Engaging communities in earthquake risk reduction: lessons from the 2010-2011 Canterbury earthquakes

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ABSTRACT: In 2015, three major international disaster-resilience and sustainability instruments will be coalesced: 1) the Sendai Framework for Disaster Risk Reduction 2015-2030 on building resilience to disasters; 2) the Sustainable Development Goals; and 3) the 2015 climate agreement under the UN Framework Convention on Climate Change. Lessons from the Canterbury earthquakes have shown that building resilience in a community can be considered in a range of contexts. First, providing a safe physical environment through good building design and land-use planning is of fundamental importance. Secondly, providing information about hazards, their impacts and self-protective actions that can be taken to reduce risk, is vital in encouraging public preparedness and in reducing social and physical impacts. Thirdly, resilience should also be considered in a wider context, where other factors such as community development, engagement and participation play an important role in building adaptive capacity to disasters. We should ensure that factors beyond knowledge and understanding are incorporated into educational programmes. Individuals first need to become motivated to confront the hazardous aspects of their environment, and then form intentions to actually make preparations. It is important to understand the beliefs and attitudes that underpin people's responses to risk so that intervention strategies can be targeted to enhance motivation and intentions, and address any misunderstandings that may be present. The design of earthquake risk reduction policy and practice should be integrated with wider community development initiatives and will be more effective than standalone programmes. There is now unprecedented opportunity for the New Zealand science community to align, harmonize and integrate their research with global efforts to provide the evidence-base for improved policy and practice, and learn from our own experience from the Canterbury earthquakes.

1 INTRODUCTION

In 2015, three major international disaster resilience and sustainability instruments will be coalesced: 1) the Sendai Framework for Disaster Risk Reduction 2015-2030 on building resilience to disasters; 2) the Sustainable Development Goals; and 3) the 2015 climate agreement under the UN Framework Convention on Climate Change. These events present an unprecedented opportunity for the New Zealand science community to align, harmonize and integrate their research with global efforts to provide the evidence-base for improved policy and practice in Disaster Risk Reduction. The governments of the world, including New Zealand, came to Sendai, Japan in March 2015 to take stock of the achievements and shortcomings of the Hyogo Framework for Action, and seek to put in place a successor strategy to serve the world's needs for the coming decade and beyond. Also in 2015 a number of New Zealand agencies and organisations are taking stock of lessons from the 2010-2011 Canterbury earthquakes. This paper outlines some of these key lessons from Canterbury which can feed into global efforts to improve resilience and sustainability outcomes.

2 KEY LEARNINGS FROM THE CANTERBURY EARTHQUAKE

Analysis of research to-date highlights three areas for priority action: 1) providing a safe physical environment through good building design and land-use planning; 2) providing information about hazards, their impacts and self-protective actions and 3) consideration of resilience in a wider context.

1) Providing a safe physical environment through good building design and land-use planning

Providing a safe physical environment through good building design and land-use planning is of fundamental importance and has been highlighted following the Royal Commission of Enquiry and a number of reviews of land-use planning (St Clair and McMahon 2011). The Natural Hazards Research Platform identified a set major lesson learned (Leonard 2015) from Christchurch as:

1. Land use planning is important to limit unacceptable economic losses.
2. A solution must be found to manage earthquake prone building risk.
3. Better communication is needed to explain building codes.
4. Improved communication in terms of risk not hazard is needed.
5. Engineers and scientists should talk to the public in terms of possible impacts, not the word "safe", and not earthquake magnitudes.
6. The Building Code is for life safety but a city's future depends on functionality – how do we achieve this in the code or city planning process?

2) Providing information about hazards, their impacts and self-protective actions

Research following the Canterbury earthquakes has also highlighted the need ensure that factors beyond knowledge and understanding are incorporated into educational programmes (McClure et al. 2014). Individuals first need to become motivated to confront the hazardous aspects of their environment, and then form intentions to actually make preparations. It is important to understand the beliefs and attitudes that underpin people's responses to risk so that intervention strategies can be targeted to enhance motivation and intentions, and address any misunderstandings that may be present (Eiser et al. 2012).

3) Consideration of resilience in a wider context

The Christchurch earthquakes have provided an opportunity to identify readiness measures based on survivor's views on what was required or would need to be developed to assist people and communities to cope, adapt and recover with future earthquakes (Paton et al. in press). The Canterbury research clearly shows the importance of considering resilience in a wider context, where other factors such as community development, engagement and participation play an important role in building adaptive capacity to disasters (Paton et al. 2014). Disasters impact on people and communities, interrupt normal societal functions, render essential infrastructure temporarily unusable, and disrupt business activity and employment for periods of months to years (Alcántara-Ayala et al. 2015). Strategies developed to facilitate recovery tend to address the associated psychological, social, economic and infrastructure issues separately. However, analyses of events such as the 2011 Christchurch earthquake have identified a need for a more comprehensive approach to conceptualizing disaster recovery (Paton et al. 2014).

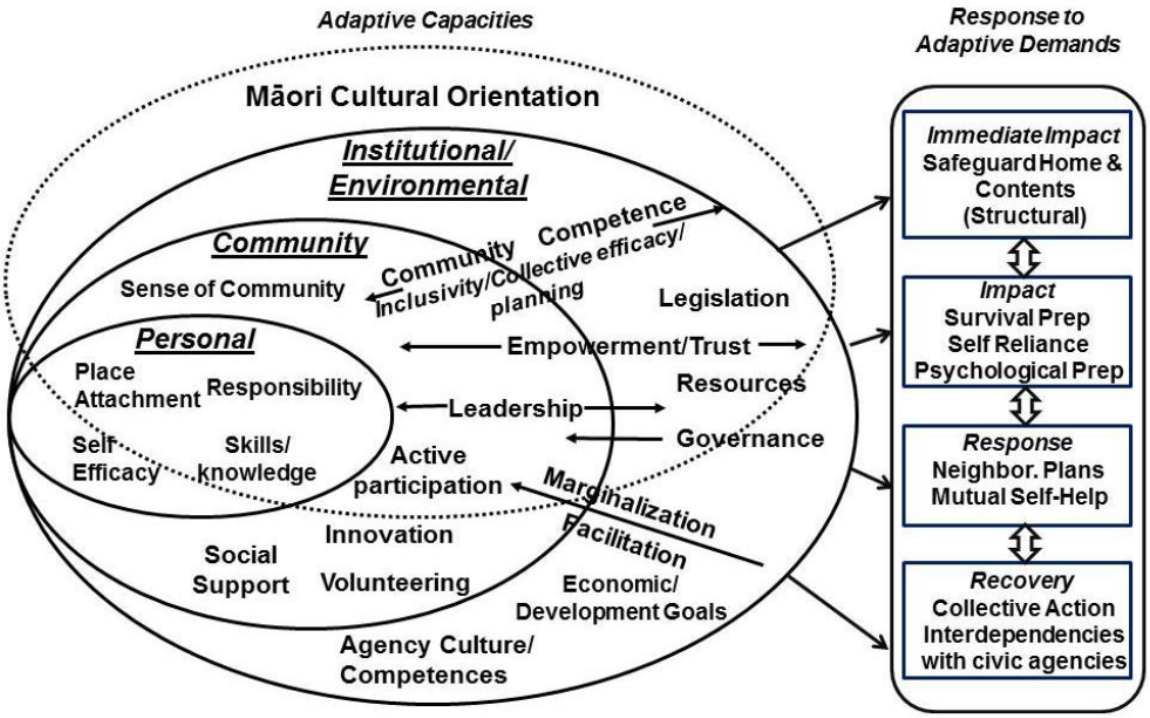

Figure 1. A model of community resilience, showing the context and factors important for developing resilience, and the interactions between different factors (Paton et al. 2014).

The Canterbury earthquakes have shown that there is much inherent strength within communities and this can and should be harnessed to improve resilience. The active involvement of formal and informal community networks in hazard education and other mitigation activities has been shown to be a key predictor of preparedness and resilience. Given the prolonged nature of the recovery, and the diverse issues (e.g. confronting hazard effects, coping with relocation, dealing with insurance companies etc.), people face, the effectiveness of community recovery initiatives can be enhanced using a strengths-based strategy to facilitate the development of enduring self-help capabilities. A key component of the Canterbury recovery strategy focussed on identifying and mobilizing, (and, if required, developing) existing community competencies and processes and assisting people to apply them in the challenging circumstances of the recovery environment (Alcántara-Ayala et al. 2015). The objective is to facilitate people's ability to make sense of their experience and reframe it in meaningful ways using a community-based approach.

3 FUTURE DIRECTIONS

A two day workshop on disaster risk communication, hosted by King's College London, Humanitarian Futures and Global Network for Disaster Reduction in London in May 2013 (http://www.irdrinternational.org/wp-content/uploads/2013/04/RIA-Workshop-Report_May-16-17-2013.pdf) identified a set of key issues to be considered. Five New Zealand researchers added input from a Canterbury earthquake perspective.

1. Using trusted local institutions for risk communication, even when new roles are required.
2. Impactful science communication is built on an awareness of local values and context.
3. Science actors need to understand how decisions are made locally so that new information can be effectively targeted.
4. Building on local capacity to facilitate local reflexivity and learning can include peer to peer knowledge transfer.
5. Be honest in communicating what science does not know.

The workshop concluded that capacity building is required for researchers and scientists seeking to engage or partner with local communities. Underpinning this is a need to develop guidelines and share existing lessons on knowledge exchange. This is a core component of a paradigm shift involving breaking down the distinction between the process of knowledge production and policymaking/implementation.

On 18 March 2015 representatives from 187 UN member States adopted a new framework for disaster risk reduction with seven targets and four priorities for action. Known as the Sendai Framework for Disaster Risk Reduction 2015-2030, the framework outlines seven global targets to be achieved over the next 15 years: a substantial reduction in global disaster mortality; a substantial reduction in numbers of affected people; a reduction in economic losses in relation to global GDP; substantial reduction in disaster damage to critical infrastructure and disruption of basic services, including health and education facilities; an increase in the number of countries with national and local disaster risk reduction strategies by 2020; enhanced international cooperation; and increased access to multi-hazard early warning systems and disaster risk information and assessments (http://www.wcdrr.org/uploads/Sendai_Framework_for_Disaster_Risk_Reduction_2015-2030.pdf).

There is now unprecedented opportunity for the New Zealand science community to align, harmonize and integrate their research with global efforts to provide the evidence-base for improved policy and practice across the 4 Rs (of reduction, readiness, response and recovery) and learn from our own experience from the Canterbury earthquakes.

4 **REFERENCE**

Alcántara-Ayala, I., Altan, O., Baker, D., Briceño, S., Cutter, S., Gupta, H., Holloway, A., Ismail-Zadeh, A., Jiménez Díaz, V., Johnston. D., McBean, G., Ogawa, Y., Paton, D., Porio, E., Silbereisen, R., Takeuchi, K., Valsecchi, G., Vogel, C., Wu, G., Zhai, P. (2015). Disaster Risks Research and Assessment to Promote Risk Reduction and Management. ICSU-ISSC Ad-hoc Group on Disaster Risk Assessment. March 12, 2015.

Eiser, J. R., Bostrom, A., Burton, I., Johnston, D. M., McClure, J., Paton, D; van der Pligt, J., White, M. P. (2012). Risk Interpretation and Action: A Conceptual Framework for Responses to Natural Hazards. International Journal of Disaster Risk Reduction 1:5-16. DOI: http://dx.doi.org/10.1016/j.ijdrr.2012.05.002.

Leonard, G. 2015. Recent volcanic and earthquake hazard and risk activities at GNS Science, New Zealand, and the Cities and Volcanoes Commission of IAVCEI. Proceedings of the 2015 International Workshop on Earthquake and Volcanic Hazards and Risks in Asia-Pacific Region, March 16th-17th, 2015, Sendai, Japan.

McClure, J., Wills, C., Johnston, D., Recker, C. (2011). How the 2010 Canterbury (Darfield) earthquake affected earthquake risk perception: Comparing citizens inside and outside the earthquake region. Australasian Journal of Disaster and Trauma Studies, 2011-2, 3-10.

Paton, D., Johnston, D., Mamula-Seadon, L., Kenney, C. M. (2014). Recovery and Development: Perspectives from New Zealand and Australia. In N. Kapucu & K. T. Liou (Eds.), Disaster and development: Examining global issues and cases (pp. 255-272). New York, NY: Springer.

Paton, D., Anderson, E., Becker, J., Petersen, J. (in press). Developing a comprehensive model of hazard preparedness: Lessons from the Christchurch earthquake. International Journal of Disaster Risk Reduction.

St. Clair, Mark, and David McMahon. 2011. “Consideration of Liquefaction and Lateral Spreading Hazards in the Zoning and Development of: Part A: The Eastern Suburbs of Christchurch from 1977 to 22 Feb 2011 Part B: Brooklands, Kaiapoi and Kairaki/The Pines from 1977 to 4 Sept 2010”. Canterbury Fact Finding Project. Hill Young Cooper Ltd and Resource Management Group Ltd.