This event resulted in significant distress within the community and, anecdotally, affected the relationship between Waikouaiti residents and the Dunedin City Council. Subsequently, the water scare event is considered influential in shaping community perceptions and attitudes towards the local government and hazard preparation generally.

Thematic analysis of the interview data was coded into themes relating to social, economic, institutional, environmental and physical indicators following conceptual framings of community resilience by Twigg (2009) and Kwok et al. (2019). The findings from the themes, contextualised within existing community resilience studies, were used to develop a conceptualisation of community resilience called the Community Resilience Ecosystem. This framework is used to explore the inter-connected factors that contribute to and influence grassroots community resilience and is intended to support hazard management planning and resilience building in rural communities.

The complex, multi-layered notion of 'community'

Defining 'community' is complex and multi-layered (see Mulligan et al. (2016). This was acknowledged by community and local government participants in this study. Traditional emergency management approaches have tended to focus on communities in spatially defined areas, thus failing to consider the full range of social and temporal dimensions that play a role in determining resilience (Twigg 2009). For example, the detection of lead contamination in the local water supply in 2021 was not confined to the geographic boundaries of Waikouaiti, as residents from Hawksbury and Karitāne were also affected by the event. Additionally, due to the potential effects of the contamination over time, people who live permanently and have lived there for longer periods of time had greater exposure to the health risk as compared to other home owners or visitors. This event demonstrates how the complexities of community can affect the application of hazard management responses.

To support resilience initiatives through hazard management planning it is critical that a range of opinions, voices, experiences and resources within a community are acknowledged and considered. A community leader said, 'You need broad, overarching perspectives'.

In the aftermath of the water scare event, the community urged the district and regional councils to consider inclusive, accessible and collaborative engagement processes to avoid loss of trust and damage to community relationships with local government. Participants described having spaces for discussion and knowledge sharing between local residents and local government officials, to enable a range of voices and opinions to be considered in the resilience-building process. By appreciating the complexities that exist around the term 'community',

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1. *National Disaster Resilience Strategy,* at www.civildefence.govt.nz/cdem-sector/plans-and-strategies/national-disaster-resilience-strategy.

2. Snowball sampling (also known as chain-referral sampling) is a non-random sampling method used when characteristics of samples are rare or difficult to find. It occurs when one participant recommends others who are then invited to take part in the research.

emergency management planners and practitioners can pay attention and care to the human, spatial and temporal factors that influence resilience in communities.

A holistic, interconnected approach

One of the most referenced and critical elements of this study, and many other academic contributions, is the holistic and interconnected nature of communities (Twigg 2009). The Community Resilience Ecosystem draws together these elements and demonstrates the importance of a holistic approach to hazard management that acknowledges the social, economic, institutional, environmental and physical factors of community resilience (Figure 1). The community ecosystem is represented with interlocking and interconnected arrows. There are 5 core factors that define the ecosystem and were selected based on their broad acceptance in the literature as the most commonly used indicators of community resilience. Within each of these factors, the results from the Waikouaiti case study revealed a number of context-specific variables that shape community resilience that can be applied to other rural townships. Thus, our framework provides guidance for emergency managers to determine, investigate and enhance community resilience.

A key benefit of adopting a holistic view of the relationship between hazard management and community resilience is that resilience is not shaped simply by physical resources and funding, which has often been the focus of local government policy. This study revealed that approaching community resilience in a holistic manner can guide perspectives away from a reliance on physical and economic aspects towards the social dimensions of resilience, such as community leadership and collective effort at the grassroots. The opportunities to improve community resilience are listed in Figure 1. These opportunities offer practical actions to help guide resilience building and emergency management activities within rural communities. They focus on relationships, knowledge sharing and building trust.

The important and influential role of governance in community resilience

The role of institutions, particularly the Dunedin City Council, Otago Regional Council and Emergency Management Otago in New Zealand is important to guide and support emergency management and community resilience in rural communities. These institutional relationships, processes and constraints (funding and
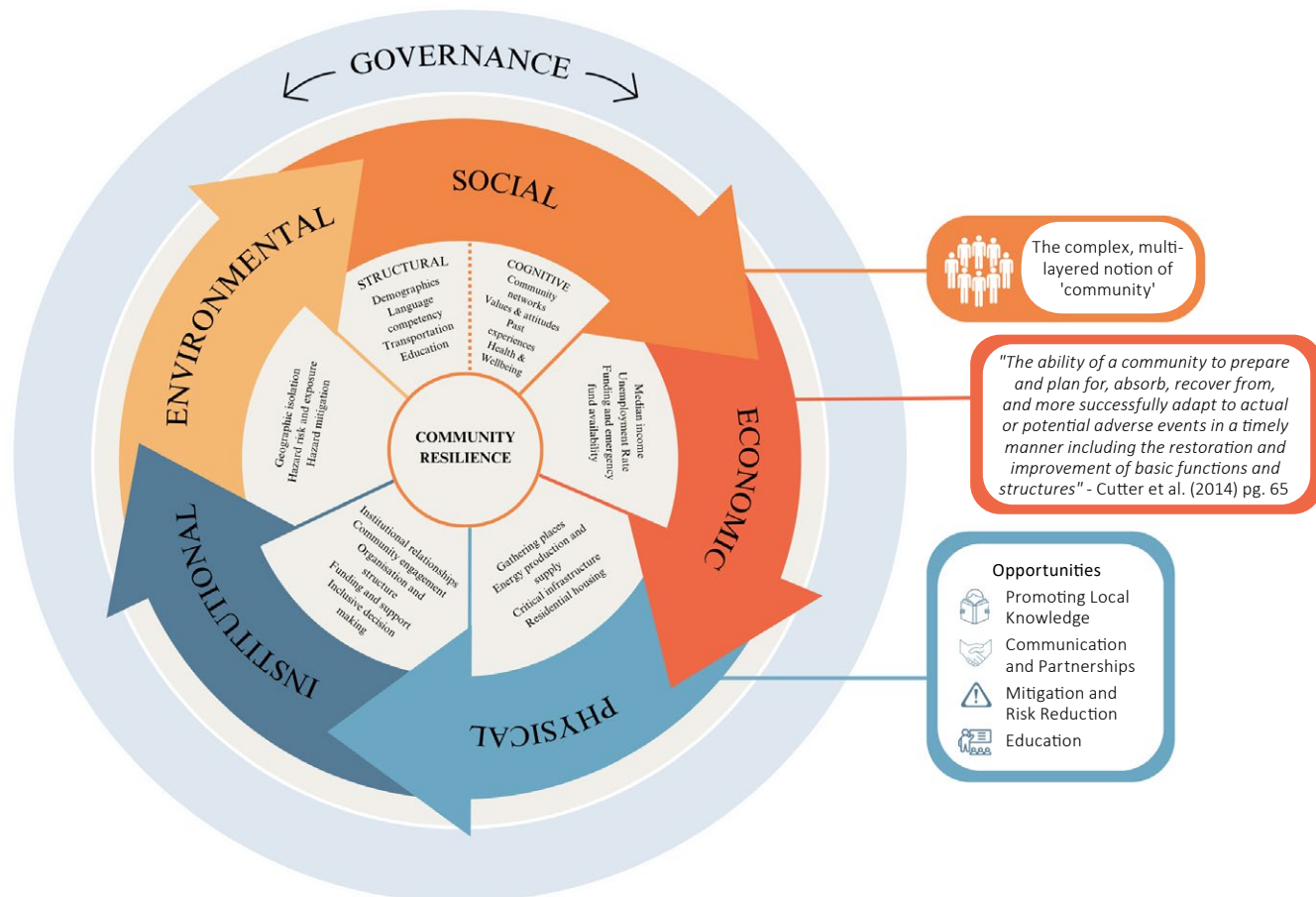

Figure 1: The Grassroots Community Resilience Ecosystem: Enhancing Hazard Management and Resilience in Rural New Zealand.

resource availability) are important influences on wider resilience building in community resilience studies. Kruse et al. (2017) and Twigg (2009) identify disaster risk governance and the associated laws, policies, responsibilities and relationships as significant factors that shape resilient communities. The notion that governance is a framing structure in which community resilience sits has been applied to the Community Resilience Ecosystem.

Findings from the Waikouaiti case study revealed the importance that participants placed on governance. Members of the Waikouaiti community disclosed negative perceptions of local council and emergency management that were driven by a lack of clarity about roles and responsibilities. A shared understanding of roles and strong relationships between communities and outside providers can create effective responses during hazard events and can result in improved resilience. Therefore, open and transparent communication between authorities and communities are needed to understand who, how and when resilience-building actions are implemented.

Academic literature and research findings show that people are more willing to take responsibility and contribute to local preparedness actions if they perceive their relationship with formal agencies as fair and empowering (Paton and McClure 2013). This supports international and national policy disaster risk reduction and resilience, including the *Sendai Framework for Disaster Risk Reduction 2015-2030*[3] and the National Disaster Resilience Strategy, that promote empowering communities to develop community-led resilience. Collective effort guided by local knowledge was evident in Waikouaiti as an opportunity to enhance community resilience through the empowerment of the community. Participants identified the co-production of knowledge and ideas between the community and emergency managers as an opportunity to enhance resilience. One participant said, 'coming up with better solutions together; that's how we are going to make better decisions'.

Participants were supportive of improving the roles and responsibilities of local government in hazard management for rural communities. Key informants, including from local government, emergency services organisations and community leaders, recognised the potential benefits from council adopting a supportive role in rural resilience. In particular, implementing resilience-building actions and initiatives at the grassroots level. A local resident participant spoke about the role that council should play in emergency management and resilience-building initiatives, 'I think the best thing to do is to support what we want to do locally'.The shift from a top-down management approach to the empowerment and support of grassroots, bottom-up management originates from the notion that local communities are often more successful to prepare, respond and recover from events.

Community resilience outlook

This research showed that approaching practical hazard planning with an understanding and appreciation for holistic community resilience can enable effective grassroots resilience building. The Community Resilience Ecosystem framework provides a summary of the elements and influencing factors that contribute to the complex and multi-layered notion of community resilience. It is also a framework for local government to encourage and support grassroots community resilience in communities.

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3. *Sendai Framework for Disaster Risk Reduction 2015-2030,* at www.undrr.org/ publication/sendai-framework-disaster-risk-reduction-2015-2030.

References

Kruse S, Abeling T, Deeming H, Fordham M, Forrester J, Jülich S, Nuray Karanci A, Kuhlicke C, Pelling M, Pedoth L and Schneiderbauer S (2017) 'Conceptualizing community resilience to natural hazards-the emBRACE framework', *Natural Hazards and Earth System Sciences,* 17(12):2321–2333. https://doi.org/10.5194/nhess-17-2321-2017

Mulligan M, Steele W, Rickards L and Fünfgeld H (2016) 'Keywords in planning: what do we mean by 'community resilience'?', *International Planning Studies,* 21(4):348–361. https://doi.org/10.1080/13563475.2016.1155974

Paton D and McClure J (2013) *Preparing for Disaster - Building Household and Community Capacity.* Charles C Thomas, Publisher.

Spector S, Cradock-Henry NA, Beaven S and Orchiston C (2019) 'Characterising rural resilience in Aotearoa-New Zealand: a systematic review', *Regional Environmental Change,* 19(2):543–557. https://doi.org/10.1007/s10113-018-1418-3

Twigg J (2009) *Characteristics of a disaster-resilient community: a guidance note.* DFID Disaster Risk Reduction NGO Interagency Group: Teddington, UK. https://discovery.ucl.ac.uk/id/eprint/1346086/1/1346086.pdf

Wither D, Orchiston C, Cradock-Henry N and Nel E (2021) 'Advancing practical applications of resilience in Aotearoa-New Zealand', *Ecology and Society,* 26(3). http://dx.doi.org/10.5751/ES-12409-260301