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ABSTRACT

The M_w 6.3 Christchurch earthquake that struck at 12:51pm local time on 22 February 2012, caused 185 deaths, over 7000 injuries and in excess of US\$12 billion in damage to the Canterbury region. The Christchurch earthquake occurred approximately six months after the 4 September 2010 M_w 7.1 Darfield earthquake, the epicentre of which was 20km west of the city. There were no deaths and few major injuries from the September 2010 event, but property losses were in excess of \$US 4 billion.

This report discusses the responses to these challenges and explores the resources and relationships that those affected by earthquake consequences identified as contributing to differences in community responses to recovery demands and to their recovery. It discusses how several person/household-, neighbourhood-, community-, and societal-level factors acted, individually and collectively, to influence the development of community response to the 2011 Christchurch earthquakes and aftershocks. The report also discusses the demands and challenges that changed over time for Christchurch residents and businesses during the response and recovery cycles experienced by people affected by the series of earthquakes/aftershocks in Christchurch in 2011. Data were collected in June and July 2011. The timing of the data collection increased the validity of the findings as it allowed tapping into some experiences of aftershocks and thus into the complex, unique and repeated response-recovery cycles presented by this event.

Key issues include:

- Recognition of a lack of preparedness and the need for better household and community preparedness at physical (structural, survival), social and relationship levels.
- Recognition of the importance of psychological preparedness and a need for it to be developed and integrated with other public education and community engagement readiness and recovery strategies.
- The individual, community and relationship factors identified as facilitating resilience (e.g., hope, efficacy, collective efficacy, active participation, leadership, ability to represent needs to agencies) are discussed.
- 'Community' played several roles in response and recovery – in different ways and with different levels of social coherence. Most people reported that neighbourhood groups emerged in response to the need to meet survival and response needs. However, these groups did not necessary transition into effective recovery resources. Some did, but most dissipated after the immediate crisis had diminished (they did resurrect after the significant aftershock in June and subsequently).
- Social networks that facilitated the development of a sense of community emerged in several ways with some developing from existing relationships and others emerging from a need to deal with local response issues.
- The development of 'community' during recovery was influenced by structural factors such as socio-economic status and whether social networks were built around locational (geographically-centred) versus relational (based on shared interests rather than geography) communities.

- The development of community was also influenced by more dynamic factors. Participants identified several factors they felt helped or hindered the development of functional social networks. These were the degree of external assistance received early in response that limited the perceived need for people to identify and meet their own needs, the degree to which the existing or emerging social networks possessed the core competencies required to organise into a functional entity, and the degree to which local leadership capable of promoting and sustaining community functioning emerged in a community.
- People's perception of how they adapted and coped was influenced by their relationships with societal-level agencies and government departments. The quality of these relationships affected whether people felt they were marginalised (disempowered) or whether agencies facilitated (empowered) people's ability to take responsibility for their own response and recovery.
- Bureaucracy and lack of agency competence were cited as constraints.
- Community response was marginalized by the perception that formal response was uncoordinated and by the belief that agencies lacked the capacity to make choices regarding what needed to be done in specific communities.
- The lack of household preparedness and the expectation that civil defence would operate instantaneously resulted in some framing of negative views of response issues. This is supported by different views of this relationship emerging in June.

KEYWORDS

Christchurch, earthquake, preparedness, response, community, constraints, psychological preparedness, community education

1.0 INTRODUCTION

The M_w 6.3 Christchurch earthquake that struck at 12:51pm local time on 22 February 2012 caused 185 deaths, over 7000 injuries and in excess of US\$12 billion in damage (Bannister & Gledhill, 2012). The Christchurch earthquake occurred approximately six months after the 4 September 2010 M_w 7.1 Darfield earthquake, the epicenter of which was 20km west of the city. There were no deaths and few major injuries from the September 2010 event, but property losses were in excess of \$US 4 billion. The Canterbury earthquake sequence was characterised by a high level of seismicity (especially damaging aftershocks over a period of more than 18 months within close proximity of the city of Christchurch). The long duration of this event impacted on community recovery and resulted in considerable and prolonged disruption to the lives of many.

The impact of the earthquake on Christchurch was substantial. Some 100,000 homes (approximately, half of the housing stock) were damaged, and 7,000 homes were rendered uninhabitable. About 3,000 of the 5,000 businesses in the Christchurch CBD were displaced and 1,200 CBD building had to be demolished. More than half of the road network had to be replaced and 12 schools had to be relocated. With these kinds of effects, it is easy to appreciate how the earthquake has impacted every sector of the community (housing, education, sport, culture, business and infrastructure). In Christchurch, some areas of the city that were designated red zones, including whole suburbs, as well as a need to re-develop much of the central business district meaning that some parts of Christchurch will not be able to return to what they were before. Some areas will be abandoned and others will be redeveloped from the ground up.

The Christchurch earthquake presented those affected and those responsible for managing the consequences and facilitating the recovery with very challenging circumstances. These challenges were evident not only in building and infrastructure loss, but also with regard to impacts on heritage, community, culture, economic/ commercial and governance domains of social and societal life. Analyses of community responses in different locations revealed differences in how and how well communities and their members responded to the demands and challenges posed by the recovery environment.

This report discusses the responses to these challenges and explores the resources and relationships that those affected by earthquake consequences identified as contributing to differences in community responses to recovery demands and to their recovery. It discusses how several person/household-, neighbourhood-, community-, and societal-level factors acted, individually and collectively, to influence the development of community response to the 2011 Christchurch earthquakes and aftershocks. The report also discusses the demands and challenges that changed over time for Christchurch residents and businesses during the response and recovery cycles experienced by people affected by the series of earthquakes/aftershocks in Christchurch in 2011. Data were collected in June and July 2011. The timing of the data collection increased the validity of the findings as it allowed tapping into some experiences of aftershocks and thus into the complex, unique and repeated response-recovery cycles presented by this event.

Analyses of this nature are important from the perspective of understanding resilience and adaptive processes. The need to understand adaptive and resilient recovery was identified by the Hyogo Framework for Action 2005-2015 (International Strategy for Disaster Risk Reduction (ISDR), 2005) as the key element of a disaster risk reduction (DRR) strategy.

However, if adaptive and resilient response to natural hazards is to be understood, and if the evidence base required to support resilience assessment and intervention planning is to be provided, it is necessary to assess adaptation and resilience when people are experiencing significant levels of disruption from hazard events (Berkes, Colding, & Folke, 2003; Bruijn, 2004; Carpenter et al., 2001; Klein et al., 2003; Paton & Johnston, 2006). The analysis of community responses to the Christchurch earthquake sequence provides an appropriate context in which to examine adaptive and resilient responses.

The systematic evaluation of the experiences of people, groups and communities in response and recovery plays a vital role in developing understanding of the competencies, processes and relationships that contribute to adaptive and resilient responses. Learning from people's experience of a large-scale hazard event can play a pivotal role in validating theories as well as testing policies, plans and assumptions about response to and recovery from complex, long-duration natural hazard events. This, in turn, provides a more robust, evidence-based foundation for developing policies, plans and procedures to facilitate sustained adaptive and resilient responses to the diverse consequences of hazard events and to the physical, social and psychological demands that people experience over the course of prolonged periods of hazard recovery.

To collect the data on which the content of this report is based, focus group interviews were conducted in each of five affected suburbs in July 2011. These data were complemented with that from twenty individual in-depth interviews. The timing of data collection allowed assessment of recovery experience from both the February earthquake and from a significant aftershock in June 2011.

2.0 OBJECTIVES

A key goal of this report is to identify factors that helped and hindered resilience in those who experienced the Christchurch earthquake sequence. Once identified, the findings can be extrapolated to New Zealand in general. The approach adopted is based on the fact that hazard events impact individuals and families, affect whole communities and disrupt the societal processes that normally govern people's lives. In taking this position, it becomes evident that developing a comprehensive view of adaption and resilience is a function of the independent and interdependent action by all stakeholders (e.g., communities, their members, businesses and societal institutions and agencies). Conceptualising adaptive and resilient processes as involving 'interdependencies' highlights the importance of facilitating shared responsibility for risk management and for the response and recovery activities associated with hazard events as a key goal in risk management and recovery planning. Shared responsibility involves different individuals and groups playing complementary roles in both risk management and recovery.

To play complementary roles in risk management, stakeholders must possess the knowledge, competencies and resources (e.g., self-efficacy, community competence, trained staff, response and suppression capabilities) required to anticipate events, to reduce or mitigate risk before events occur, and to be able to mobilize, organize and use resources to confront the problems encountered, adapt to the reality created by hazard activity, and recover as quickly and effectively as possible. An emphasis on shared responsibility introduces an additional development need into the risk management process (Paton & Johnston, 2006). That is, the planning and development strategies used to facilitate sustained resilience must include mechanisms designed to integrate the resources available at each level to ensure the existence of a coherent societal capacity. Finally, strategies adopted must be designed to ensure the sustained availability of these resources and the competencies required to use them over time and against a background of hazard quiescence and changing community membership, needs, goals and functions.

The content of this report represents a test of the validity of the above stated position. Advancing understanding of this process requires that the demands and challenges that people face during recovery be identified (i.e., recognises that adaptive and resilience processes can only be assessed when people are facing significant challenges). The scale, complexity, national significance and duration of this event provides opportunities to build understanding of how the actions of people, communities and governments can, individually and collectively, facilitate or hinder recovery and development in the aftermath of a major disaster. The first issue addressed concerns what people had to contend with and how these demands changed over the course of recovery.

3.0 CHANGES IN RECOVERY DEMANDS OVER TIME

The Christchurch earthquake and aftershocks resulted in respondents recognizing inadequacies in their structural readiness. Structural readiness refers to adjustments that increase the survivability of and level of physical protection offered by one's home and property during the period of experiencing hazard effects. For earthquakes it involves, for example, securing the house to its foundations and strapping chimneys to prevent their collapse. Such actions enhance the capacity of the home to protect its inhabitants and to increase the likelihood of people having a habitable dwelling during the recovery period. Being able to remain in a habitable home increases people's availability to offer mutual assistance and social support to others and to be available to contribute to economic recovery (as customers and employees). The lack of structural preparedness was identified as increasing the adaptive demands people faced (e.g., having to move out of the home).

The second area of concern identified by people was their having inadequate essential supplies (e.g., stored food and water for all those in the home for three -five days) and a lack of household emergency planning. Respondents reported how their lack of such readiness and planning made adjusting to the loss of water, power and sewerage services more challenging than need be. Not only did this reduce their capacity for self-reliance, it meant diverting attention to accessing essentials like water and temporary toilet facilities rather than attending to family needs and planning how best to respond to their circumstances (e.g., dealing with livelihood issues). Respondents also identified their lack of psychological preparedness as an issue affecting their resilience, particularly with regard to coping with the impact of repeat aftershocks, and adapting to changes in living conditions, loss of social relationships and livelihood disruptions throughout the several months over which recovery took place.

As the situation stabilized, people moved into the recovery phase of their disaster experience. During the first few weeks (although aftershocks required people to run through response-recovery cycles several times), people discussed how being able to work with neighbours and other community members to develop (self-help) groups to confront local demands (e.g., removing rubble, proving mutual support, setting up community meeting places, taking care of those with special needs) contributed to their resilience. Subsequently, respondents described how re-establishing community groups or forming new ones played significant roles in resilience (e.g., organizing local efforts to repair homes, identifying and meeting local needs). Recovery was also influenced by the ability of community groups to represent diverse (needs differed from community to community depending on, for example, cultural status, socio-economic status, impact of loss of CBD employment) community needs to agencies and to secure the resources each community needed to take responsibility for their recovery. Thus, it was evident that what people had to contend with changed over time (e.g., from loss of utilities to making neighbourhoods safe to dealing with government agencies) as they negotiated physical, social and institutional demands that changed over the course of a prolonged period of recovery (summarized in Figure 1).

While all focus groups acknowledged experiencing similar adaptive demands, they differed with regard to how the communities they represented dealt with recovery demands. The existence of such differences provided an opportunity to explore how their respective community capacities and characteristics (Norris et al., 2008; Paton & Johnston, 2006) influenced recovery (e.g., their ability to develop neighbourhood groups, deal with external agencies etc.). The in-depth interviews identified several factors that influenced people's

vulnerability and resilience to earthquake hazard consequences (primary and secondary) and thus the quality of their recovery. Discussion starts with activities that occurred in households and families.

3.1 PERSON/HOUSEHOLD/FAMILY- LEVEL

The foundation for response activities was family reunification and returning home. If this was not possible, initial response involved congregating at the home of a family member or a friend (in descending order of preference). Not surprisingly, the meeting of immediate family needs was necessary before engaging with neighbours and others within the immediate geographic area to meet basic needs (e.g., securing water, temporary toilet facilities etc.). Participants recognised that this was complicated by their lack of earthquake preparedness.

Initial adaptive and coping efforts were complicated by people reporting their being ill-prepared for the February event. The consequence of this was that many were unable to be self-sufficient for any length of time. The unexpected magnitude and repetitive nature of the aftershocks were cited as the reasons for the generally low level of psychological (with psychological preparedness being cited as highly significant in the context of repetitive aftershocks) and physical preparedness of people in Christchurch. This was despite the occurrence of the September 2010 earthquake. Participants largely dismissed the impact of the September earthquake as a cue to preparing and stated that it generally did not significantly affect their lives. This observation is consistent with the effects of the normalisation bias (minimum damage from 9/10 earthquake resulting in the level of impact becoming the expected norm) and/or the Gambler's fallacy (the occurrence of the earlier earthquake reduces the perceived likelihood of a future earthquake and thus the need to prepare). The lack of survival (e.g., water) planning increased demands on people and agencies to provide and distribute the resources people required for their survival. This observation is supported by findings that in Christchurch only 28% of households meet the requirements for basic preparation (Statistics New Zealand, 2012).

The lack of preparedness has several significant implications for people's resilience. It undermined initial self-reliance and increased people's dependence on formal response agencies to meet survival needs that could have been easily met by a more prepared population. Having to focus on meeting needs can hinder the ability of agencies to engage with communities to work on local issues. Lack of preparation also constrains the mobilisation of local initiatives and slows the formation of the kinds of structured social networks (communities) that assist social and psychological recovery.

It was also interesting that many participants commented on their need for the kinds of preparedness regularly advocated for in existing public education programs. This provides an example of how the passive presentation of information in public education programs generally fails to facilitate action, and why a community-engagement based approach is required to increase the efficacy of public education and community outreach initiatives (Paton & McClure, 2013). However, it is also pertinent to accommodate the fact that while public education has addressed the need for people to prepare to meet their immediate needs, it has not addressed the longer term and enduring consequences that could occur (e.g., implications of aftershocks; social disruption etc.). The latter issues have been identified in the literature (e.g., Paton & Johnston, 2006) and are discussed above (summarised in Figure 1 – right hand column).

3.2 PERSON-LEVEL FACTORS

With regard to person-level influences on adaptation and coping, hope and reassurance were considered important factors underpinning adaptation. This reflects the psychological impact of people experiencing high levels of ambiguity and lack of control, particularly once immediate needs are met and recovery issues become daily demands. So, for example, knowing that infrastructure repair was beginning and would progress, knowing that they were not alone and that reliable sources of support, help and information was available are encapsulated in sense of hope that a viable and desirable future would be a possibility. Hope and realistic optimism are important characteristics of effective sustained functioning at the individual level. For these factors to function to facilitate adaptation, being connected to appropriate social and information networks (capable of advising people of recovery progress and being able to offer support) is essential.

From a person-perspective, the initial development of social networks was complicated by population movements into and out of neighbourhoods. Residents leaving increased the sense of isolation in those remaining. This sense of isolation was reported as more problematic in lower socio-economic communities. Loss of people from social networks and the dynamic nature of response and recovery (e.g., need to transition through response and recovery cycles repeatedly as a result of prolonged aftershock sequences) made regaining a sense of normality particularly challenging.

In highly stressful circumstances characterised by lack of control, low predictability and high ambiguity, re-establishing social networks and normal routines is an important aspect of adjustment. Irrespective of demographics, routines that were permanently broken (e.g. friendships, normal social activities) weakened the community's social fabric and reduced individual resilience. The loss of routine compounded people's sense of isolation and loss of local residents from neighbourhoods affected people's ability to rebound by constraining opportunities for social support. Problems in re-establishing routines and activities contributed to the sense of grief at the loss of these activities, particularly if friends who had once shared these activities had moved away and were believed to be irreplaceable.

Participants reported that re-establishing relationships and normal routines (people and places) was particularly important psychologically. Re-establishing normality helped people regain a sense of well-being and assisted in re-establishing their sense of belonging. This was linked to neighbourhood and community related activities and introduces how constructs such as sense of community place attachment are important predictors of individual adaptation and resilience. It also highlights a need to include social support (see below) provision in psychological preparedness and to identify alternate ways in which it can be provided when social networks are disrupted or rendered less effective by people being overwhelmed or dealing with network members moving away.

3.3 FAMILY

Family dynamics and response played a role in response effectiveness. Issues relating to children were identified and concerns over children's recovery represented a significant demand on families. Family-level resilience was also affected by gender role relationships activated by response and recovery demands and by guilt processes that stem from earlier decisions not to prepare or to prepare inadequately (e.g., male members of households feeling guilty as they believed that preparing was their responsibility and a task that was neglected as it was not seen as a priority).

Family adaptation was more challenging for families with school-age children. Children's peer relationships were important for adaptation and managing psychological impacts. Schools played important roles in response and recovery. By providing children with access to their peers and friends, returning to the social environment and organised nature of school life helped reintroduce a sense of normality, and enhanced children's sense of adaptive capacity and ability to cope. Building support networks around schools can be beneficial not only for the children, but also for their parents and for others such as teachers. If parents are unable to follow normal work or life routines (which was identified as a separate stressor), their getting involved in school activities and providing mutual support for teachers and other parents, can provide social support, help them regain a sense of control, and contribute to developing social networks and the competencies (e.g., self-efficacy) that represent important adaptive capacities. An interesting aspect emerged from people recognising the need for better psychological preparedness.

3.4 PSYCHOLOGICAL PREPAREDNESS

A need for more attention to be directed to psychological preparedness was evident in responses. Respondents identified the impact of the lack of psychological preparedness as being comparable to the lack of physical and social preparedness. In addition to its inclusion in future readiness planning, there is scope for its use in the recovery phase in relation to helping people cope with the impact of repeat aftershocks (which were identified as significant setbacks to physical and psychological recovery) in future events.

In addition to considering it as a unique aspect of preparedness, public education and community outreach can also examine ways of integrating the development of psychological preparedness with activities intended to develop physical, household and social readiness. This requires consideration being given to several issues; identifying the nature and application of psychological preparedness, its relation to other aspects of preparedness, and identifying how psychological preparedness can be applied in pre-, response, and post-event, recovery and rebuilding stages.

Psychological preparedness can address issues that arise prior to events occurring. Psychological preparedness could be beneficial with regard to managing the anxiety that has often been identified as an impediment to people deciding to prepare (Morrissey & Reser, 2003; Paton, Smith & Johnston, 2005). A need to consider post-event psychological preparedness derives from the fact that people may face socio-legal processes (e.g., litigation, public inquiries) and media coverage that may persist for months or years. People may benefit from preparation to deal with the blame processes (e.g., self and other blame, counterfactual thinking) that can affect well-being in this context and that can be divisive in community settings. Ascertaining whether this would be beneficial and determining how, when and by whom it should be provided is an issue for future research. However, a need for psychological preparedness emerged most frequently in relation to its influence on people's ability to deal with the challenges encountered when faced with earthquake hazard consequences.

Psychological preparedness is not about eliminating people's vulnerability to adverse emotional and stress reactions. Rather, it is intended to help people understand how and why they react as they do and to assist them to develop the capacities to manage stress over time. Managing stress not only protects well-being, it also enhances motivation and the quality of decision making and people's capacity to sustain functioning in high demand circumstances.

Psychological preparedness possesses three essential elements (Morrissey & Reser, 2003). These are: to anticipate the anxiety and concerns that will arise; to identify uncomfortable or distressing thoughts and emotions that may cause further anxiety; and to find ways of managing the responses so that one's coping capacity remains as effective as possible. Procedures such as stress inoculation training and learned resourcefulness represent strategies that could be used to promote psychological preparedness (Meichenbaum, 2007; Mooney et al., 2011; Morrissey & Reser, 2003, 2007; Paton, 1994).

A key goal of psychological preparedness is to develop the degree to which people possess the competencies and capacities (e.g., knowledge, planning/anticipation, recognition, thinking, feeling, decision making and the management of one's own thoughts, feelings and actions) that influence their ability to comprehend and understand, predict, recognize and manage the emotional correlates of anticipating and facing challenging circumstances. Psychological preparedness can be enhanced through direct and vicarious experience with emergency situations and scenarios (e.g., using stories and case studies from Christchurch to frame public education materials for residents in Wellington). Being better able to anticipate what they may encounter enhances people's ability to predict, respond to and exercise control over challenging circumstances and to manage and recover from the associated stress.

In addition to seeing psychological preparedness as a separate area for development in risk management programs, it is also pertinent to consider how psychological readiness and other aspects of hazard readiness can be integrated. The rationale for exploring this possibility lies with the role predictability and control play in managing stress.

For example, rather than just providing people with information about preparing, explaining the relationship between hazard characteristics, preparedness measures and how and why they are effective could help people develop a greater sense of predictability and control (Paton & McClure, 2013; Paton, 2008). Engagement-based approaches to community outreach that build relationships between neighbours and community members can assist both the development of a sense of collective control, and can facilitate the development of social support (e.g., informational, tangible, emotional, and belongingness support) which can make beneficial contributions to psychological preparedness before, during and after hazard events (Paton & McClure, 2013). Doing so can also contribute to developing a sense of shared responsibility for managing hazard consequences, increasing resilience and decreasing vulnerability.

3.5 ADAPTATION, RESILIENCE AND VULNERABILITY

The psychological impact of the June earthquake was significant. It damaged morale and was the tipping point for some residents' decisions to move out of Christchurch. It was identified as confirming that the earthquake was an ongoing event. The continuing and unpredictable nature of aftershock activity provided a context in which to assess factors contributing to vulnerability and resilience.

Factors contributing to vulnerability were isolation and loneliness; loss of social networks (particularly when aftershock activity triggered decisions for friends to leave); knowing that close friends and family were struggling to manage psychologically and feeling unable to help them; loss of social support as a result of all social network members being simultaneously affected; and experiencing a sense of the progressive dwindling of psychological resources (particularly following aftershocks that were experienced as significant setbacks). Loss of physical amenities was felt very strongly by some (e.g.,

perceived loss of a usable beach in South Shore) and increased the likelihood of people thinking about leaving the area. Younger respondents felt the loss of the social environment offered by the central city.

With regard to people's views on what contributed to resilience, factors included:

- demographic diversity;
- confidence in self-help and self-sufficiency;
- flexibility and adaptability to respond to changing demands;
- a mentality of getting the job done (self efficacy);
- a capacity to engage with people and maintain relationships;
- becoming actively involved in community activities;
- the willingness to care, share yours and to listen to others' stories;
- knowledge of/sensitivity to community dynamics and culture;
- ability to return to normal routines as soon as possible; and
- regaining a sense of belonging and identity.

Other things that help participants cope and rebound: helping others (shared social responsibility); sense of connectedness to outside support; talking and connecting with others about shared experiences; understanding and empathy; access to information about local events, international experiences; normal stages and so on (for some this contributed to anxiety); focusing on the positives from the earthquake experiences; obvious progress on infrastructure; moving through a process – attending to immediate safety, survival needs, establishing routine and normality, grieving, resting, moving ahead (although this would often stall with recurrent events); and a background that helps develop resilience (e.g. Kiwi culture, Red Cross training, scouts).

Adaptation and resilience were facilitated by active involvement in community life and by connecting with other people through directly helping others or helping through establishing a form of normality and new routines (active involvement is an important source of resilient characteristics such as self efficacy and collective efficacy). Personal resilience was directly related to the community response and recovery (see below).

Factors that assisted establishing a sense of normality and routine included: being connected to people through helping others, membership of neighbourhood and community groups that developed and sustained a sense of connectedness; and having meeting places for regular interaction (and sharing stories). Initially this occurred in relation to direct response activities (e.g., water tank use), but later occurred in more coherent meeting places such as local shops, schools, or community venues. Opportunities for socialisation and the restoration of some social fabric were generally viewed positively as an influence on recovery.

However, for some, social events were sources of distress. This was particularly so for those only just coping and for whom the additional burden of providing and receiving support constituted a stressor. Social support is an important predictor of resilience. This finding identifies that support characteristics and function need to be assessed and it is important not to assume that the presence of opportunities for social interaction will mitigate psychosocial risk. It also raises a need to develop alternative approaches to accessing meaningful support (e.g., the buddy system, peer support systems) for those having trouble coping.

The importance of developing people's capacity to effectively utilise social support arises from identifying how community meetings and ad hoc social events helped people make a positive transition into the recovery phase. Social events provided opportunities to normalise realities and feelings and obtain psychological support provided through shared mutual experiences and understandings. Sharing experiences and developing mutual understanding play pivotal roles in how people impose meaning on their experiences and develop and implement response and recovery strategies.

Mingling with other community members strengthened bonds and connections and contributed to developing a stronger sense of community (that emerged through a sense of shared fate) although there were differences between areas and in how this was accomplished (see below). Social network effectiveness was influenced by people's ability to identify with other ('like-minded') people. Initially the sense of 'shared fate' (and atypical circumstances) was the common social denominator. Subsequently, groups were formed around the shared interests and goals of their members.

As the sense of acute emergency diminished, so did the level of volunteer participation and frequency of neighbourhood barbecues and get-togethers. This shift reflects the notion of shared fate as a mechanism for binding people. As people normalise, they start to reconnect primarily with their prior social networks or with people they identify with more. Since the sense of shared fate strengthened people's sense of social coherence, it is important to attend to how this could be developed and so act as both a recovery resource over time and contribute to sustained readiness in at-risk communities.

Resilience became a process that was a function of the degree of group self-organisation into functional entities capable of confronting these evolving demands. This raises issues about the degree of individual and collective community input into planning (short-, medium- and longer-term) for recovery and rebuilding. An issue here is the time devoted to assisting group development. The lack of involvement was highlighted in people's accounts. It should be noted that an issue here is the degree to which people know how to be involved (see below). This introduces empowerment as a factor in resilience (Paton, 2008; Paton & McClure, 2013). Empowerment comprises two complementary processes. These are the existence of empowered people and groups, and the availability of empowering settings (e.g., agency input) that meet needs presented by communities (Paton & McClure, 2013).

Problems with early neighbourhood groups were further compounded by the experience of what Quarantelli called Response Generated Demands (i.e., those relating to the process of recovery management). In particular, people identified the lack of control, ambiguity and unpredictability, the sense of living in limbo, emanating from growing reliance on the actions of government and insurers to advance recovery. The sense of limbo complicates resilience efforts as people and agencies fail to engage as this resulted in people feeling marginalised.

Lack of involvement in planning can result in people experiencing a loss of clarity and undermines the degree to which they believe they can have a long-term future (in Christchurch). Waiting, rather than being able to take ownership of issues contributes to stress (reduces control, create ambiguities in their current situation, and reduces predictability) and to low motivation and helplessness.

For some communities, the June 13 event reactivated existing response mechanisms and provided an opportunity to examine the efficacy of the community processes developed earlier. Ad hoc leaders identified each other and coordinated efforts. Prior leaders re-emerged in the role they played in February. The strength of the previously emergent

community groups to re-activate, often quickly, and to efficiently take the learning from previous events and applying it to new situations was assisted by a better developed government response that created more empowering settings for community activities. Community response was again complicated by it being a trigger for people to leave, including some who had only recently returned.

Two levels of emergent social organisation occurred. Their origins and function mirrored the nature of emergent response and recovery needs (see above and Figure 1). The first centred on neighbourhoods and evolved to facilitate meeting immediate response (survival) needs. The second involved community groups and focused on recovery. These were sometimes linked, but not always.

4.0 NEIGHBOURHOOD-LEVEL ACTIVITIES

Initial neighbourhood groups emerged spontaneously and were largely independent of pre-existing (community) group memberships. This is not surprising as neighbourhood and community may not overlap as a result of the growing presence of relational communities in urban contexts. Neighbourhood groups functioned to secure key resources (e.g., food, water) and to offer support to those in with specific needs – thus to facilitate meeting survival needs. The quality of prior relationships with neighbours may have enhanced their capacity to offer tangible and other types of support (emotional, informational...). This did result in the response to meeting needs taking place in (daily life) around this social context.

Mutual neighbourhood assistance continued over subsequent days and weeks. Helping others was identified as an important foundation for resilience. Neighbourhood bonds were identified as being of high value, although the extent of contact diminished over time. While they were reactivated following aftershocks, it became evident that neighbourhood-based networks functioned predominantly to deal with immediate response issues and less for community recovery.

During the early stages, the quality of social relationships, and the stability needed to create a 'sense of community' was influenced by the degree to which a specific social network was affected by population movements into and out of Christchurch. Lack of stability affects the development of a sense of identity and the quality of social support (social exchange) that is accessible. Dynamic patterns of migration into and out of urban areas needs to be considered in planning, not just in relation to the physical movement of people, but also in relation to its implications for social and psychological adaptation and social support.

During the second month of recovery, changes to the social fabric occurred, with the dissolution of some groups and the emergence of others. 'Community' activity was characterised by diversity. Two main sources of diversity were evident. One related to locational versus relational communities. The other concerned the level of coherence and functionality in community groups (both pre-existing and emergent).

Diversity was evident with regard the mix of locational (e.g., Sumner and Red Cliffs) and relational (parts of central city and South Shore) communities. For example, central city residents described their inhabiting various micro-communities, each having its own set of characteristics. This introduced diversity into how different communities responded even though existing within the same general geographical area of the central city. People's perception of social coherence was also influenced by the extent to which residents were permanent.

5.0 COMMUNITY-LEVEL ACTIVITIES

For some respondents, active engagement at a neighbourhood level contributed to resilience at a community level. Active engagement plays a pivotal role in developing the personal and collective competencies that contribute to developing empowered people (Paton, 2008; Paton & McClure, 2013). Connections through prior involvement in neighbourhood and community groups played an important role in resilience, particularly when people had been involved in coherent groups and had had specific functional collective experiences (e.g., dealing with issues important to the community, problem solving), even where existing group structures were not accessible during recovery. Involvement in groups where activity includes problem solving, planning etc. provides the core competencies required for adaptive response to emergent issues presented by recovery demands (e.g., relationships with insurers and government agencies).

Links between neighbourhood and community were facilitated by the emergence of leaders, with leaders facilitating connections between groups. While evident in the more affluent communities, lower socio-economic communities experienced greater difficulties attempting to self-organise beyond the immediate neighbour groups. In lower socio-economic communities, group development was constrained by levels of intrinsic resources, the lack of ability of groups to self-organise, and a lack of emergent leaders.

Self-activated, self-managed groups facilitated a capacity to respond to emergent needs within communities. In low socio-economic areas, where existing organisations (e.g., Red Cross) met this need, success was greater in the response than in the recovery phase. Given that NGOs and other external agencies may be involved for finite periods of time, a strengths based approach to building capacities from existing processes and competencies and developing them in the context of the disaster is required (particularly in lower socio-economic or other marginalised communities). This highlights the importance of self-organising groups for medium to long-term recovery. This process can be facilitated by identifying the characteristics of functional communities. These relate predominantly to community competencies and leadership.

5.1 LEADERSHIP

The key qualities of emergent leaders were their skills, background, experience, attitude, connections, availability, and their having a strong sense of commitment to helping others within the community. Leadership could be multi-faceted. Some leaders emerged because of their training (e.g., business, civil defence, Scout's) and others because they had tools, equipment and expertise to know how to contribute to resolving specific problems. However, their success was often dependent on their willingness to take the initiative in difficult and dynamic conditions. Transition to functional recovery groups was hindered by leaders lacking group coordination and management skills, their wanting to wait for government directives or, more frequently, the fact that could not be available to fulfil a community leadership role over the longer term.

Effective leaders were defined by recognition and respect from government and outside agencies. Community support was directed by the community rather than by outsiders or by miscellaneous internal groups and individuals who had neither full nor comprehensive understanding of the community needs and dynamics;

Community leaders had the following characteristics:

- Well connected/could either call upon or work out who to call upon.
- Knew how the community worked/how to get the community working.
- Leadership or management experience that assisted their being better able to manage unpredictable, ambiguous circumstances and being willing to take action (this reflects characteristics such as self-efficacy and active coping styles) particularly in novel, challenging circumstances.
- Being willing to make decisions even when faced with uncertainty.
- Availability (over the long term).
- Leader succession planning.

Emergent leaders played important roles in seeking external information and advice and in building links with external agencies and specialists to secure the resources and help required to respond to and meet local needs. Those playing leadership roles in a community facilitated finding out what was available and where, accessing and evaluating reliable information, understanding the bigger picture, and identifying what needed to be done. This was particularly important with regard to the kinds of expertise required to perform technical activities such as damage assessment and then to be able to use this to inform decision-making processes. Making decisions in a timely manner was identified as a key issue.

Leadership training and management skills played significant roles in helping communities move from response into recovery. The long-term commitment issues of the leadership role also had to accommodate the demands of returning to normal daily life and such tasks, for all, were often compounded by the greater demands of living and working in post-earthquake Christchurch (e.g. longer travel times).

5.2 EMERGENT COMMUNITY GROUPS AND CHARACTERISTICS

The effectiveness of community leadership was influenced by community member characteristics (e.g., knowledge, skills, experience) and community competencies (e.g., history of working together, inclusivity, planning skills). Functional communities were characterised by flexibility and adaptability (e.g., to move from recovery back into response and back again with each aftershock). Functional groups were characterised by their ability to access useful outside information, support and resources. They also became the focus of outside agencies connecting with each community. This provides a good example of how empowered people and empowering settings can complement one another.

The longer term effectiveness of groups was influenced by tangible, external factors such as a) a lack of available funding or lack of direction from government regarding the physical recovery of an area, and b) issues associated with competencies and leadership (this meant that in some places community groups did not develop in ways that allowed them to order and direct their own recovery).

For some groups the early experience of external aid, provided in a top down rather than an empowering manner, may have contributed to a failure to transition to a recovery role. The provision of external assistance deprived the group of a context in which to develop competencies as they dealt with local issues and needs. While it can expedite initial response, this example illustrates how a top-down approach can constrain community recovery.

While it might be assumed that pre-existing groups would be well placed to facilitate recovery, this was not always the case. In Southshore, one established group, the existing residents group, marginalised itself by lack of engagement and an inability to assist recovery. This was attributed to the community awaiting government directives (e.g., land use), the lack of formation of effective community groups to organise the community into the recovery phase, the receipt of outside help received during response which may have interfered with the community developing its own processes, and the lack of adaptive processes such as inclusivity, managing diversity, and not knowing how to apply problem solving and planning processes in a new context. In Amberley, there was the expectation that, should a significant event occur, it would be the existing group leaders and groups that would form the backbone of response groups within the community, and that they would provide perspectives of leadership, resources and expertise. This was not realised, and as a result, Council response staff in communities had taken responsibility for several response issues.

The discussion of community experience identified several community development factors that affected resilience. Prominent here were:

- knowing the community had to take the lead and manage the situation themselves particularly in light of a continuing lack of presence of formal agencies;
- locating a central hub that was safe and accessible;
- operating on scarce or unreliable information;
- determining the skills and resources needed to meet local needs;
- creating a register of skills and resources within the community to meet current and future, unidentified needs (important for planning and adaptation);
- identifying vulnerable community members, their needs and how to resource these needs;
- the ability to secure information and/or guidance and specialist expertise from agencies and authorities outside of the community;
- the ability to secure relevant outside support and resources proactively rather than having government and external agencies approach the community;
- identifying a specific contact within the community to coordinate outreach and donations;
- being willing and able to take action to deal with emergent issues and needs;
- the realisation that outsiders cannot fulfil and deliver community emergency requirements, even if relief and government agencies can provide commodity and security relief in a short period of time;
- internal (within the community) empowerment, encouragement and support of community initiative;
- governments empowering community response.

Participants identified that it is important for a community to have the organisation and resources internally to effectively move from response into the recovery phase (particularly when the latter will persist over a long period of time). Key competencies recognised include bottom-up planning and a need for inclusivity (ensuring that as many people as possible are given opportunities to participate). That is, it is important to include greater consultation with the community to build understanding of reasons for decisions that affect the community. For

external agencies, this involves their ability to create empowering settings for community recovery (Dalton et al., 2001; Paton & McClure, 2013).

The lack of empowering settings (Paton & McClure, 2013) was also evident in people's longer term experience of bureaucracy (e.g., people reporting frustration at being reassigned each time they contacted a government agency). This reiterates the need to examine how response and recovery agencies can create empowering settings. This is a complicated topic and encompasses issues ranging from the expediency of response, the need for specific crisis management procedures and processes (and associated management and training issues), agency culture change, and the selection and training of staff.

A sense of connectedness to others was linked to people's perception of their resilience. Being connected enhanced information flow and access through multiple channels. More importantly, well connected residents become stakeholders in the community as a whole. Benefits of connectedness include widespread commitment to recovery and well-being of the community and individuals within it; understanding and mutual support; having community knowledge and understanding of community dynamics; a greater capacity for using initiative to meet its specific needs; and trust and credibility within the connections. Trust is a particularly important characteristic when dealing with uncertainty.

Problems at the community level were linked to, for example, residents associations and other community groups failing to respond and failing to develop an overarching integrating framework; not knowing who to call for mandates, help, guidance, advice, information (for communities to hunt for and find the correct people and agencies to provide information and assistance was highly resource intensive and time-consuming); government, agencies, and large companies were not seen to proactively reach out to offer help and find out what was needed; local police and fire officers reportedly lacked authority or initiative actions with emergent leaders; it was expected that civil defence sector posts would whip into action fully manned and resourced; starting from scratch rather than mobilising from existing emergency preparedness platforms; limited specific technical knowledge or expertise; newly self-activated community groups struggling to find outside agencies to provide for community needs or requests for specific types of help (empowerment and engagement); having to spend precious time and resources hunting for information on outside help rather than such information arriving and help being offered without solicitation (e.g., knowing needs and how to represent them and being empowered); lack of coordination among those with practical and technical emergency response skills and those in need of it; volunteer fatigue and exhaustion. The experience of recovery led people to identify the qualities they desired in the community:

- a sense of belonging by residents or community-based group membership or affiliation or shared value – this sense of belonging had strong association with routine activities and events (building on pre-existing strengths);
- a sense of support through caring and sharing network connections; a village feel, a sense of geographic boundaries;
- a sense of unique identity through intrinsic role use, resources or activities; unique amenities that residents enjoy and that provide opportunities to socialise and interact including opportunities to bump into each other (risk beliefs and regular interaction);
- commitment to and a passion for the well-being of other members as well as to the community as a whole;

- Connection to church groups, a Marae, extended family, also adds to the sense of community.

While the above discussion relates to what were self-forming groups, the finding of group differences in the quality of both the development and function of community-based groups identifies a need to include community group development strategies in risk management and recovery planning. Potential strategies are discussed in the next section.

5.3 COMMUNITY DEVELOPMENT STRATEGIES

There are several approaches that have been used to facilitate the development of empowered communities. These are similar to the concept of the Neighbourhood Emergency Response Team proposed for Canterbury. Other successful programs include Jishubo, The Community Emergency Team Model, The Cascade Model Building Islands of Resiliency, and the Community Resilience Centre Model.

Jishubo, developed in Japan (with a boost in activity following the Kobe earthquake). Jishu-bosai-soshiki, or Jishubo for short, literally meaning 'autonomous organization for disaster reduction' is a neighbourhood association for disaster preparedness and rescue activity at the community level in Japan. Whenever a local government wishes to organize any form of disaster preparedness events, such as drills, workshops, among others, it will make use of the Jishubo framework. Jishubo is a form of participation activity particular to Japan. It operates through a form of local governance called Chonaikai.

The Community Emergency Team Model developed from recognition that, in certain disasters, it may take time for regional or national authorities to assist. Teams comprise neighbourhood volunteers and professionals (this is pertinent in relation to recognition that a lack of professional knowledge of local issues constrained response and recovery in Christchurch) who take responsibility for response management and control, identifying affected persons and groups, establishing and running local support systems, and developing community recovery programs. Teams have a designated leader with other roles being established as required by anticipated and emergent issues (e.g., medical, logistics etc.) and a spokesperson to liaise with the wider response. As with all such approaches, selection, training, tenure and succession issues need to be considered.

The Cascade Model Building Islands of Resiliency is a process designed to reach out to affected people using a few professional workers to train semi-professionals who then work with, train and support local volunteers. It has been used most in relation to psycho-educational needs and can be used to promote self-help. It can also serve as a referral resource for those identified from within communities as needing professional help. Training and selection issues need to be addressed.

The Community Resilience Centre Model was developed to promote community response to ongoing stressful events. The objective is to develop and advance community resilience by encouraging and working with residents to change their situation, to take responsibility, to be active participants and to help themselves and others to develop their coping and response capacity. This is done under professional direction and supervision. It is comparable to the strengths-based approaches developed elsewhere. It functions as a focal point for collecting and coordinating resource use. It has two main functions: psycho-educational and developing community resilience by activating local groups. The idea is to develop teams that deal with a range of recovery issues (e.g., community development, psychological support, information and communication, fundraising, economic and livelihood, culture and

leisure etc.). This draws on Barker's notion of community development and increases inclusivity through the development of complementary roles. The model thus informs the development of sustained empowerment. This is important in relation to how communities relate to societal agencies, institutions and processes.

6.0 SOCIETAL-LEVEL ISSUES

NGO's (e.g., Red Cross and Salvation Army) were recognised for their contribution to meeting early resource needs and offering counselling. However, during the response period, other formal response agencies such as Search and Rescue, Fire and Police, and some emergency response government personnel (e.g., CD) were described as poorly coordinated and often lacking local contacts or knowing local distribution locations. Agencies were perceived to be working in isolation with little coordination of functions. Engagement needs to be considered within each level as well as between levels. This affects the quality of empowering settings.

A common pattern was that established community groups (e.g. Residents Association) who felt they lacked (internal) leadership and direction looked to civil defence within the community to fill such gaps. However, the lack of intermittent presence of civil defence groups within a given area meant they were not always present or available, and when they were they lacked the resources, capabilities and directives to fulfil this emergent role (this identifies a possible selection and training and need for CD).

Early in the recovery phase, respondents identified several issues that they perceived as acting to marginalise them from the recovery process. Common issues concerned land and property issues, business recovery, and uncertainty regarding rebuilding. Concerns about these issues were manifest in questions about their commitment to staying in their local community or in Christchurch. Other issues described as disempowering or marginalising included red tape that overrode other (local) decisions. These issues conspired to make it difficult for people to move forward and resulted in their experiencing a state of flux. This, in turn, depleted community resources, undermined confidence in the recovery process and prompted questions about remaining in the area as a long-term living option.

Over time, participants reported that existing government and relief organisations started to use emergent leaders at a community level, as well as using groups as the conduit into communities. New or revitalised community centres and organisations started advocating for their communities through CERA, CanCERN and Christchurch City Council. These provide examples of the development of empowering settings and their role in recovery. They contribute to the objective of creating a capacity to interact effectively with empowered people and communities (Paton & McClure, 2013).

7.0 CONCLUSION

The analysis supports the definition of resilience as people's capability to draw upon resources and competencies at individual, collective and institutional levels (*which need to be identified/developed*), to anticipate, cope with, adapt to, and develop from (*able to be used/applied*) the demands, challenges and changes encountered before, during and after hazard events characterised by unpredictability and uncertainty. The preparedness issues identified are summarised in Figure 1.

Resilience is a function of people's capacity to deal with the immediate impact of events (particularly important when preparing for seismic hazards for which no warning is possible). This involves the degree to which people have adopted measures that encompass, for example, safeguarding as far as possible, the structural integrity of houses and securing fixtures/fittings. Preparedness at this level not only reduces the risk of injury and death, it also increase people's availability to assist recovery and reduces demands on services (e.g., people have a habitable dwelling within the neighbourhood/ community).

During the Impact phase (3+ days) resilience is a function of people's readiness. That is, the degree to which they have developed emergency plans and secured resources and know how to use them to increase their self-reliance and their capacity to confront/adapt to hazard consequences. Resilience at this level is also influenced by psychological preparedness. It is also important to expand the scope of planning at this level to encompass being away from home (e.g., at work, school) and being separated from family.

As people move into the Response phase, resilience is a function of people's capacity to work with neighbours and community members to confront local demands. This includes, for example, a capacity to collectively solve local problems, plan/execute tasks, access social support, and develop a sense of community. A need to consider, for example, employment and relocation issues should be included in planning for this level of resilience. It is also pertinent to consider the implications of increasing levels of interaction between community and civic agencies.

During Recovery and Rebuilding, resilience builds on the above capabilities with a capacity to secure and use social support and a capacity for collective action built around effective leadership to facilitate effective engagement and interaction between community and civic agencies being important. These aspects of preparedness, and their relationship to core community processes is summarised in Figure 1.

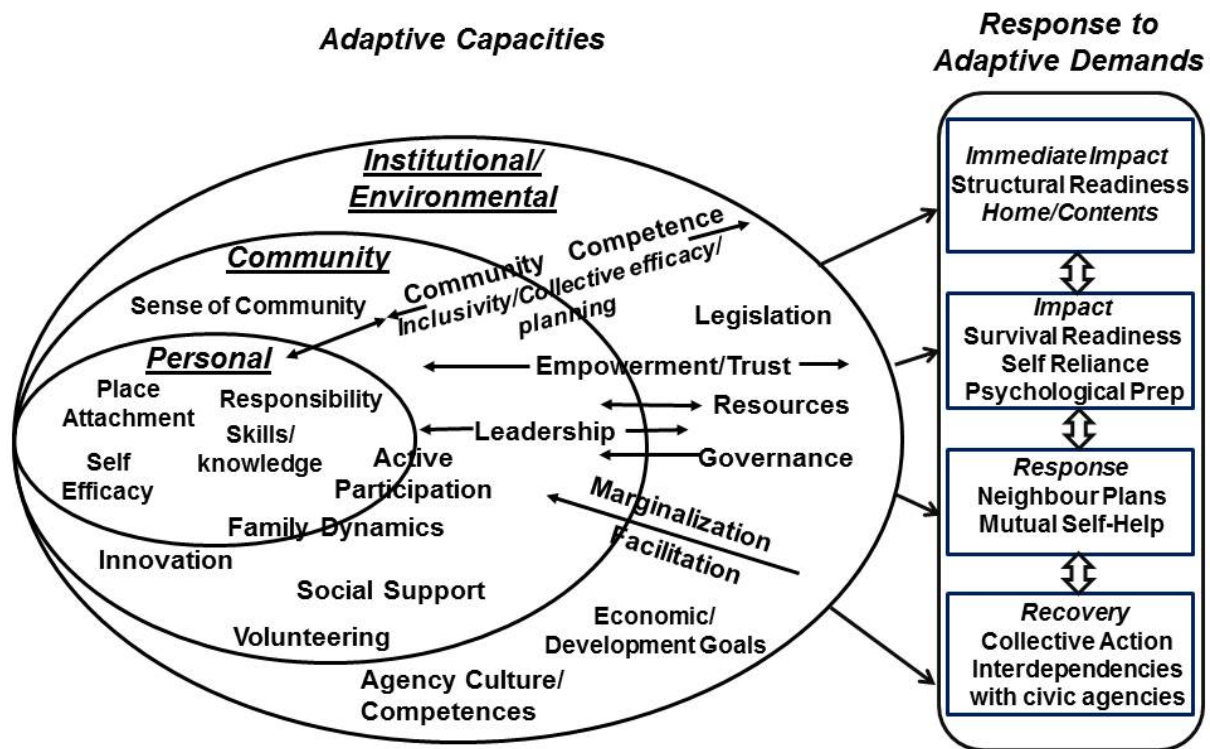


Figure 1 Summary of a) Responses to Adaptive Demands (over time), and b) the adaptive capacities and interdependencies at personal, community, cultural and Institutional/ environmental levels identified.

Conducting interviews with people as they navigated their way through a long and complex recovery made it possible to assess the challenges that people had to negotiate in disaster recovery. Interviewees all identified the important role that structural and survival readiness would play in increasing resilience for future events. Examining how physical, community and societal recovery challenges were dealt with by different groups identified how the adaptive capacities of people (e.g., self-efficacy, place attachment), communities (e.g., inclusivity, sense of community, collective efficacy) and government agencies and businesses (e.g., empowerment, trust) play interdependent roles in facilitating recovery and development in the aftermath of major disasters.

The adaptive capacities that influenced the effectiveness of people's responses to recovery demands are summarized in Figure 1 and provide some level of empirical corroboration of theoretical conceptualizations of resilience (e.g., Klein et al., 2003; Norris et al., 2008; Paton, 2008; Paton & Johnston, 2006; Pelling & High, 2005). The contents of Figure 1 depicts both the resources at person, community and societal levels identified as facilitating recovery, and constructs that play pivotal roles in linking or integrating levels of analysis to create a more holistic model of societal resilience. For example, it depicts 'community competence' and 'leadership' as constructs that help link communities to government agencies and businesses (Norris et al., 2008; Paton, 2008). The bi-directional arrows next to these constructs are used to indicate the influence of these constructs in both mobilizing community activity and linking community to societal-level resources. The constructs of 'empowerment' and 'trust' are also linking concepts, but ones that act in ways that link societal agencies with communities. All four of these constructs thus play complementary roles in resilience, with the former contributing to empowered communities and the latter to creating empowering settings. The concepts of facilitation and marginalization are depicted with a uni-directional arrow, signifying that their current mode of operation is top-down. Governance is depicted in the same way. It was suggested, however that both concepts could enhance recovery by

conceptualizing governance and agency and business relationships as occurring within an empowerment framework. This conceptualization remains tentative until more work is conducted. The contents of Figure 1 could be used to formulate research questions and hypotheses to further empirical research into resilience and provide the foundation for generalising the findings of this work to other communities in New Zealand.

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