

Paper:

Working Together, Building Capacity – A Case Study of Civil Defence Emergency Management in New Zealand

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New Zealanders are exposed to multiple natural hazards. The country has experienced major disasters in the past, but recent decades have been relatively uneventful.² This paper reviews the New Zealand approach to civil defence emergency management (CDEM), as introduced by the Civil Defence Emergency Management Act 2002 (the CDEM Act). The approach promotes co-operative planning and sustainable management of hazard risks through the “4Rs” – reduction (of risks), readiness, response and recovery. It recognises the central government’s roles of national coordination, and emphasises the responsibilities of regional CDEM Groups, local government and communities for managing local hazard risks. The paper reviews various initiatives to illustrate that capacity building is a collective effort requiring active involvement across central and local government, non-governmental agencies, communities and all individuals. New Zealand’s preparedness is examined from several perspectives, including: the level of public preparedness, lessons learned from real emergencies, a national exercise programme, and a monitoring and evaluation programme. The paper concludes that New Zealanders are making progress but difficulties remain in persuading all parties to work towards the vision of a “Resilient New Zealand.”

Keywords: New Zealand emergency management, civil defence emergency management, capacity building

1. Introduction

New Zealand is an island nation consisting of two principal islands (North and South) that lie across the boundary of the Australian and Pacific tectonic plates in the South Pacific Ocean. A population of 4.3 million spreads

across a land area of nearly 270,000 km², similar to the size of the United Kingdom. Many communities and a lot of infrastructure are located in areas that are likely to be affected by natural hazards, including earthquakes, landslides, volcanic eruptions, tsunamis, a variety of extreme weather events, and floods. For example, Auckland – the country’s commercial centre and home to one-third of the total population – has been built on a dormant volcanic field. A reawakening and eruption of the volcanic field would have devastating impacts on the nation. The capital city, Wellington, and many communities in the South Island are situated close to major active faults, some of which have produced large earthquakes since European settlement 150 years ago.³ Other regions are exposed to varying levels of hazards. Despite the exposure, New Zealand is fortunate to have been spared from major disasters for several decades,⁴ with floods and landslides dominating the losses to properties and infrastructure [1–3].

New Zealand’s political system is based on the Westminster system, with a single House of Representatives. The governmental system has two tiers – central and local government. Local government consists of 12 regional councils and 73 territorial authorities (city or district councils), which are collectively called “local authorities.”⁵ Over the last 25 years New Zealand’s governmental system has undergone systematic decentralisation and devolution, as a result of nationwide reforms in economic policy and public sector management systems [4, 5]. Local government was restructured and the number of local authorities was significantly reduced. Government-owned lifeline utilities were privatised or corporatised, resulting in a greater number of operators both in the public and private sectors.⁶ The Government has no direct control

1. The views expressed in this paper do not represent the New Zealand Government’s official views.
2. This paper was submitted before the magnitude 7.1 earthquake that struck the Canterbury region of the South Island of New Zealand (where the second largest city Christchurch is located) on 4 September 2010. Fortunately, no deaths and only a few serious injuries were reported as a result of the earthquake. The impact on buildings, infrastructure and economy, and psychosocial effects are being assessed as the paper is being finalised. However, the event is set to become the most costly disaster so far in New Zealand history. It will also be the most significant real test for many years of New Zealand’s emergency management arrangements, but it is too soon for an assessment in this paper of their effectiveness.

3. The Wairarapa Fault, 30 km east of Wellington City, produced a large earthquake of approximate magnitude 8.2 in 1855, triggering landslides across 20,000 km² of land and generating tsunami up to 9 metres high.
4. New Zealand’s most recent natural disaster that caused significant casualties was a magnitude 7.8 earthquake in 1931 in Hawke’s Bay (256 deaths recorded), and the most costly natural disaster was a magnitude 6.3 earthquake in 1987 in Edgcomb.
5. Regional Councils are responsible for managing broad-spectrum issues for their regions, such as water resource management, regional transport planning, and river management and flood control. Territorial authorities deal with day-to-day issues for their local community, such as building control, resource management, and community services. Four of the territorial authorities also have the functions of regional councils and are called “unitary authorities” (<http://www.lgnz.co.nz/lg-sector/>).
6. Lifeline utilities are entities that provide infrastructure services to the community, including water, wastewater, transport, energy, and telecommunications.



over private operators and now has fewer resources directly under its command with which to respond to, or recover from, an emergency. These changes created opportunities for, as well as challenges to, emergency management.

The Resource Management Act 1991, the CDEM Act 2002, and the Building Act 2004 make up the key legislation influencing and promoting integrated management for environment and hazard risks [1].⁷ The Resource Management Act promotes sustainable management of resources, specifying that both regional councils and territorial authorities have responsibilities to avoid or mitigate natural hazards [6]. The CDEM Act provides for the delivery of emergency management through devolved accountability. It specifies the roles and responsibilities of the central government, local government, and lifeline utilities [7]. The Building Act requires consideration of the nature of the land on which a building is to be built, and its exposure to earthquake, wind and snow loading, as these influence the building's structural requirements [8]. Several other Acts address other specific aspects of hazard risk management. For example, the Local Government Act 2002 requires every local authority to have a 10-year "long-term council community plan" that describes the activities of the council (including hazard risk management), provides for integrated decision-making and co-ordination of the resources of the council, and provides an opportunity for participation by the public in decision-making on activities to be undertaken by the council [9]. There is no equivalent comprehensive planning process at the central government level, although public budgets are developed within a medium-term expenditure framework and longer-term fiscal objectives. The Earthquake Commission Act 1993 sets out the arrangements for a national natural disaster insurance scheme for residential properties, with provisions for research and public education to improve community resilience [10].⁸

This paper discusses the overarching CDEM framework (**Fig. 1**), comprising the CDEM Act, the National CDEM Strategy that establishes the vision of a "Resilient New Zealand," which is defined as "communities understanding and managing their hazards" [11]; the National CDEM Plan that aims to integrate and align agencies' CDEM planning and related operational activities at the national level [12]; and the Guide to the National CDEM Plan that sets out the high-level operational arrangements of core CDEM organisations in the public and private sectors [13].⁹ The paper summarises local and national arrangements for managing hazard risks, reviews various capacity building initiatives by governmental and non-

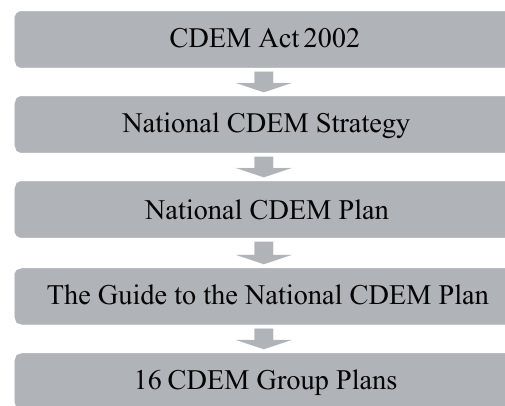


Fig. 1. Civil Defence Emergency Management framework.

governmental organisations, and concludes with an examination of New Zealand's preparedness.

2. Arrangements for Emergency Management

New Zealand's emergency management system had traditionally been based on command-and-control, response-oriented arrangements [14, 15]. The "hazard-specific" approach almost exclusively focused on getting ready for disasters before they happened and responding to them when they occurred. There was insufficient linkage, for example, between land-use planning and risk management, and no consistent approach to preparing for and responding to different types of hazards. The contemporary approach advocates collaboration and co-ordination, aiming to address all hazard risks through the "4Rs" – reduction, readiness, response, and recovery.¹⁰ It recognises that not all hazard risks can be reduced to zero; however, their impacts can be reduced through the process of risk reduction, pre-event planning, effective response arrangements, and a better recovery process that also reduces the impact of future disasters.

2.1. Local Arrangements

Local communities are the first responders to their local emergencies. New Zealand's geographic features, the nature of the transport network, and the distribution of population mean that many communities – including the capital – can be isolated by an emergency for a period of time. The New Zealand approach has therefore emphasised the responsibilities and capacity building needed at the local, community, and individual levels. The "bottom-up" approach aims to build a resilient and safer New Zealand with communities understanding and managing their own hazards [11].

The formation of regionally-based CDEM Groups was a major innovation of the CDEM Act (**Fig. 2**). The Act requires every regional council and territorial authority to be a member of a CDEM Group that is governed by a joint

7. "Risk" is defined as a combination of exposure and community vulnerability to a hazard. A hazard may pose many risks such as death, injury, property damage, and social, economic and environmental consequences.

8. In this paper, the term "resilience" is used to describe the ability to prevent or lessen the impact of an emergency, to withstand and to recover from the impact. This includes the resilience of the built and social environments, and the economy.

9. The National CDEM Plan came into force in July 2006, and is currently under review. The Guide to the National CDEM Plan first became operational in July 2006 in conjunction with the Plan, and has been revised twice to update information and reflect changes in arrangements.

10. The 4Rs are similar to "PPRR" – preparedness, prevention, response, and recovery – used in some other countries.

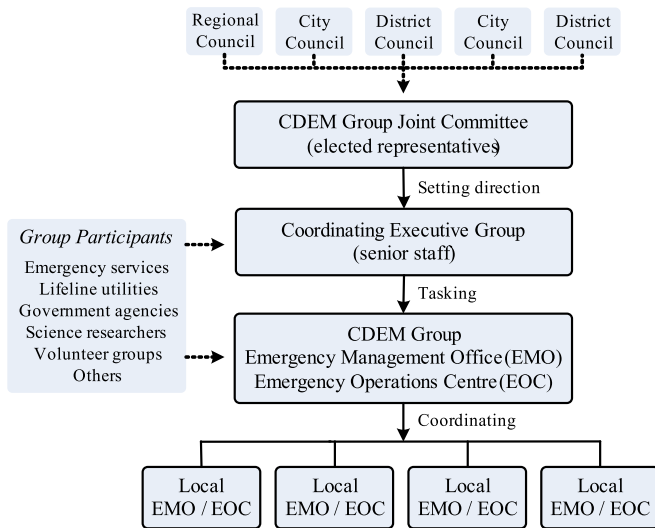


Fig. 2. Civil Defence Emergency Management Group structure (Source: Adapted from Figure 5.2 of the Guide to the National CDEM Plan).

committee consisting of one representative (mayor or an elected councillor) from each member council. There are currently 16 CDEM Groups in the country, based on the boundaries of regional councils.¹¹ These Groups and their constituent local authorities are primarily responsible for assessing and managing local hazard risks, consulting and communicating about risk management with their community, responding to and managing the adverse effects of emergencies in their area, developing and implementing a CDEM Group Plan that is to be reviewed every five years, and, when requested, assisting other Groups in the implementation of civil defence emergency management in their areas. CDEM Group Plans must include identification of the hazards and risks to be managed by the Group, and the arrangements and resources necessary to manage those risks [16].

The CDEM Act requires every CDEM Group to establish and maintain a Coordinating Executive Group that provides advice to the CDEM Group joint committee, and oversees the development, implementation, and evaluation of the CDEM Group Plan. A Coordinating Executive Group consists of the chief executive officer or delegate of each member local authority, a senior police employee, a senior member of the New Zealand Fire Service, the chief executive officer or delegate of the hospital and health services operating in the area, and any other persons that may be co-opted by the CDEM Group (such as representatives from welfare and lifeline utilities). Hence the CDEM Groups provide a platform for local authorities to work together with other governmental and non-governmental agencies to address local vulnerabilities and

enhance their emergency response and recovery capacities, as illustrated in the welfare and lifelines subsections below.

Funding for local risk reduction, readiness, response, and recovery activities comes from a local property-based rating system. Government funding (from the general income tax) is limited. It aims to provide the minimum level of assistance required to restore community capacity for self-help, and to provide the most appropriate long-term solutions [12]. If a significant and coordinated response is required for an emergency, a state of local emergency may be declared under the CDEM Act, allowing access to emergency powers such as evacuation, requisition, closing roads and public access, and directing agencies or individuals to undertake certain actions. But a declaration does not affect eligibility for financial support from the central government. Many effective responses to small and medium-scale events do not necessitate a declaration of a state of emergency, given good planning beforehand. CDEM Groups and local authorities are therefore encouraged to take a proactive approach to managing their local hazard risks.

2.2. National Arrangements

At the national level, the System of Domestic and External Security Coordination is the mechanism for managing all national crises (Fig. 3). Under this system, the central decision-making body of the executive government is the Cabinet Committee on Domestic and External Security Coordination chaired by the Prime Minister. This committee consists of Ministers responsible for departments that play essential roles in managing national crises, including portfolios related to biosecurity, civil defence emergency management, defence, foreign affairs, health, intelligence and security, and police [17]. The Cabinet Committee is supported by an officials' committee comprising chief executives from government agencies relevant to those portfolios. The officials' committee coordinates efforts and sets direction for agencies involved.

The lead agency for managing a national crisis will vary, depending on the type of emergency event. For example, the Ministry of Civil Defence and Emergency Management (which is part of the Department of Internal Affairs) is the lead agency for responding to a civil defence emergency. The Ministry of Health is the lead for a response to a pandemic, and the Ministry of Agriculture and Forestry is the lead for biosecurity risks. For all emergency responses, the Ministry of Civil Defence and Emergency Management plays a role in supporting the lead agency. The National Crisis Management Centre may be activated to monitor the development of an emergency, to engage with or assist affected CDEM Groups and local authorities, or to manage a significant emergency by controlling and coordinating the overall response [12, 13]. If the impact of a natural disaster requires a response beyond the resources of the affected CDEM Groups, a state of national emergency may be declared under the CDEM Act.

11. The boundaries of CDEM Groups are not fully consistent with the boundaries of regional councils. The population and land area covered in each CDEM Group vary widely. Three of the Groups comprise only one local authority, while other Groups have up to 11 local authority members (http://www.civildefence.govt.nz/memwebsite.nsf/wpg_URL/For-the-CDEM-Sector-CDEM-Groups-Index?OpenDocument).

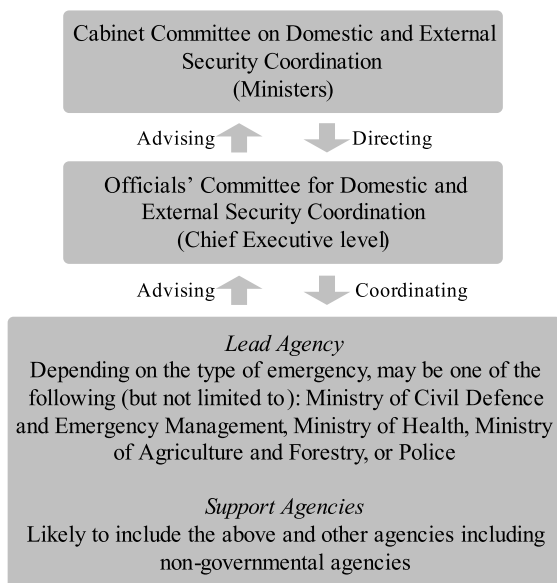


Fig. 3. System of Domestic and External Security Coordination (Source: Adapted from Figure 3.1 of the Guide to the National CDEM Plan).

Government assistance to businesses affected by emergencies is primarily directed towards the individuals within a business, not the business itself, as the Government does not underwrite business risk. Individual businesses are responsible for their own business continuity planning [13]. For the rural sector that represents a significant part of New Zealand's economy, individuals and communities remain primarily responsible for their response to and recovery from adverse climatic events and natural disasters. The Ministry of Agriculture and Forestry has programmes in place to help farming communities recover from adverse events should the scale of an event exceed the community's capacity to cope.

3. Capacity Building Initiatives

Capacity building has included initiatives to increase national and local understanding of hazard risks, to help develop local government's capability for emergency management, to raise public awareness and individual preparedness for disasters, to better coordinate the delivery of welfare during and after an emergency, to explore ways for enhancing infrastructure resilience, and to provide a "safety net" by maintaining an affordable national insurance scheme for residential properties. These initiatives are discussed below to illustrate New Zealand's collaborative approach to capacity building that requires a collective effort from central and local government, non-governmental agencies, communities and individuals.

3.1. Connecting Hazard Risk Research and Resilience

Recognising existing hazards is the first step towards managing risks. Increased understanding of hazard risks

helps emergency managers and decision-makers identify and reduce community vulnerabilities over time. In New Zealand there has been increasing emphasis on collaboration between research agencies and across central and local government, and on linking researchers with the needs of end-users so that risk reduction, readiness, response and recovery can reflect research findings.

A major research facility that contributes to this work is the national hazard monitoring network – "GeoNet." It gathers fundamental geophysical data on earthquakes, volcanoes, landslides, and tsunami with the coverage and resolution necessary for modern research.¹² It is largely funded by the Earthquake Commission and Land Information New Zealand, and operated by the Institute of Geological and Nuclear Sciences (a Crown research institute).¹³ The high degree of near real-time system automation enables the delivery of rapid alerts and, in certain circumstances, warnings, for example, to evaluate the likelihood of tsunami generated by earthquakes offshore or to support forecasting of volcanic ash plume risks to aviation [18]. The investment in GeoNet and related research has benefited organisations with interests in geological science, emergency management, and the underwriting of insurance risk in New Zealand [19]. GeoNet has also played a role in raising public awareness of geological hazards following established precedents in North America.¹⁴ The GeoNet website enables members of the public to provide "felt reports" and increasing numbers of people are contributing.¹⁵

A Memorandum of Understanding between the Institute of Geological and Nuclear Sciences and the Ministry of Civil Defence and Emergency Management formalises the arrangements for the Institute to provide scientific advice to the Ministry during "business as usual" and emergency responses for tsunami, volcanic eruptions, earthquakes, and landslides [20]. It identifies the capabilities and services that, using the outputs of GeoNet and other capabilities of the Institute, can enhance emergency management. These arrangements have been tested several times recently, and proved effective, during responses to the tsunami generated by large earthquakes in Samoa (September 2009), Vanuatu (October 2009 and May 2010), and Chile (February 2010) [21].

Several multi-year, multi-agency research projects are underway to help address some of New Zealand's largest hazard risks. The project "It's Our Fault" was launched in 2006 by the Earthquake Commission and the Acci-

12. GeoNet geophysical network maps can be viewed from <http://www.geonet.org.nz/resources/network/netmap.html>.

13. The Earthquake Commission is New Zealand's primary provider of natural hazard insurance to residential property owners (<http://www.eqc.govt.nz>). Land Information New Zealand is a government department responsible for land titles and survey systems, topographic and hydrographic information, and managing Crown property (<http://www.linz.govt.nz>).

14. "Did You Feel It?" by the United States Geological Survey (<http://earthquake.usgs.gov/earthquakes/dyfi/>).

15. "Felt reports" allow members of the public to describe the recent earthquakes they felt, where they were and what happened. The information, quantified using the New Zealand Modified Mercalli Intensity (MMI) scale, is used together with instrumental records to make "shaking maps." These maps show the geographic distribution of shaking intensity and contribute to an understanding of how that area might respond in a future earthquake (<http://www.geonet.org.nz/earthquake/>).

dent Compensation Corporation.¹⁶ Led by the Institute of Geological and Nuclear Sciences, the project aims to improve knowledge of the frequency, size and impacts of earthquakes in the Wellington region [22]. Based on its success, a comparable programme was launched in 2008 to determine volcanic risk in Auckland. These projects have received additional sponsorship from the respective city and regional councils, and the Foundation for Research Science and Technology.¹⁷ The information gathered will facilitate more accurate hazard risk estimates, help the respective communities determine more effective risk reduction, and facilitate a faster response and recovery from a damaging earthquake or volcanic eruption.

In 2009, natural hazards research was chosen by the New Zealand Government as a pilot for a new way of allocating public research funding. The Natural Hazards Research Platform was established, with the National CDEM Strategy providing direction for research investment. Responsibility for setting the research strategy and objectives is devolved to the research institutions themselves, comprising a group of government research organisations, universities and private consulting firms. The platform aims to provide for long-term and complex research projects, to enhance collaboration between research organisations across different disciplines, and to focus on linking researchers with end-users such as engineering consultancies and emergency management organisations at both local and national levels. The platform's operation is still at an early stage, and its performance will be reviewed after four years.

3.2. Government Supporting Local Capability Development

A wide range of initiatives by the Ministry of Civil Defence and Emergency Management provides guidance and support to regional CDEM Groups and local authorities, assisting them to fulfil their statutory responsibilities for emergency management. These initiatives include publishing guidelines and best practice guides, using regionally-based advisors to provide the linkage between central and local government, deploying a new emergency management information system, and establishing a competency framework and role maps for core emergency management roles. Since 2001 the Ministry has conducted an annual survey of stakeholder's perceptions of its performance. The survey results have shown that stakeholders (including government agencies and CDEM Groups) have a positive view of the work undertaken by the Ministry, and that there is increasing demand for support from, and engagement with, the Ministry [23].

3.2.1. Guidelines

Since the introduction of the CDEM Act, the Ministry has published more than ten guidelines and technical standards.¹⁸ These documents provide guidance and assistance to CDEM Groups and their local authority members on how a function defined by legislation or national planning arrangements should be performed. They describe the desirable approaches and outcomes, and require CDEM Groups to take a generally consistent approach and perform at a certain standard. All guidelines are prepared in consultation with CDEM Groups, reflecting the principles of collaboration and coordination. Working groups, comprising the Ministry and representatives from all or representative CDEM Groups, are formed to share ideas, identify common issues, and develop a collective strategy or programme. Additionally, several best practice guides, supporting plans, and other information documents have been produced in partnership with other governmental and non-governmental agencies to provide information and current best practice examples of a range of CDEM tasks.

The value of these guidelines and information documents is recognised by the CDEM sector and beyond. However, it has also been suggested that CDEM Groups and local authorities could be overwhelmed by too many guidelines. There are challenges in embedding the "text-book" information into what the practitioners do. The Ministry is addressing this by taking different approaches to disseminating information, and providing more assistance to CDEM Groups when applying the guidelines to local planning activities.

3.2.2. Regional Emergency Management Advisors

Three teams of regionally-based emergency management advisors have been established by the Ministry for the northern, central, and southern parts of the country. These regional advisors provide a linkage between central and local government, and between different CDEM Groups and local authorities, during "business as usual" as well as during an emergency. The regional advisor is usually a non-voting member of the CDEM Group Coordinating Executive Group, and provides advice and assistance to CDEM Groups by participating in the Groups' strategic planning meetings, disseminating key messages from the central government, facilitating information and knowledge sharing, advocating best practice, and requesting additional support from the central government for CDEM Groups when needed.

16. The Accident Compensation Corporation is a government organisation that provides comprehensive, no-fault personal injury cover for all New Zealand residents and visitors to New Zealand (<http://www.acc.co.nz>).

17. Subject to enactment of new legislation currently being considered by the New Zealand Government, from 1 February 2010 a new Ministry of Science and Innovation will replace the Foundation for Research Science and Technology and the Ministry of Research Science and Technology. The new Ministry will manage Government funding for science research and advise the Government on New Zealand's science system.

18. The Ministry has published guidelines on the formation of CDEM Groups, developing a CDEM Group Plan, response management, lifeline utilities and emergency management, declarations of a state of emergency, mass evacuation planning, recovery management, tsunami evacuation zones, CDEM Group Plan review, CDEM exercises, and welfare in an emergency; and national technical standards for tsunami signage, and the CDEM competency framework. All these publications are freely available from the Ministry's website (http://www.civildefence.govt.nz/memwebsite.nsf/wpg_URL/For-the-CDEM-Sector-Publications-Index?OpenDocument).

3.2.3. Emergency Management Information System

The need for an integrated information system has long been identified as a weakness for CDEM in New Zealand [24, 25]. A major initiative to enhance information sharing and decision-making is the deployment of a new emergency management information system for the Ministry, all CDEM Groups and local authorities. The new web-based system is scheduled to go live in October 2010 and will help provide a “common operating picture” about the impact of a disaster, and how resources have been or will be deployed across different local authorities, CDEM Groups and government agencies. The new system will be particularly valuable for managing the response to, and recovery from, a larger-scale emergency.

3.2.4. CDEM Competency Framework

The CDEM competency framework, launched in 2009, outlines the eight key areas of competencies required to perform CDEM functions effectively: leadership, relationship management, information management, risk management, planning, implementation, communication, and capability development. Each key area is represented by a number of *competencies*, and each competency is described by a set of *indicators* [26]. The framework aims to promote professionalism in emergency management, inform the development of career pathways, identify development opportunities, and assist with recruitment and retention of staff. In addition to the strategic framework, role maps that provide a complete picture of the skills, knowledge and attributes required to be effective in a specific role have been produced.¹⁹ A toolkit was developed to assist CDEM Groups to apply the competency framework and role maps to develop job profiles, training material, and interview questions. The competency framework has been progressively adopted by CDEM Groups and local authorities. Education institutes that provide CDEM professional development are encouraged to apply the framework to developing their training courses.

3.3. Public Education Campaign

Public education is fundamental to raising public awareness and preparedness for emergencies. The Ministry of Civil Defence and Emergency Management is responsible for the national *Get Ready Get Thru* campaign [27], which follows the theme that if people are better prepared before a disaster strikes (get ready) they are more likely to withstand the impacts and recover from the disaster (get through).²⁰ The campaign focuses on promoting individual responsibility for being aware of

the hazard risks one may face and taking actions to prepare for emergencies, such as having emergency kits and household emergency plans.

A National Public Education Reference Group, chaired by the Ministry and consisting of representatives from all 16 CDEM Groups, shares ideas and initiatives, integrates national and regional public education activities, and develops the long-term strategy for the public education programme. Members of the group also take responsibility for liaison and communication about public education initiatives within their Groups. The CDEM Groups and local authorities that are better resourced and have stronger leadership are more likely to be actively raising public awareness and preparedness, including recruiting CDEM volunteers, establishing appropriate public alerting mechanisms, and preparing community response and evacuation plans.

The Ministry has produced a range of generic resources that can be easily adapted by CDEM Groups and local authorities. The *Get Ready Get Thru* campaign includes a dedicated website that provides information and advice on what to do to be better prepared [28]. All information on the English-based website is translated into seven other languages, recognising the cultural diversity of the New Zealand community. The campaign also includes mass media advertising and the *What's the Plan Stan?* school resource that targets primary school students.²¹ It aims to provide students with the necessary knowledge and skills to act in a safe manner when disasters occur. It also aims to get the *Get Ready Get Thru* message into homes through children, as they are often the best channel for achieving social marketing objectives. The resource has proved popular and there have been several stories of survival attributed to what the children learned from *What's the Plan Stan?* at school.²²

A resource aimed at helping the deaf and hearing impaired community with emergency preparedness was launched in August 2010. It includes a series of videos with information on how to prepare for emergencies. The information is provided in New Zealand Sign Language and is also captioned for those who do not use sign language. It encourages those with significant hearing impairment to plan ahead for their specific requirements in an emergency, such as arranging for a support team to alert the hearing impaired person if there is a need to evacuate and assistance required.²³

19. These include role maps for Recovery Manager, Emergency Management Officer, Contoller, Welfare Manager, Lifeline Utility Coordinator, Public Information Manager, and CDEM Response Teams (http://www.civildefence.govt.nz/memwebsite.nsf/wpg_URL/For-the-CDEM-Sector-Professional-Development-CDEM-Competency-Framework?OpenDocument).

20. Several government agencies are involved in different aspects of public education for emergency preparedness, such as the Earthquake Commission's *EQ-IQ* campaign (<http://www.eq-iq.org.nz/>), and the New Zealand Fire Service's *Get Firewise* campaign (<http://firewise.fire.org.nz/>).

21. *What's the Plan Stan?* (English version) was first launched in 2006, with the Te Reo (Maori) version created in 2008. The resource was revised and re-launched in late 2009 to align with the new New Zealand Curriculum, which took effect at the beginning of 2010. The current resource package includes a handbook for teachers, a CD-ROM that contains stories, interactive games and research material, a story book, and a dedicated website (<http://www.whatstheplanstan.govt.nz>).

22. For example, children who had learned at school about the appropriate response to tsunami were holidaying with family in Samoa and knew exactly what to do, urging their families and others to run to high ground when the magnitude 8.0 earthquake struck near the coastline of the island country in September 2009.

23. Copies of the resource were distributed to all local authorities and many public libraries. The resource is promoted by not-for-profit organisations that advocate interest of the deaf community and those with a hearing impairment. The videos are available from Deaf Aotearoa website (<http://www.deaf.org.nz/videos/education>).

3.4. Welfare Provisions

Providing welfare for affected individuals is very important in an emergency. This includes meeting the basic needs of food, clothing, and shelter, and providing emotional support and counselling services. New Zealand has taken a “cluster” approach to welfare management in emergencies by encouraging organisations with similar objectives to work together. It recognises the need for coordinating the wide range of agencies that are involved in welfare delivery.

The National CDEM Plan provides for national co-ordination of governmental and non-governmental agencies responsible for housing, social development, education, health, emergency management, animal welfare, etc. There are requirements for pre-event continuity planning and welfare delivery during and after an emergency. A National Welfare Coordination Group is chaired by the Ministry of Social Development, and its roles are to liaise with all agencies providing welfare at the national level, monitor welfare provision against changing needs, coordinate the delivery of welfare, and liaise with the National Crisis Management Centre [12]. While this “cluster” approach is recognised as valuable, further work is required to clarify the functions of various agencies, and to ensure the required capacity and capability is in place.

At the CDEM Group level, a regional welfare advisory group is formed to coordinate welfare functions and liaise with the CDEM Group Emergency Operations Centre during an emergency [13]. A local welfare committee may be formed to coordinate welfare functions within a district and liaise with the local Emergency Operations Centre [29]. Some regional welfare advisory groups meet regularly, have detailed plans for emergency welfare management, and are represented on the CDEM Group Coordinating Executive Groups. Other groups have yet to clarify and establish the functional arrangements, such as the operational interface between a regional welfare advisory group, the CDEM Group Emergency Operations Centre, and the National Welfare Coordination Group. The CDEM Groups that are better resourced and those having experienced real events are more likely to have a functional welfare advisory group.

3.5. Lifeline Utilities

Lifeline utilities, which provide infrastructure services such as water and energy, are critical for meeting people’s basic needs and are vital components of the economy. The level of infrastructure resilience is a strong determinant of community resilience. The CDEM Act therefore requires every lifeline utility to ensure that they are able to “function to the fullest possible extent” – even though this may be at a reduced level – during and after an emergency [7].²⁴ Individual lifeline operators (whether publicly or privately owned) are primarily responsible for contingency planning. It is in their commercial interests

to ensure that the infrastructure could withstand disruption and recover to “business as usual” as soon as possible after an emergency strikes.

Over the last two decades, there has been significant development in New Zealand in addressing infrastructure resilience. The growth of lifeline engineering (introduced to New Zealand in 1989) and the formation of regional Engineering Lifelines Groups across the country provide a platform for lifeline operators to work with scientists, engineers, and emergency managers to identify and address interdependencies among lifelines and their vulnerabilities to regional-scale emergencies [30, 31]. Engineering lifelines groups have been established in every region of the country, all involving public and private operators (though participation is voluntary). The purpose of lifelines groups is to promote hazard risk awareness and activity over and above the risk management undertaken by the individual organisations. Regional lifelines projects have resulted in a number of improvements to infrastructure resilience, including enhancing resilience across different lifeline sectors by strengthening road bridges that carry services in addition to road traffic, such as water, power, gas, and telecommunications [32]. Most lifelines groups have informal relationships with CDEM Groups. Some are represented on the CDEM Group Coordinating Executive Groups and perform specific roles agreed to by the CDEM Groups.

A National Engineering Lifelines Committee, established in 1999, brings together major national utilities and governmental agencies with an interest in promoting infrastructure resilience.²⁵ It focuses on addressing the interdependence of network infrastructure, enhancing collaboration, and ensuring that new ideas and lessons are exchanged between different lifelines groups. Progress has also been made by individual lifeline sectors to address specific resilience issues within the sector. For example, a Telecommunications Emergency Planning Forum was established in late 2008 and consists of major telecommunications operators in New Zealand. The forum was initiated following several severe weather events in 2007 and 2008, with the recognition that there was a need for enhancing the resilience of telecommunications services. It promotes the continuity of telecommunications services by developing and maintaining an agreed upon and well-functioning capability for emergency response, and coordinating responses to government requests for information and support.

The National CDEM Plan and the Guide to the National CDEM Plan address the need for coordination across different lifeline operators. They state that, during responses to emergencies, CDEM Groups are primarily responsible for coordinating local lifeline utilities across affected regions, and the Ministry of Civil Defence and Emergency Management has responsibility for coordinating lifeline

24. “Function to the fullest possible extent” has not been defined in legislation or national planning documents. The performance of a lifeline utility after an emergency is usually measured by the time it takes to restore its services to the normal level against the magnitude of the emergency.

25. The Committee currently comprises private companies (Telecom Ltd, and Vector Ltd), a non-governmental and not-for-profit organisation (Water New Zealand), a state-owned enterprise (Transpower), and several governmental agencies (New Zealand Transport Agency, Ministry of Civil Defence and Emergency Management, the Earthquake Commission, and the Institute of Geological and Nuclear Sciences).

utility sectors at the national level [12, 13]. Work has been undertaken at the national level and by some CDEM Groups to address these requirements, and detailed operational arrangements with various lifeline utility sectors and individual operators are progressively being established.

3.6. The National Natural Disaster Insurance Scheme

New Zealand has a national natural disaster insurance scheme that is designed as a “safety net” to ensure that the financial costs of repairs to residential properties could be met as far as possible without significant additional assistance from the government. The scheme is managed by the Earthquake Commission and insures about 90% of the country’s residential properties.²⁶ Initially created in 1945 following a series of damaging earthquakes, its coverage has been adjusted a number of times to reflect the changing needs of society and the insurance market.

All residential property owners who purchase fire insurance from the commercial market automatically acquire the Earthquake Commission’s insurance cover. This has ensured that most residential properties are covered by the Commission’s insurance scheme. The scheme insures residential buildings, land and personal belongings against damage caused by earthquakes, volcanic eruption, tsunami, landslides, hydrothermal activity, storm or flood damage (to land only), and fire following any of the above. Many of these insurance products are not available, or would be expensive to acquire, from the private market. Under this national scheme, the maximum premium payable for every property is NZ\$60/year, plus a goods and services tax, for which the property owner receives a maximum cover of NZ\$100,000 for the dwelling (about 40% of average building replacement cost), NZ\$20,000 for contents, and market value for land lost in close proximity to the dwelling [33]. Private insurers provide top-up cover above these caps.

Most parts of New Zealand are exposed to one or more of the perils covered by the Commission’s insurance scheme. The scheme therefore does not take into account the ownership or management of risks, and the same premium rate applies throughout the country regardless of location. The costs of meeting insurance claims (and all of the Commission’s other functions) are met from premium income, with any annual surplus being credited to (or deducted from) the Natural Disaster Fund. The fund currently totals around NZ\$6 billion (in August 2010) and is supported by a large reinsurance programme with overseas partners. There is also a guarantee from the Government, which ensures that the Commission will be able to meet its obligations if the fund and reinsurance cover is exhausted [18].

4. Examining New Zealand’s Preparedness

New Zealand’s preparedness is examined through surveys of the level of public preparedness, reviews of response to (medium and small-scale) emergencies, a 10-year national exercise programme, and a national monitoring and evaluation programme that represents the first assessment of national CDEM capability.

4.1. Public Preparedness

For most New Zealanders, flooding and landslides are the natural hazards most likely to have been experienced in recent decades. Major disasters caused by a large earthquake, a volcanic eruption, or a tsunami, for example, have not occurred in most people’s living memory.

The Ministry of Civil Defence and Emergency Management undertakes annual surveys to measure changes in the public’s attitudes and actual preparedness since the *Get Ready Get Thru* campaign started in 2006 [34–38]. The survey results have indicated that public awareness of the *Get Ready Get Thru* campaign is high, and more people are prompted to *think* about preparing for disasters, or to *talk* to family and friends, as a result of seeing the advertising. However, the increase in the level of public preparedness has not been significant. The surveys have shown that approximately 25% of New Zealanders are prepared at home for an emergency, and 10% of New Zealanders are “fully prepared,” which is defined as having an emergency survival plan that includes what to do when not at home, having emergency items and water, and regularly updating emergency survival items [34]. Surveys conducted by CDEM Groups have also concluded there is a relatively low level of public preparedness [39, 40]. Similarly, surveys conducted for the Earthquake Commission show that awareness of hazard mitigation methods has risen but mitigation activity has remained static [31].

The challenge of motivating people to move from awareness to taking actions, and the difficulty of sustaining public interest in disaster preparedness, is well recognised in New Zealand. Several studies have been undertaken to analyse the factors (such as incentives or barriers) that influence individual preparedness [41]. The strategy taken by the Government and local CDEM agencies is to utilise every opportunity – whenever there is a disaster overseas or an emergency in New Zealand – to remind the public that disasters can strike at any time or place. The approach to delivering the message of preparedness is also being adapted to target specific audience and community groups, such as Lions and Rotary Clubs, migrants, and those for whom English is a second language.

4.2. Lessons Learned from Real Emergencies

Widespread flooding in February 2004 in the lower North Island was the first real test of the new CDEM arrangements introduced by the CDEM Act 2002. The impact of, and response to, that event prompted an independent review to examine how the new arrangements func-

26. Of the remaining 10% of residential dwellings approximately half are owned and self-insured by a Crown entity, Housing New Zealand, which provides affordable housing to low-income people.

tioned. The review concluded that the CDEM Act provides an appropriate structure for dealing with large-scale emergency events, and many of the elements of an effective emergency management capability were in place at the local and national levels. However, several areas required improvement such as more guidelines on declaring a state of emergency, closer operational linkages between various response agencies, and more effective communications systems [24].

New Zealand has been fortunate to be affected only in a minor way by several tsunami in recent years, but those events have tested the national and local CDEM response capability and the public's preparedness for tsunami risks. The events have been a major factor in prompting the public and the government to think more about, and act upon, emergency preparedness and response. The December 2004 Indian Ocean tsunami prompted the first major review of New Zealand's tsunami risks and preparedness, with recommendations to address the gaps [42, 43]. There have since been increased investments in tsunami related research, such as tsunami source and inundation modelling, and the establishment of a national tsunami monitoring network [44]. Tsunami response planning (including evacuation plans) and public education has also had greater focus at the national, local, and community levels. The September 2009 Samoan tsunami triggered the issuing of the first national tsunami warnings and responses from national and local CDEM agencies around the country. Concerns about the national response to the event – in particular public information management – were raised, and internal and external reviews were undertaken to identify areas for improvement [45, 46]. A number of lessons were also learned in the responses to the February 2010 Chilean tsunami and the May 2010 Vanuatu tsunami threats. Processes for alerting the media and the public about potential tsunami are being improved.

Lessons have also been learned from overseas disasters and applied to the New Zealand context where appropriate. For example, following the magnitude 7.5 Padang earthquake in September 2009, a team of New Zealand structural engineers were deployed by New Zealand's Agency for International Development and the New Zealand Society for Earthquake Engineering. They assisted Indonesian local and provincial agencies with rapid structural assessments of earthquake-affected buildings in and around Padang. Lessons learned from this experience were brought back to help improve the New Zealand's building safety evaluation processes following large earthquakes [47].

4.3. National Exercise Programme

Exercises help participating agencies assess their readiness, response and recovery capabilities, and identify gaps and areas for improvement. In the New Zealand context, exercising is particularly important because, in the absence of recent large events, there is a certain degree of inevitable complacency in central and local government, the private sector, and individuals.

The National CDEM Exercise Programme has a 10-year schedule and aims to test the operational capability of government agencies, CDEM Groups, and their partner agencies such as lifeline utilities. The programme is managed by the Ministry of Civil Defence and Emergency Management, with representation from all 16 CDEM Groups and the National Engineering Lifelines Committee. It recognises the importance of undertaking exercises at all levels of the CDEM structure by adopting a four-tier approach: local exercises (held by individual agencies); CDEM Group-wide exercises (involving all agencies in the CDEM Group); inter-Group exercises (involving more than one Group); and national exercises [13]. Participation in the programme is voluntary, and the exercises are dependent on available funding and resources within participant agencies.

Two national exercises were held in October 2006 and March 2008, based on the scenarios of a magnitude 7.6 earthquake in Wellington and a volcanic eruption in Auckland, respectively. They tested the arrangements for responding to such a disaster at the national and CDEM Group levels. Both exercise reports recommended a range of actions for government agencies and CDEM Groups, some of which are yet to be fully addressed [25, 48]. Another national exercise based on a tsunami scenario is planned for October 2010 [49].

4.4. Monitoring and Evaluation Programme

A national CDEM monitoring and evaluation programme was launched in late 2009, after two years of development and consultation with the CDEM sector. This programme represents the first attempt to measure systematically the capability of individual CDEM Groups (and their constituent local authorities), government departments, emergency services, and lifeline utilities.

A capability assessment tool that includes a set of nationally consistent performance indicators and measures ("capability criteria") was developed [50]. The roll-out of the assessments has been anticipated and welcomed by most CDEM Groups, as they are keen to learn how well placed they are with their existing planning, arrangements, and resources. The Ministry of Civil Defence and Emergency Management has been working with CDEM Groups to evaluate their performance. The process involves the self-assessment by the CDEM Group and all member local authorities (stage one), followed by the Ministry's assessment through interviewing local CDEM personnel and reviewing CDEM documentation (stage two). An assessment report is provided to each CDEM Group for them to address the issues and recommendations identified through the evaluation.

Assessments completed to date show that some CDEM Groups have performed well at the Group level, but performance of individual members varies widely. On the other hand, some Groups lack leadership and coordination at the Group level. Overall, issues identified include: the need for stronger leadership from mayors and senior officials; constraints of funding and resources; insufficient

understanding of the CDEM structure, roles, and statutory responsibilities of CDEM Groups and their members; and a lack of priority accorded to CDEM. Actions recommended to address these issues variously require leadership, additional resources, and change in attitude and organisational culture over time.

The assessments of government departments (including the Ministry of Civil Defence and Emergency Management), emergency services, and lifeline utilities are scheduled to be completed in 2011. The CDEM framework enables various organisations to work together to address hazard risk issues. It does not prescribe required performance standards and detailed operational arrangements. The lack of agreement amongst various parties in these areas may pose challenges for the evaluation process. A national report, based on the results of all assessments, will summarise the themes and issues across the CDEM sector, showing where the critical gaps lie. This will be the first major national review of CDEM in New Zealand since the introduction of the new CDEM framework in 2002.

5. Conclusion

New Zealand's approach to emergency management emphasises addressing all hazard risks through devolved accountability. It promotes integrated risk management that involves the 4Rs – reduction, readiness, response and recovery. It stresses the responsibility of individuals, communities, local authorities, and regional CDEM Groups to be aware of the hazard risks they may face, take actions to mitigate the risks, and make arrangements for responding to and recovering from emergencies. It also requires all infrastructure asset managers and business owners to take responsibility for business continuity planning.

The capacity building initiatives led by various governmental and non-governmental agencies have shown that New Zealanders are making progress in enhancing resilience. The enabling, empowering, and co-operative approach has its advantages; however, it has not ensured active involvement by all parties. There are disaster management areas in which detailed operational arrangements and required performance standards have yet to be explored, promoted, and agreed upon. The country's capacity for managing a large-scale disaster under the current arrangements has not been truly tested. Complacency with risk reduction and emergency preparedness remain challenges at national and local levels. The first assessment of national civil defence emergency management capability is to be completed in 2011, and will indicate how resilient New Zealand actually is.

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