HAWKE'S BAY EMERGENCY MANAGEMENT GROUP

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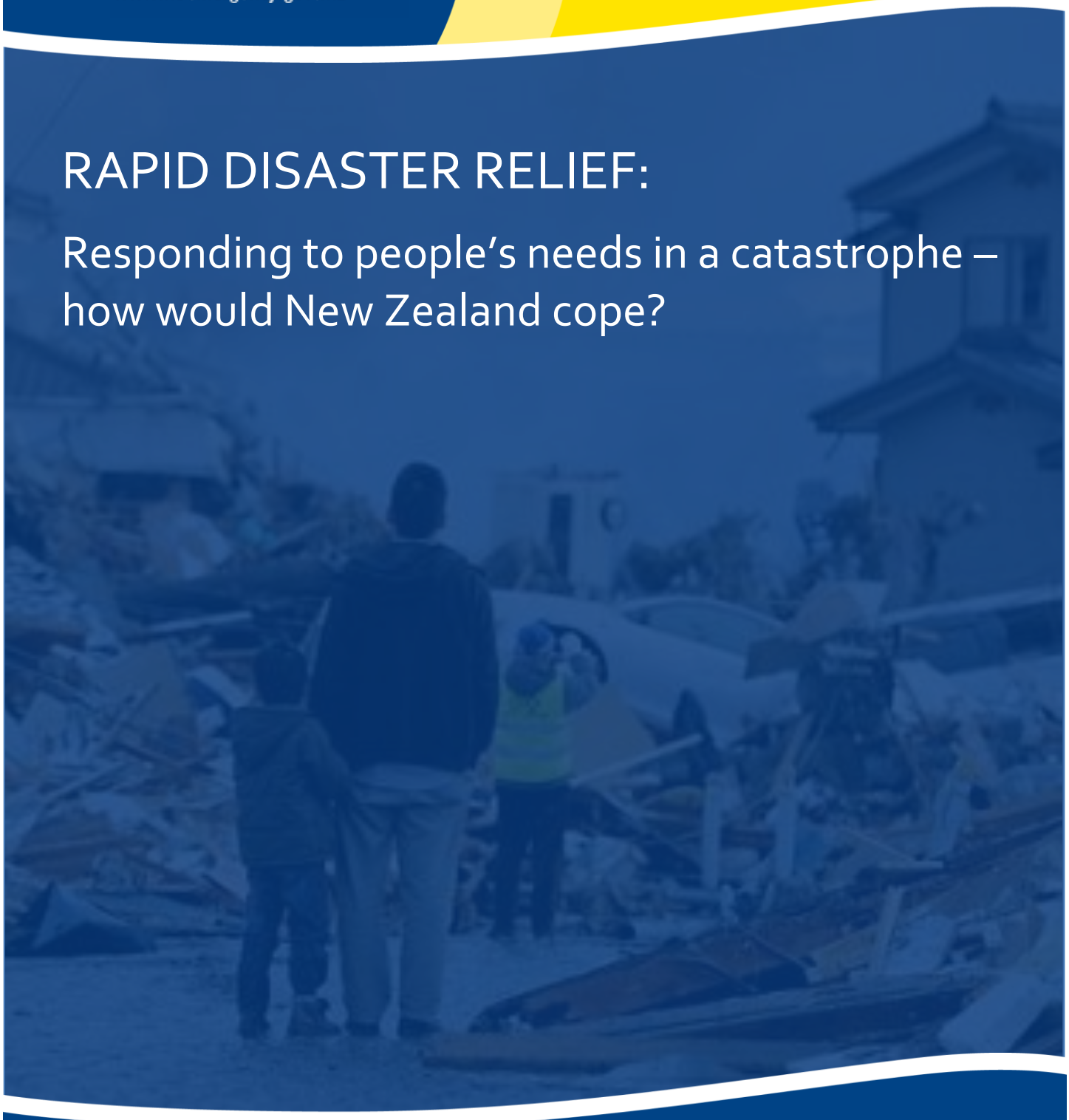
RAPID DISASTER RELIEF:

Responding to people's needs in a catastrophe – how would New Zealand cope?



Report completed by
HAWKE'S BAY CIVIL DEFENCE EMERGENCY MANAGEMENT GROUP

Ngā mihi

Acknowledgement

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Foreword

Alison Prins

Group Welfare Manager
Hawke's Bay Civil Defence Emergency Management

I am confident the work we do to build our communities' resilience, together with their own response capabilities and our emergency management arrangements, means we can take care of people's basic needs in most emergencies.

However, we now know more about the likelihood and impact of significant hazards such as a large Alpine fault or Hikurangi subduction zone rupture than ever before. These hazards could lead to a catastrophic event. They have the potential to significantly impact a large number of people and multiple regions, and create extremely difficult environments in which to respond.

Our ability to manage a response to a catastrophic event is what keeps me awake at night. My specific worry is that our communities will be overwhelmed, and we the official responders may not be able to provide relief quickly enough to meet their basic needs. This could mean people who survive the event may then go through increased suffering, worsening outcomes, or perish due to delays, or worse – no support at all.

I started thinking about our response to this kind of event as being quite different from our usual welfare and emergency response. It felt like we needed to categorise this kind of response differently – to refer to it as 'rapid disaster relief'.

I looked at our current arrangements to see how we were planning for rapid disaster relief and found the CDEM sector does not really talk about this kind of response. While there was great work going on to address catastrophic event scenarios, such as the Wellington Earthquake National Initial Response Plan, the South Island Alpine Fault Earthquake Response Framework, and the Hikurangi Earthquake and Tsunami Response Framework, rapid disaster relief capability was a gap in our sector's readiness and we needed to understand and test this.

The Hawke's Bay Civil Defence Emergency Management Group supported a resilience funding application for a project to scope rapid disaster relief planning in New Zealand.

The initial concept was to review existing literature to learn from international experience and understand rapid disaster relief in New Zealand, hold a workshop to test our learnings, and write a report.

As we started our research it quickly became apparent the gap was bigger than rapid disaster relief. The gap extended to our general understanding of different scales of events, for example, how a catastrophic event is different to an emergency or disaster. As such, this final report takes a much broader view than we first intended.

We found new thinking was needed to plan for these possible catastrophic events and proposed the new concept of rapid disaster relief. We tested this concept at a CDEM sector workshop, starting a rich discussion to better understand how we can further develop New Zealand's capability to prepare for catastrophic events.

Developing this report has been enlightening and informative. We have found there is a real desire from the sector to better understand and better prepare. This report recommends the further work our sector can carry out, as this is only the beginning.

We ask you to consider how this report can inform your future work, research, investment and capability development so we can be better prepared for catastrophic events in New Zealand.

Finally, we have found many wise words from those who have responded to catastrophic disasters internationally. But we can use our own words to inspire us to work together for our people.

Ma whero ma pango ka oti ai te mahi

If everyone does their part, the work will be complete.

Executive summary

New Zealand is susceptible to hazards such as earthquakes, tsunami, volcanic eruptions, human disease epidemics and terrorism. Hazards, when combined with underlying vulnerabilities, can have a devastating impact on people and their environment, resulting in an emergency, disaster or catastrophic event. New Zealand response agencies have a lot of experience in managing emergencies and some in managing disasters, but no experience in managing catastrophic events. It is likely that some time in our future we may experience a catastrophic event, impacting New Zealanders on a scale not experienced before in our country. While we expect people will work together to support each other (the unofficial response), and mandated local and national organisations will support them (official response), there is likely to be significant and time-critical unmet basic needs. Catastrophic events present a complex mix of challenges, making it difficult for the unofficial and official response to provide for people's basic needs in a timely manner. Delays can lead to suffering and worsening outcomes. The purpose of this report is to understand New Zealand's ability to meet peoples' basic needs during a catastrophic event. It involved a brief review of academic and Civil Defence Emergency Management (CDEM) sector literature, analysis of case studies and a CDEM sector workshop. The report proposes a new concept – rapid disaster relief and has used this concept to recommend further investment across five themes – response systems, processes and plans, international assistance coordination, hazard scenarios to inform rapid disaster relief, assessments to inform rapid disaster relief, and the provision of rapid disaster relief.

1 Introduction

Hazards, when combined with underlying vulnerabilities, can have a devastating impact on people and their environment, resulting in an emergency, disaster or catastrophic event. New Zealand response agencies have a lot of experience in managing emergencies and some in managing disasters, but no experience in managing catastrophic events.

New Zealand is susceptible to hazards such as earthquakes, tsunami, volcanic eruptions, human disease epidemics and terrorism. Some of these hazards (such as an Alpine fault earthquake or Hikurangi subduction zone earthquake and tsunami) pose a significant risk to New Zealand. It is likely that some time in our future we may experience a catastrophic event, impacting New Zealanders on a scale not experienced before in our country.

Catastrophic events can be characterised by a hazard event that:

- has an extremely large physical and social impact on thousands of people across multiple regions
- displaces large numbers of people for extended periods of time, if not permanently (within their lifetimes at minimum)
- causes widespread devastation across multiple regions, including significant damage to buildings and infrastructure such as transport, power, telecommunication and water networks
- requires major national and international resources and coordination in an extremely challenging environment
- overwhelms the capacity of local communities and local and national organisations
- poses massive challenges to recovery and significant long-term effects.

After a catastrophic event some people will be without their basic needs – food, water, shelter and medical care – and some will need help to meet these needs (Alexander, 2015 and Wang, 2013). While we expect people will work together to support each other (the unofficial response), and mandated local and national organisations will support them (official response), there is likely to be significant and time-critical unmet basic needs (Twigg and Mosel, 2017).

Catastrophic events present a complex mix of challenges, making it difficult for the unofficial and official response to provide for people's basic needs in a timely manner. Delays can lead to suffering and worsening outcomes, for example, people's health will deteriorate due to untreated injuries, pre-existing health conditions, lack of water and nutrition, and exposure.

This is a 'wicked' problem: a disaster or catastrophic event causes impacts that are too great for the affected area and people to deal with properly on their own. But our communities and official response organisations can plan and prepare for response and recovery to provide for people's needs in a timely manner. (Alexander, 2015 and Wang, 2013).

It is crucial New Zealand understands its capabilities before a catastrophic event and incorporates lessons learnt internationally. This report is the first look at New Zealand emergency management system's capacity to provide for people's basic needs in a catastrophic event, recognising New Zealand will likely experience a catastrophic event some time in its future.

The purpose of this report is to understand where New Zealand is currently at, define where it could be and recommend what actions can be taken to lessen the gap between the current and ideal state to meet peoples' basic needs during a catastrophic event.

This report starts with a brief overview of disasters, disaster management, disaster assistance and disaster relief. It touches on two case studies of international catastrophic events to understand issues and lessons learnt. The next section explores disasters, disaster management and assistance within a New Zealand context. It then proposes a new concept – rapid disaster relief. This concept is used to unpack the current state to highlight where the gaps lie in providing for people's needs during a catastrophic event. The report then recommends actions to lessen the gap.

This report is about understanding the broad landscape and therefore does not go into detail, nor does it consider or propose how people's basic needs should be met during a catastrophic event. It does not explore the unofficial response of those affected by the disaster despite recognising the valuable role that affected people play in supporting each other and meeting each other's basic needs. It also does not consider the basic needs of animals and pets as those organisations mandated to this kind of care are best placed to do this.

2 Methods

This section sets out the methodological design of this report and highlights the purpose of the report, emphasising its qualitative nature. It then details the methods used.

2.1 Methodology

The purpose of this report is to understand where New Zealand is currently at, attempt to define where it could be and recommend what actions can be taken to lessen the gap between the current and ideal state to meet peoples' basic needs during a catastrophic event.

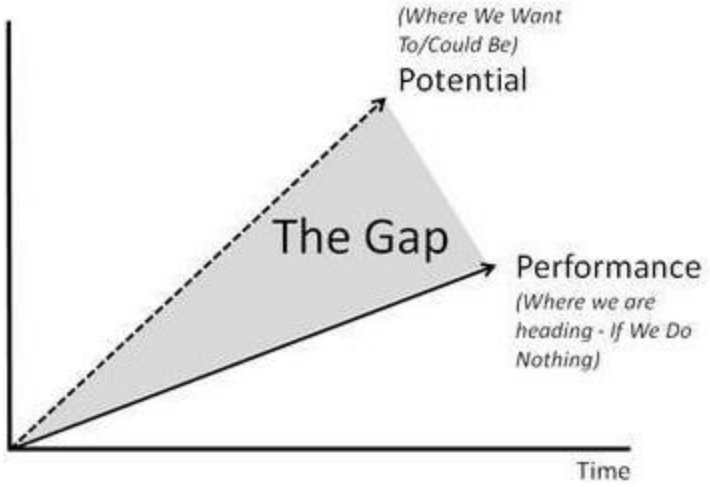


Figure 1 Conceptual diagram of gap analysis

The most appropriate way to do this was through a qualitative approach as this method recognises the world is dynamic and evolving, constructed and reconstructed through political, social, economic processes and systems across space and time (Limb and Dwyer, 2001).

This report involved a brief academic review of literature to understand disasters, disaster management, disaster assistance and disaster relief. It includes a high-level overview of two of the most well-known sudden onset catastrophic event in recent times– - Hurricane Katrina in the United States of America and the Tōhoku earthquake and tsunami in Japan.

These case studies were selected as both countries have a relatively similar socio-economic status to New Zealand, and each country's response to and recovery from these events have been well documented and reviewed, providing plenty of lessons to learn.

The high-level case study analysis was followed by a brief review of publicly available Civil Defence Emergency Management (CDEM) sector documents and reports to understand the academic literature in the context of New Zealand. These reviews were then used to assess New Zealand's capability and capacity to provide for people's basic needs in a catastrophic event and to recommend actions to improve its capability. This resulted in a draft report.

The draft report was used as a starting point for discussion at a CDEM sector workshop to propose a new concept – *rapid disaster relief* – to frame possible solutions to meeting people's needs during a catastrophic event. The purpose of the workshop was to discuss the draft report, understand the CDEM sector's recognition of the problem, test the definition of rapid disaster relief and the recommendations, and validate its contents amongst the CDEM sector.

Seventy-four representatives from organisations such as the Ministry of Civil Defence & Emergency Management, CDEM groups, New Zealand Defence Force, emergency services and non-government organisations were invited to the workshop in Wellington, and 35 participants from 24 organisations attended.

The workshop organiser presented the draft report and its findings to the attendees before dividing them into five groups to provide feedback. The workshop was a powerful way to understand participants' perceptions, experiences and knowledge of the topic (Maxwell, 2012 and Secor, 2010).

The post workshop survey showed that of the 22 people who completed the workshop evaluation form:

- 77 per cent said the workshop met its intended outcomes
- 100 per cent said the workshop was worthwhile
- 95 per cent said the CDEM sector needs to invest in developing more capability in this area.

This highlights the value of this project and the need to continue to develop our rapid disaster relief capability into the future.

The discussions held during this workshop directly influenced the direction of this report and its recommendations. This report was the impetus for academic research in New Zealand.

3 Background

This section gives a brief overview of disasters, disaster management, disaster assistance and disaster relief.

3.1 Disasters

Emergencies and disasters occur all around the world due to four factors: hazard, exposure, vulnerability and capacity (Bankoff, 2001). These four factors contribute to the severity of the hazard's impact on people and their environment and can be reduced, increased or removed from the equation to reduce levels of risk (Blaikie et al., 1994; Gaillard, 2010; O'Keefe et al., 1976; Wisner et al., 2012).

Hazard x Exposure + Vulnerability – Capacities = Disaster risk

'Hazard' – the first of these four factors – can be categorised as slow or rapid onset, and man-made or natural. In order for there to be disaster, people and their environment need to be 'exposed' to the hazard, the second factor. The third factor – 'vulnerability' – is influenced by social systems including social class, age, gender, health, ethnicity and locality (Bankoff, 2001 and Wisner et al., 2012). The fourth factor, 'capacities', are the assets of disaster-threatened people such as their knowledge, skills and resources that enable them to be more resilient to hazards (Blaikie et al., 1994; Gaillard, 2010; Wisner et al., 2012).

Exposure, vulnerability and capacities are influenced by trends such as population growth, changing population movement and increasing social and economic inequalities. These trends mean more people are exposed and vulnerable to hazards so when a hazards occurs, it has the potential to impact more people more severely than we have previously seen. This scale of event goes beyond an emergency or disaster and has led to the emergence of new category – a catastrophic event (Furin, 2018).

Emergencies, disasters and catastrophic events vary in scope, size and context, making them difficult to categorise (Furin, 2018 and Quarantelli, 2000). A simplistic description of the difference between emergencies, disasters and catastrophic events is below in Figure 2.

	Emergencies	Disasters	Catastrophic event
Size of impact	Fully or partially localised	Widespread and severe	Extremely large in the physical and social sphere
Size of response	Mainly local or regional resources used, with some assistance from nearby areas	Intergovernmental, multi-agency, multi-jurisdictional response needed	Major national and international resources and coordination required
Plans and procedures activated	Standard operating procedures used and emergency plans may be activated	Disaster or emergency plans activated	Disaster or emergency plans activated, but huge challenges may overwhelm them
Impact on response resources needed for response	Managed using resources available locally/regionally	Extensive damage to resources in disaster area; major inter-regional transfers of resources	Local and regional emergency response systems need much outside help
Challenges to post-event recovery	Few challenges to recovery process	Major challenges to recovery from disaster	Massive challenges and significant long-term effects

Figure 2 Simplistic differences between an emergency, disaster and catastrophic event (Adapted from Alexander, 2015)

Catastrophic events can be characterised by a hazard event that:

- has an extremely large physical and social impact on thousands of people across multiple regions
- displaces large numbers of people for extended periods of time, if not permanently (within their lifetimes at minimum)
- causes widespread devastation across multiple regions, including significant damage to buildings and infrastructure such as transport, power, telecommunication and water networks.
- requires major national and international resources and coordination in an extremely challenging environment
- overwhelms the capacity of local communities and local and national organisations
- poses massive challenges to recovery and significant long-term effects.

A catastrophic events overwhelms those in the affected area and the country's disaster response systems (Carafano, 2011). It threatens the health, safety and wellbeing of those affected as normal systems no longer function, preventing people from accessing their basic needs such as food, water, shelter and medical care. The scale of the event makes it difficult to prioritise needs because of the number of needs to be prioritised, leading to suffering and worsening outcomes (Carafano, 2011 and Quarantelli, 2000).

3.2 Disaster management

Disaster management (also referred to as emergency management) is the development of policy, planning and operational activities to establish and maintain ways to deal with disaster risk reduction, readiness, response and recovery at all levels – local, national and international (Carter, 2018 and Perry and Lindell, 2007). This includes plans, structures and arrangements to manage all aspects of an event (Perry and Lindell, 2007). The public should be actively involved and participate in disaster management alongside emergency managers and technical experts (Alexander, 2015).

3.3 Disaster assistance

Evidence shows people affected by a hazard event work together to support each other. However, when faced with a disaster or catastrophic event, they need resources beyond their capacity to respond and recover (Alexander, 2015 and Wang, 2013). This assistance may come from groups such as local and central government, local and international non-government organisations, community organisations such as local churches and community groups, the public and those affected (Alexander 2015; Degnbol-Martinussen and Engberg-Pedersen, 2003; de Haan, 2009; Rogerson et al., 2004).

These groups can be simplistically divided into those who give and those who receive disaster relief (see Figure 3 below). This division of disaster relief does not consider the complexity of interactions between donors and receivers and that people can be both donors and receivers within the system (Degnbol-Martinussen and Engberg-Pedersen, 2003; de Haan, 2009; Rogerson et al., 2004).

Donor	Receiver
• Taxpayer • Private voluntary donor e.g. individuals and business/companies • Donor government • Intergovernmental organisations (IGOs) e.g. United Nations agencies, World Bank etc. • International non-government (INGOs) organisations • International Federation of Red Cross and Red Crescent Societies • National government • Local government • Affected communities	• National government • Local government • National NGOs • Affected community

Figure 3 Table of disaster relief donors and receivers

The type of assistance needed will also depend on the scale of the event. Assistance may be at a local, regional, national or international level and come in the form of 'aid' (Fink and Redaelli, 2010). Aid is loosely defined as the voluntary transfer of resources such as financial support, technical assistance and physical items such as food and water, from one organisation to another (de Haan, 2009). Aid can include a wide variety of activities, which can be broadly divided into either development or humanitarian aid (Figure 4 and Fink and Redaelli, 2010).

Humanitarian aid	Development aid
• Short term • Delivered in disaster-impacted areas • Responds to an incident or event • Focused on saving lives and restoring livelihoods.	• Long term • Delivered in less-developed areas • Responds to systemic problems • Focused on sustainable economic development

Figure 4 Humanitarian aid versus development aid (Fink and Redaelli, 2010

3.4 Disaster relief

The process of responding to a disaster, providing humanitarian aid to affected people, to save lives and alleviate suffering is called disaster relief. Types of assistance that may be provided as part of disaster relief include services, goods or equipment in Figure 5 (Comfort and Boin, 2001).

Form	Example
Services	Providing teams of skilled personnel such asmedical teams or search and rescue personnel
Goods	Providing goods such as clothing, shelter materials, food and medical supplies
Equipment	Providing temporary response capabilities such as generators or helicopters

Figure 5 Differentiation between services, goods and equipment

The ability to respond quickly to a disaster relies on the availability of services, goods and equipment, and ability to deliver these as rapidly as possible (Arnette and Zobel, 2019). Some argue essential goods should be stored in strategic locations so they are available immediately after an event (Sharifyazdi et al., 2018 and Durann, Gutierrez and Keskinocak, 2011). This is a common undertaking by most INGOS and NGOs as well as some governments. Others argue the cost may not necessarily weigh up the benefits of stockpiling goods and equipment.

Often governments impacted by disaster will also receive assistance from IGOs, INGOs and NGOs. After a disaster or catastrophic event, recipient governments typically have to deal with many donor countries and IGOs (Degnbol-Martinussen and Engberg-Pedersen, 2003 and Nunnenkamp and Ohler, 2011) at the same time as coordinating and managing multiple INGO and NGOs. Managing these organisations often places an additional burden on governments that are already under pressure (Degnbol-Martinussen and Engberg-Pedersen, 2003). It is argued that NGOs are often single-minded in their efforts and having a large number of organisations, each with their own agendas can lead to poor coordination, impairing the aid's effectiveness (Harvey, 2013; Hendrie, 1997; Nunnenkamp and Ohler, 2011). In some situations, NGO efforts are duplicated, so it is it important this response is managed and coordinated effectively to provide for people's needs and to minimise duplication of effort. This is difficult to do well, and the failure of aid coordination has become "legendary" (Eyben, 2007:640 and Hendrie, 1997). As a result of these continued failures there is growing recognition that there is a need for greater coordination and cooperation between donors such as IGOs, INGOs and NGOs and recipient governments (Bankoff and Hilhorst 2009; Harvey, 2013; Hendrie, 1997).

Several methods have been trialled to improve coordination between organisations that provide assistance such as a joint assistance programme or through the cluster system (Eyben, 2007). The cluster system is the latest common method of operation amongst non-government organisations as shown in Figure 6 (Eyben, 2007). The purpose of the cluster system is to strengthen the capacity of NGOs to respond to emergencies and disasters during response by clearly defining the roles and responsibilities of each NGO.

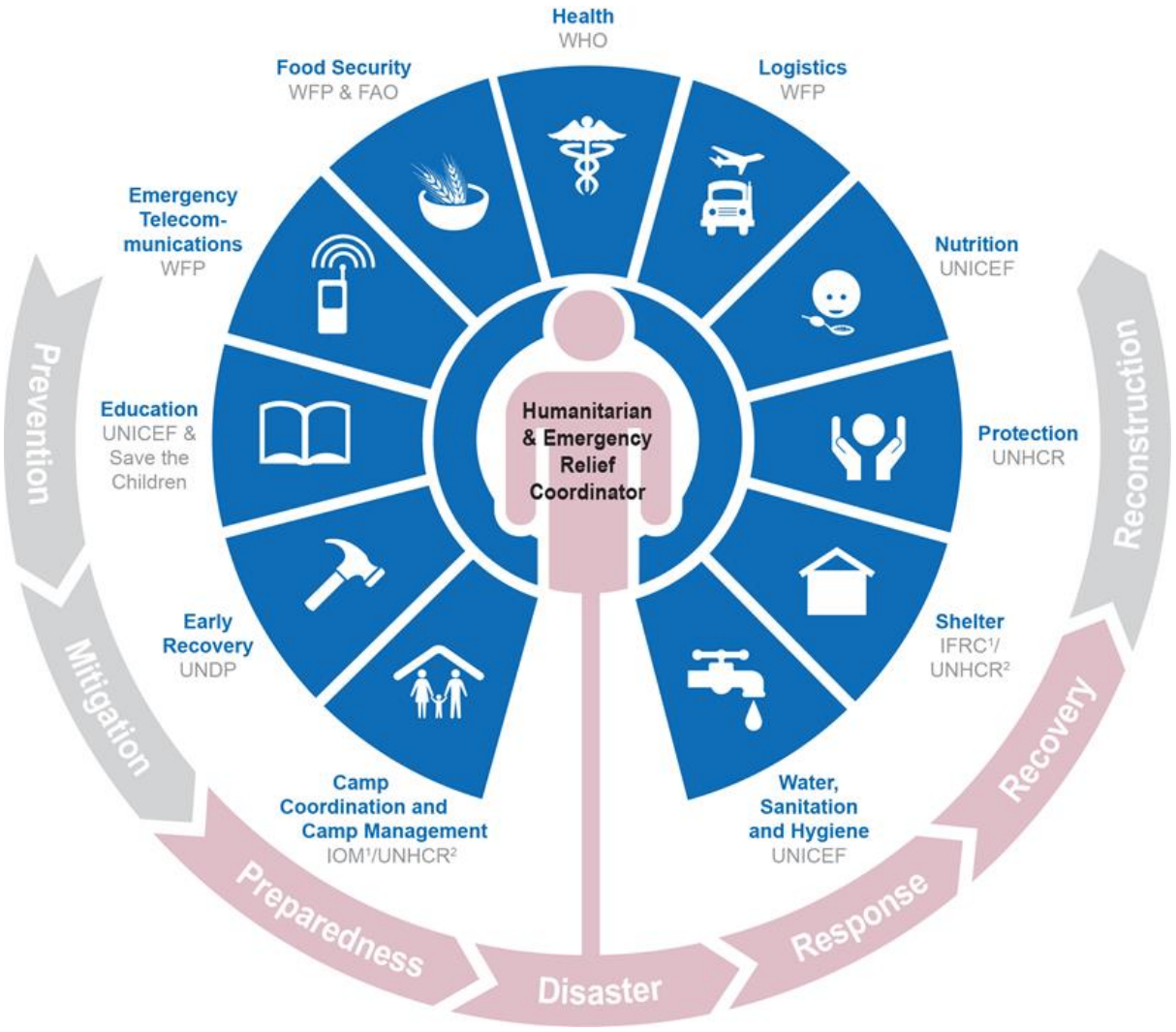


Figure 6 Cluster system used by INGOs and NGOS

Effective coordination of disaster relief ensures reduced gaps and overlaps in the assistance provided. Recently, more emphasis has been placed on the role recipient governments play in coordinating INGO and NGO assistance during an event. This includes ensuring a streamlined process for requesting, declining and deploying all types of assistance to the affected areas for any event. This work can be carried out prior to an event to ensure each INGO and NGO understands the recipient government's systems and processes and its roles and responsibilities in an event.

3.5 Disaster needs

Matching disaster relief to needs is complex given everyone has different needs in any given situation while people's basic needs remain the same (Maslow's Hierarchy of Basic Needs).Maslow identifies a 'core' of basic needs as someone's 'physiological' and 'safety' needs. The most basic of these needs is the physiological need for food, drink, shelter, sleep and oxygen. Although impacts may vary considerably from one disaster to another, typical needs that arise include:

- food and safe drinking water
- essential shelter and warmth items such as blankets and heaters
- medical care
- sanitation and waste disposal
- psychosocial support.

It is an imperative to meet people's basic needs immediately after an event. Delays escalate the severity of the impacts on people. For example, Dame Claire Bertschinger comments that:

> "it's more important to look after the wounded that are there, and make sure they have some sort of facilities, definitely water, sanitation, food. Any small wounds that aren't dealt with and looked after, because even a break, it can lead to osteomyelitis very easily if it's not looked after quickly and correctly."

Persistent unmet needs and delayed care pose serious threats to people's health and wellbeing following a disaster, especially in vulnerable communities (Davis et al., 2010). Disasters catalyse new, or exacerbate existent, disparities in health and health care within the affected population (Davis et al., 2010).
Those with unmet health needs during the initial response can evolve into chronic health needs during recovery as shown in Figure 7 (Davis et al., 2010). For example, research has documented long-term medical needs of those affected by the Indonesian 2004 tsunami who aspirated large quantities of seawater (Davis et al., 2010).

Vulnerable population	Need not being met	Escalation if needs are not met rapidly
Elderly person (65 and over)	Access to water	Dehydration in elderly leads to poor medical and health outcomes as well as hospitalisation and mortality. Common complications associated with dehydration include low blood pressure, weakness, dizziness and increased risk of falls. Research shows dehydration has a long-term impact on the demand for health care services and contributes to development of chronic diseases.
Child	Access to food	Hunger is related to poor health outcomes, including a higher risk of depression and suicidal ideation in adolescents, and chronic conditions, particularly asthma. In addition, nutrient deficiencies, such as iron deficiency, impair learning and cause decreased productivity in school-age children (Ke and Ford-Jones, 2015).
Injured person	Access to medical care	There are a wide range of symptoms that may occur if a severe bone trauma is not treated rapidly. These include blood poisoning, bone deterioration, chronic pain, fever and limping.

Figure 7 Possible escalation of vulnerable populations if basic needs are not meet

It is critical that following an event, people's needs are quickly provided for. Carafano (2011) states disaster relief such as food, water and medical aid must be in place within hours following a disaster or those affected who could have been saved will begin to suffer and die. This effect creates a "secondary surge" in health care long after the event, placing a burden on the health care system (Davis et al., 2010).

To combat this, international standards such as Sphere standards have been developed by humanitarian practitioners based on evidence, experience and learning during various events across the world (Sphere, 2018). The Sphere standards are the most widely recognised humanitarian standards across the world and focus on water supply, sanitation and hygiene promotion (WASH), food security and nutrition, shelter and settlement, and health (Sphere 2018). The Sphere standards are used as reference tools by donor governments, recipient governments, INGOs and NGOs (Sphere, 2018).

“It's more important to look after the wounded that are there, and make sure they have some sort of facilities, definitely water, sanitation, food. Any small wounds that aren't dealt with and looked after, because even a break, it can lead to osteomyelitis very easily if it's not looked after quickly and correctly.”

Dame Claire Bertschinger on preventing suffering after a disaster or catastrophe.

4 Case studies

This section explores two examples of catastrophic event to identify key issues and potential learnings for New Zealand to prevent and ease suffering.

4.1 Case Study 1

Hurricane Katrina was an extremely destructive and deadly Category 5 hurricane that made landfall on Florida and Louisiana, particularly New Orleans and the surrounding areas, in August 2005. New Orleans was flooded as a result of engineering faults in the flood protection system around the city. Almost half a million people were evacuated and many affected by the disaster were without water, food, shelter and sanitation facilities (Figure 8, Federal Emergency Management Agency. 2005 and Shittu et al., 2018).

Figure 8 Image of outside the Superdome shelter during Hurricane Katrina in the United States of America in 2005

The scale of the event meant a country many assumed would not need support received 133 offers of assistance from foreign governments and 12 offers of disaster assistance from international organisations (Shittu et al., 2018 and Kelmam, 2007).

The official response led by the Federal Emergency Management Agency (FEMA) was widely criticised for its lack of coordination and slow response. Some of the key issues and learnings the official response experienced during this catastrophic event (Figure 9).

Issue	Learning
The official response at state and national levels were completely overwhelmed, as no planning had been undertaken for an event of that scale. For example, FEMA did not develop a National Response Plan that adequately responded to a catastrophic level event (Withanaarachchi and Setunge, 2014).	Plans need to be developed that respond to the worst-credible scenario (Carafano, 2011).
The official response had prepared for an emergency or disaster they were capable of managing but not for a catastrophic event (Withanaarachchi and Setunge, 2014). They assumed they would be able to scale up to the 'worst-case scenario'. For example, federal departments and agencies had difficulty adapting their standard procedures to this catastrophic incident.	Consider bias and assumptions (e.g. the ability to scale up) in the system when planning
Officials responded to Hurricane Katrina without a comprehensive understanding of the interdependencies between critical infrastructure (e.g. lifelines in each geographic area) and the potential national impact of their decisions (Withanaarachchi and Setunge, 2014).	An embedded understanding of the interdependencies of the lifelines and the impact this will likely have on people
There was a complete breakdown in communications (Withanaarachchi and Setunge, 2014). This resulted in a lengthy decision-making process and delays in the response while responders waited for official approvals.	Communication needs to be a priority to ensure situational awareness at all levels. The decision-making process needs to be short and allow for the pre-authorisation of key activities to ensure a rapid response (e.g. FEMA now ensures authorisations are pre-written and pre-approved to eliminate delays).
There were delays in providing goods to those impacted by the disaster (e.g. food, water and other basic needs). FEMA's logistics and contracting system was overwhelmed by the scale of the event and could not support the effective provision of time=critical basic supplies (Withanaarachchi and Setunge, 2014). There was also a lack of preparedness as FEMA lacked the tools to track the status of shipments, which interfered with supplying people's basic needs (Withanaarachchi and Setunge, 2014).	Prepositioned goods and equipment to ensure goods are on hand and pre-planned resourcing and delivery coordination of these goods (e.g. FEMA now prepositions goods and equipment to limit delays).
The ability of FEMA to respond to a catastrophic event of this magnitude had not been tested prior (Withanaarachchi and Setunge, 2014).	Test the system to respond to a catastrophic event.

Figure 9 Key issues and learnings from Hurricane Katrina in the United States

4.2 Case Study 2

The April 2011 Tōhoku earthquake and tsunami had a devastating impact on coastal areas across 20 prefectures, particularly Iwate, Miyagi and Fukushima in eastern Japan (Carafano, 2011). The event caused extensive and severe structural damage including heavy damage to roads and railways, fires in many areas, a dam collapse and significant damage to a number of nuclear power plants (Carafano, 2011).

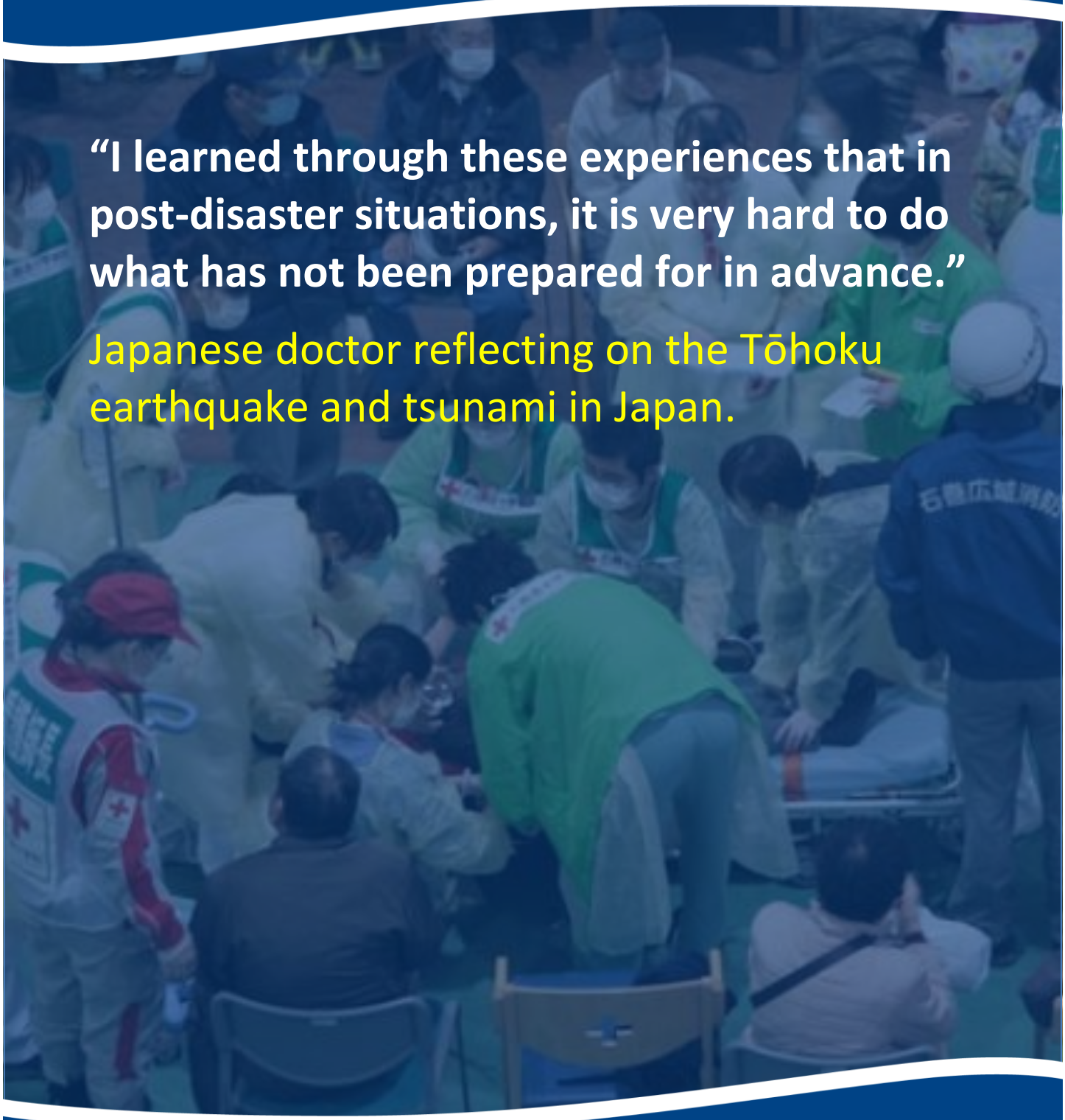
Almost half a million people were evacuated (Figure 10), nearly 16,000 died, 6000 were injured and 2500 are still reported missing (Carafano, 2011). Many countries sent response capabilities such as search and rescue teams and others sent goods and equipment. Other organisations such as Red Cross, NGOS and private organisations provided relief to those affected.

Figure 10 Image from a shelter following the Tōhoku earthquake and tsunami in Japan in 2011

The official response immediately activated after the earthquake by convening the National Committee for Emergency Management and within hours of the earthquake and tsunami the response was well underway (Nazar, 2011). Despite this, the official response experienced some key issues in responding to this catastrophic event and suggested learnings are highlighted in Figure 11 (Nazar, 2011).

Issue	Learning
Conflict between politicians and bureaucrats prevented quick and resolute decisions and action (Nazar, 2011). Centralised systems became a bottleneck that delayed decision-making (Nazar, 2011).	Develop an adaptable response system to enable quick decision-making to ensure a rapid response. The larger the scale of the disaster, the greater the need for decentralised execution, and the capacity and expertise of local leaders and community to act on their own.
Large numbers of people in emergency shelters with unmet needs (Nazar, 2011). Some shelters did not meet international SPHERE standards to meet basic needs. Shortages of food, water, medicine, blankets, nappies and toilet paper due to a shortage of petrol to transport these goods (Nazar, 2011).	Develop systems to manage large-scale displacement of those affected by disaster. The worst-case scenario should be used to assess the amount of goods and equipment needed – considering international standards – and determine how the goods and equipment will get to where it needs to go.
The health system was overwhelmed and health services disrupted (Nazar, 2011). Vulnerable people suffered as most of the primary health care and mental health infrastructure to support them was ruined by the earthquake and tsunami (Davis et al., 2010). Most hospital plans had not been tested and were not adequate given the size of the event (Nazar, 2011 and Parmar et al., 2013).	Business continuity plans should be developed for organisations that care for the most vulnerable to ensure their basic needs can be met for the worst-case scenario – given plans are usually developed for the most likely scenario.
Response was also hampered because emergency communication equipment did not function (Parmar et al., 2013).	Develop and regularly test emergency communication systems.

Figure 11 Key issues and learnings from Tōhoku earthquake and tsunami in Japan in 2011



“I learned through these experiences that in post-disaster situations, it is very hard to do what has not been prepared for in advance.”

Japanese doctor reflecting on the Tōhoku earthquake and tsunami in Japan.

5 Context: New Zealand

This section explores disasters, disaster management, disaster assistance and relief in New Zealand. It gives an overview of the New Zealand emergency management system at a regional, national and international level.

5.1 Disasters in New Zealand

New Zealand is at risk of a range of hazards divided into five categories: natural hazard risks, biological hazard risks, technological risks, security risk and economic risk (Officials' Committee for Domestic and External Security Coordination Department of the Prime Minister, 2009). The National Hazardscape Report (OCDESC and DPMC, 2007) and National CDEM Plan (Department of the Prime Minister and Cabinet, 2015) identifies the most prevalent hazards in New Zealand and the ways each hazard should be managed at the local and national level. There is no publicly available prioritisation of *specific hazard events* that pose a significant risk to New Zealand.

New Zealand has a culturally diverse, but aging population of around 4,960,000 in 2019 (Statistics New Zealand, 2019). Over one-fifth of the population live in Auckland, the largest urban area. All urban areas have well-established infrastructure networks, which support communities and commercial/industrial activities. New Zealand has a large gross domestic product for its size and population. However, there are pockets of extreme social and economic disadvantage in some areas around the country. There are also variable levels of community and organisational readiness across the country.

In New Zealand, according to the CDEM Act 2002 and the National Disaster Resilience Strategy (2019;6), an emergency is defined as

> "a situation that:
>
> - is the result of any happening, whether natural or otherwise, including, without limitation, any explosion, earthquake, eruption, tsunami, land movement, flood, storm, tornado, cyclone, serious fire, leakage or spillage of any dangerous gas or substance, technological failure, infestation, plague, epidemic, failure or disruption to an emergency service or lifeline utility, or actual or imminent attack or warlike act; and
> - causes or may cause loss of life or injury or illness or distress or in any way endangers the safety of the public or property in New Zealand or any part of New Zealand; and
> - cannot be dealt with by emergency services or otherwise requires a significant and coordinated response."

and a disaster is defined as:

> "A serious disruption of the functioning of a community or a society at any scale due to hazardous events interacting with conditions of exposure, vulnerability and capacity, leading to one or more of the following: human, material, social, cultural, economic and environmental losses and impacts."

5.2 Disaster management in New Zealand

Emergency or disaster management (more commonly referred to as emergency management in New Zealand) is the development of policy, planning and operational activities to establish and maintain ways to deal with risk reduction, readiness, response and recovery across all levels – local, national and international. This includes plans, structures and arrangements to manage all aspects of an emergency or disaster.

In New Zealand, emergency management is considered the responsibility of all individuals, communities, businesses and government. It relies on everyone taking deliberate actions to improve resilience (Ministry of Civil Defence & Emergency Management, 2019).

The official component of disaster management (the focus of this report) is governed by:

- Civil Defence Emergency Management Act 2002 (the Act)
- National Disaster Resilience Strategy 2019
- National Civil Defence Emergency Management Plan 2015 (the National CDEM Plan)
- Guide to the National CDEM Plan 2015, supporting plans, and a range of guidance materials.

The Act and other legislation identify the statutory powers, structures and arrangements the government uses to manage an emergency or disaster.

The Ministry of Civil Defence & Emergency Management (MCDEM) is responsible for administering the Act, and provides leadership, strategic guidance, national coordination, and the facilitation and promotion of various key activities across the 4Rs of (risk) reduction, readiness, response and recovery for natural hazards (DPMC, 2015). It manages central government's response and recovery functions for national emergencies from natural hazards and supports the management of local and regional emergencies (DPMC, 2016 and DPMC, 2015). When MCDEM supports other agencies for events and are not the lead, other legislation such as the Fire Emergency New Zealand (FENZ) Act comes into force.

CDEM groups are formed from local authorities and manage the response to, and recovery from, emergencies and disasters within their region (CDEM Act, 2002). They work with other organisations such as lifelines utilities and emergency services across the 4 Rs. CDEM groups also provide coordinated planning for the 4 Rs (CDEM Act, 2002). The CDEM sector has grown in recent years and more focus is being placed on professionalism (MCDEM, 2018).

The 4 Rs is the framework for emergency and disaster management in New Zealand (DPMC, 2015).

- Reduction — identifying and analysing risks to life and property from hazards, taking steps to eliminate those risks if practicable, and, if not, reducing the magnitude of their impact and the likelihood of their occurrence to an acceptable level
- Readiness — developing operational systems and capabilities before an emergency happens, including self-help and response programmes for the public and specific programmes for emergency services, lifeline utilities and other agencies
- Response — actions taken immediately before, during or directly after an emergency to save lives and property, and to help communities recover
- Recovery — the co-ordinated efforts and processes used to bring about the immediate, medium-term, and long-term holistic regeneration and enhancement of a community following an emergency.

5.3 Disaster assistance in New Zealand

Events are managed at a local and national level in New Zealand (CDEM Act 2002). The CDEM Act and the National CDEM Plan establish the structure for the management of response as detailed in Figure 12.

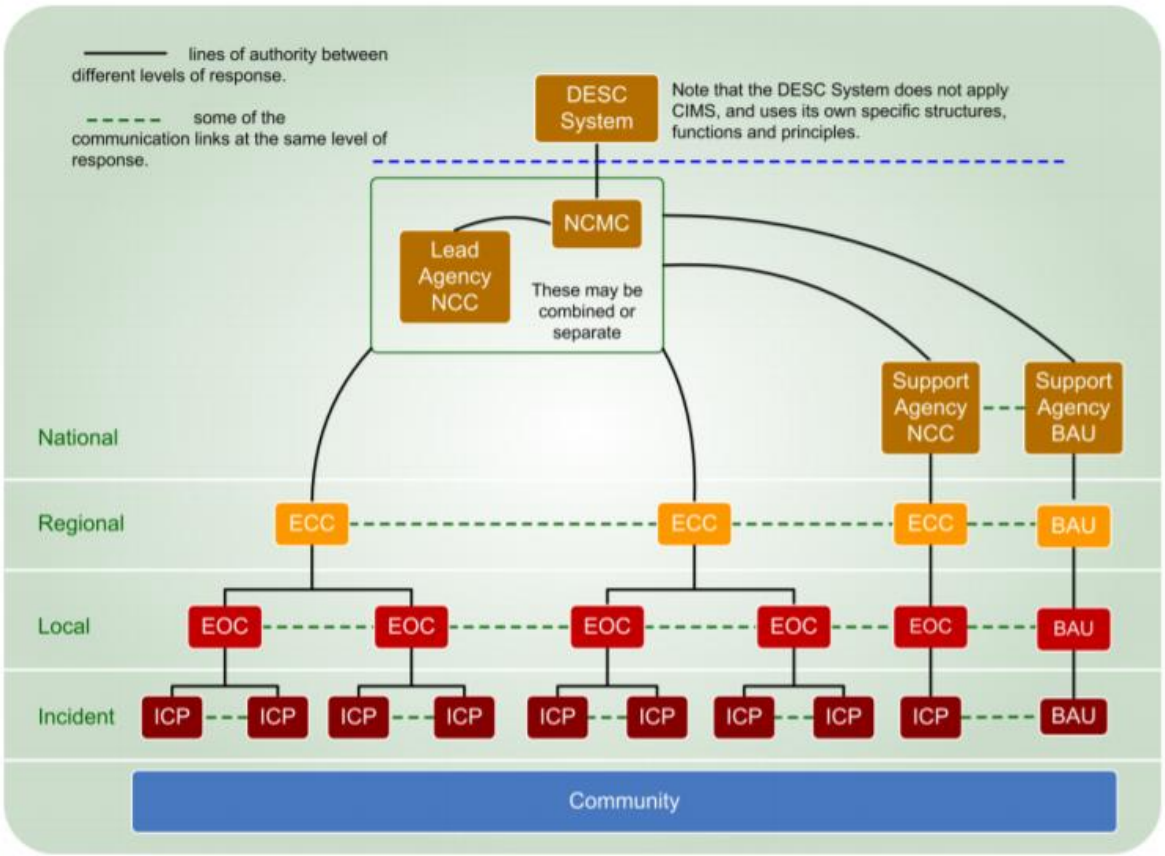


Figure 12 There are multiple levels of response during an emergency or disaster in New Zealand (DPMC, 2015)

The level activated depends on the scale of the response needed to manage the event. For example, an emergency response usually starts at a local level. The regional level is activated at a certain threshold to support the local level (DPMC, 2015). Many different organisations provide assistance to meet people's needs at these various levels.

Common response objectives that provide guidance to responders are listed below (DPMC, 2015). They are not listed in priority order, and vary depending on the event:

- preservation of life
- prevention of escalation
- maintenance of law and order
- provision of safety and security measures for people and property
- care of sick, injured and dependent people
- provision of essential services
- preservation of governance
- protection of assets (including buildings and their contents, and cultural and historic heritage assets)
- protection of natural and physical resources
- provision of animal welfare
- continuation or restoration of economic activity
- establishing effective arrangements for the transition to recovery

New Zealand uses the Coordinated Incident Management System (CIMS) for managing the coordinated response of an emergency (OCDESC and DPMC, 2014). It is a framework of consistent principles, structures, functions, processes and terminology that agencies can apply to coordinate and cooperate effectively in response (OCDESC and DPMC, 2014). CIMS is argued to be a flexible, modular and scalable framework that can be tailored to circumstances specific to any level or type of event and is currently being reviewed (OCDESC and DPMC, 2014). It is currently being reviewed. Different emergency management information systems are currently being used by different mandated local and national organisations in an emergency. For example, the Ministry for Primary Industries uses Tiake and CDEM groups use the Emergency Management Information System (EMIS). Work is being carried out across the sector to rectify this.

A Technical Advisory Group (TAG) has recently reviewed New Zealand's emergency management system. In response, the government has committed to a series of emergency management system reforms. These reforms aim to ensure New Zealand's emergency management system is step-changing into the future. They cover topics such as information systems, community and social inclusion (especially for iwi), professionalisation of the workforce, better coordination and interconnectivity, declarations, and clarifying lead and support agencies in the National Security System. However, the TAG review and subsequent reforms do not mention rapid disaster relief in New Zealand.

These reforms will be the largest changes to response systems since learnings from the Canterbury earthquakes in 2010 and 2011. This event is the largest scale of event that New Zealand has responded to (in recent times) but does not meet this report's definition of a catastrophic event. For example, this event had a large impact on thousands of people **within the Canterbury region** but did not have an extremely large physical and social impact on thousands of people across **multiple regions.**

5.4 Disaster relief in New Zealand

During readiness and response, the welfare function is responsible for coordinating the delivery of welfare services and resources to individuals, families/whānau, and communities with the support of the other response functions (MCDEM, 2015 and DPMC, 2015). New Zealand's welfare systems and processes are currently untested for a catastrophic scale of event (Alexander, 2015 and Wang, 2013).

“The theory was if it’s worse, then we’ll just scale up, and we found out scaling up didn’t work. So you have to prepare for how bad it’s going to be, or you’re going to fail. And I think that was the lesson we had to learn in all levels of government.”

Craig Fugate reflecting on FEMA’s response to Hurricane Katrina in the US.

6 Findings

This section defines the problem and proposes a new concept – *rapid disaster relief* – to define the ideal state and current state. It highlights the gap between these two states and recommends what actions can be taken to lessen the gap to meet peoples' basic needs and prevent escalation and worsening outcomes during a catastrophic event.

6.1 Disasters

In an ideal world, we would not experience disasters or catastrophic events. But the reality is, New Zealanders and their environments are exposed and vulnerable to a number of hazard events, and can be impacted by emergencies, disasters or catastrophic events. The impact of the event depends on size of hazard and level of exposure, and people's vulnerability and capacities.

We know that reducing levels of exposure and vulnerability and increasing people's capacities reduce our risk of disaster. There are many ways we can reduce our levels of exposure and vulnerabilities as well as increasing our capacities. These include:

- increasing our knowledge of natural hazards and the associated risks and consequences through research and investigation
- incorporating risk reduction measures in land-use planning and development processes
- identifying and prioritising vulnerable communities and improving their capacities and resilience to events
- developing activation levels and trigger points to guide the event management transition from an emergency, to a disaster, to a catastrophic event
- developing response plans in accordance with the hazard risk priorities
- integrating recovery into the other 3Rs of Reduction, Readiness and Response

These activities can reduce the risk of any scale of event by increasing capabilities and decreasing vulnerabilities, but we are still going to have emergencies and disasters requiring coordinated response and recovery.

In emergencies, for the most part, we can successfully meet people's basic needs without escalation impacts of increasing people's suffering. This however becomes more and more complex as the size of the impacts increase and more challenges are presented to the official and unofficial response.

In New Zealand, we are experienced at preparing and managing emergencies and disasters, but not catastrophic events. A catastrophic event can be characterised by a hazard event that:

- has an extremely large physical and social impact on thousands of people across multiple regions
- displaces large numbers of people for extended periods of time, if not permanently (within their lifetimes at minimum)
- causes widespread devastation across multiple regions, including significant damage to buildings and infrastructure such as transport, power, telecommunication and water networks.
- requires major national and international resources and coordination in an extremely challenging environment
- overwhelms the capacity of local communities and local and national organisations
- poses massive challenges to recovery and significant long-term effects.

It is only over the last few years, as New Zealand's science and risk knowledge has improved, that the CDEM sector has begun to recognise an event of this scale in our country may be likely because of our hazardscape, and explored what the impacts of certain hazards scenarios may look like.

The Ministry of Civil Defence & Emergency Management and some CDEM groups have identified and analysed the risk associated with worst credible scenarios such as large fault ruptures that pose a significant risk to multiple regions (if not the entire country), which could lead to a disaster or catastrophic event. For example, the Ministry of Civil Defence & Emergency Management has developed a national response plan to an earthquake that affects Wellington region and some CDEM groups have developed or are developing multi-region hazard frameworks to detail how they may plan for and manage response to a specific hazard scenario (see further detail below). These response plans are a relatively new approach to planning, recognising the CDEM sector needs to plan for hazard events that pose a significant risk at not just the regional level, but across regions and nationally.

The Wellington Earthquake National Initial Response Plan (WENIRP) directs and coordinates the initial national response to a major Wellington earthquake until a formal response structure and specific National Action Plan have been established (Ministry of Civil Defence & Emergency Management, 2018). The WENIRP is designed to be used as an initial response plan until the National Action Plan is developed. Response activities are split over the first three to five days of response (MCDEM, 2018). The credible worst-case scenario has been used to determine the impact of a major Wellington earthquake on the Wellington region to roads, rail, ports ,airports, lifeline utilities and the population. The plan does not include details about the magnitude of the earthquake and antecedent conditions for the scenario. National and regional response activities are also broken down over a timeline of 10 days following the earthquake The WENIRP is a national document and outlines the processes for international assistance in this scenario (MCDEM, 2018).

The South Island/Te Waipounamu Alpine Fault Earthquake Response (SAFER) Framework was published in August 2018 and provides a concept of coordination and priority setting across all six South Island Civil Defence Emergency Management groups and their partner organisations over the first seven days of response (Emergency Management Southland, 2018). The framework is based on a range of Alpine fault rupture scenarios and other potential earthquake sources, with one scenario – a south to north rupture – used in the SAFER workshops with stakeholders as a basis for planning (Emergency Management Southland, 2018). This scenario enabled SAFER to plan for a maximum credible event. The SAFER framework is an inter-regional document and highlights that national and international assistance will be required in this scenario (Emergency Management Southland, 2018).

The Hikurangi Earthquake and Tsunami (HEAT) Framework is another multi-regional response framework being developed. The aim of this framework is to develop a coordinated CDEM response to a Hikurangi subduction zone earthquake and tsunami to assist and enhance community resilience across the North Island East Coast (Hawke's Bay Regional Council, 2017). The CDEM groups from Gisborne, Bay of Plenty, Hawke's Bay, Manawatu-Whanganui and Wellington – the regions most likely to be the first and most affected – are leading the project along with MCDEM, and are using a credible magnitude 8.9 earthquake and tsunami scenario. An initial draft of the HEAT Framework is due to be completed late 2019 before being tested in 2020 and refined further in 2021 (Hawke's Bay Regional Council, 2017).

It is only through these planning projects that the CDEM sector has started to understand what these future events may mean for people. This new work recognises the unofficial and official response in New Zealand will be challenged by:

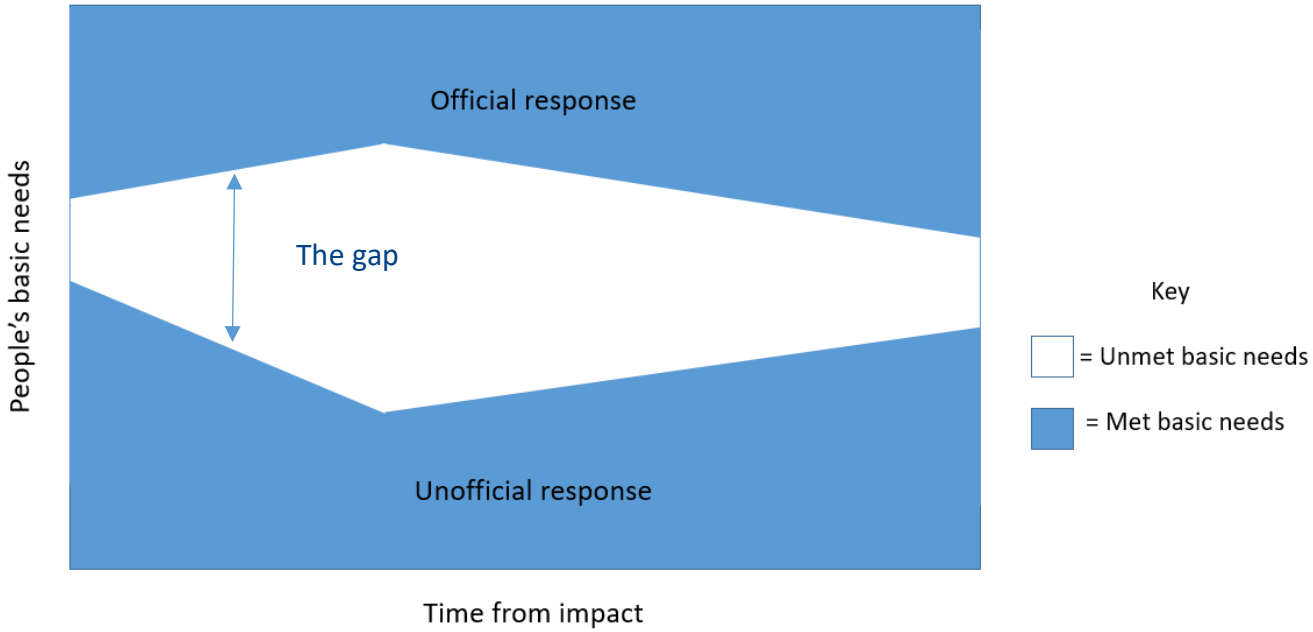
- large numbers of fatalities and injuries across multiple regions
- large numbers of people displaced for extended periods of time, if not permanently (within their lifetimes at minimum)
- widespread damage to power, communication, water and transport networks
- the availability of goods, services and equipment given the 'just-in-time' [1]approach
- rapidly changing situations
- distance from international assistance.

This will likely mean those affected will need urgent access to water, shelter, food and medical care to meet their basic needs.

While it is expected communities will work together to support themselves and those around them and the official response will activate quickly, there is likely to be significant and critical unmet basic needs as time progresses – this is the gap. This gap will emerge as early as the first few hours of the event. For example, it may be a result of community resources being depleted or the official response being

[1] 'Just in time' supply is now common in modern supply chains as it reduces costs by reducing the amount goods an organisation has in stock at the point of purchase. Pre-planning should seek to understand the goods, services and equipment readily available for rapid disaster relief.

overwhelmed by needs. If basic needs are not met, the gap will escalate until medical care, food, water and shelter is provided (Figure 13). When response is unable meet people's time-critical basic needs, increased suffering and escalation of impacts on people are likely. For example, people's health will deteriorate due to untreated injury or pre-existing health conditions, lack of water, nutrition and exposure. When response can meet people's time-critical basic needs, suffering is reduced and the situation does not escalate.



	Factors that decrease the gap	Factors that increase the gap
Reduction and readiness	• Resilience-building particularly for vulnerable populations • Risk reduction to reduce exposure of populations and lifelines • Pre-planning and preparedness	• The size of the impacts geographically • Vulnerable people and their environments • Exposed lifelines – significant impact on lifelines hindering responses • Lack of pre-planning and preparedness
Response	• Access to goods, services and equipment to meet basic needs • Quick and informed (relative to the event) decision making • Effective coordination	• Slow decision making • Delayed access to goods, services and equipment to meet basic needs • Distance from international assistance

Figure 13 Conceptualisation of the gap between the official and unofficial response and factors that increase or decrease the gap

This is the first conceptualisation of the problem during a catastrophic event – the gap between the official and unofficial response where there are unmet basic needs. The size of the gap at the start of response is influenced by multiple actions that can be taken before the event, and the size of the gap during response is influenced by the decisions and actions made during the event (see figure above). Multiple actions can be taken prior and during response to minimise the gap between the official and unofficial response, and ensure people's basic needs are met rapidly and escalation of suffering is prevented during a catastrophic event (see figure above).

Lessons learnt from Hurricane Katrina in the US and the Tōhoku earthquake and tsunami in Japan highlight that responses are not able to just scale up from emergency or disaster response to a catastrophic event response as the complexity of the response grows exponentially with the size and impact of the event. This is something the CDEM sector is only just coming to understand within the New Zealand context. During the Rapid Disaster Relief Workshop, for example, emergency planning versus catastrophic planning was likened to CDEM playing provincial rugby, when we really need to be playing for the All Backs, or CDEM playing provincial rugby, when really it is a different sport entirely.

Therefore, in New Zealand, mandated local and national organisations need to understand the assumptions and biases within current readiness and response systems and processes, and recognise that planning for, and managing, a catastrophic event requires a new way of thinking. It is critical that current systems and processes are appropriate to manage the worst possible scenario.

In New Zealand, the response frameworks have prompted the CDEM sector to explore how these time-critical basic needs are met rapidly. For example, the SAFER framework and WENIRP states it will take a 'rapid relief' approach. Rapid relief is defined as "the immediate provision of resources and assistance to ease the suffering of those affected by an emergency, on a 'no-regrets' basis" (Emergency Management Southland, 2018 and Ministry of Civil Defence & Emergency Management, 2019). This report proposes to further develop this 'rapid relief' approach to provide the CDEM sector with a framework to prepare for catastrophic events, and enable official organisations to meet people's time-critical basic needs to prevent escalation and suffering during a catastrophic event.

6.2 Rapid disaster relief

Rapid disaster relief is a newly proposed concept to meet people's time-critical basic needs during a catastrophic event. The proposed definition, key assumptions, output and outcomes are detailed below (Figure 14).

Proposed definition	Rapid disaster relief is the immediate provision of medical care, water, food, shelter and sanitation to ease the suffering of those affected by a disaster.
Proposed key assumptions	Rapid disaster relief: • must be pre-planned to be effective • must be effectively coordinated • is based on population-based assessment, not individual assessed needs • is a push process where a 'no-regrets' approach to the deployment of goods, services and equipment is taken • is triggered by a pre-identified set of conditions to prevent unnecessary delay • is enabled by logistics • prevents escalation of impacts on individual and communities • is deployed when communities are largely overwhelmed, and 'normal' life is suspended • highlights the importance of knowing your community before an event • needs decision makers to have the appropriate skills, knowledge and expertise to make prompt and informed decisions.
Proposed output	Right stuff, right place, right time.
Proposed outcomes	People's basic needs are rapidly met to prevent escalation of suffering and compounding risks during a disaster or catastrophic event.

Figure 14 Proposed new concept - rapid disaster relief

Rapid disaster relief requires rapid population and quantitative-based needs assessments, removing the individual 'human' and 'empathic' elements usually associated with a needs assessment (Figure 15). The need for this assessment to be rapid means it is carried out with limited information and an incomplete understanding of impacts. This assessment is initially carried out based on an assumed 'need' versus assessed 'need' of those affected. This is one of the ways it is considered different to normal provision of people's needs during an emergency or disaster.

	Catastrophic event	Emergency
Needs assessment	Population level based on assumed need	Assessed need at predominantly individual level
Planning	There will be multiple information needs prior to planning –based on an assumed scenario and assumed need as part of initial action plans	Based on action plan.
Expertise, experience and guidance	Low level in NZ. Untested in NZ context.	High level in NZ Tried and tested at the emergency and disaster scale of response.
Delivered by	NGOs, INGOs and NZ agencies with specific capabilities and mandates. Heavily reliant on logistics support and international capabilities.	Majority by NZ agencies and NGOs with responsibilities under welfare arrangements in National Plan. Reliance on logistics support.

Figure 15 Characteristics and comparison of catastrophic event and emergency response in a CDEM context

6.2.1 Gap Analysis and Recommendations

Rapid disaster relief is used to analyse the ideal state, current state, gap and recommendations for rapid disaster relief in New Zealand

THEME 1: RESPONSE SYSTEMS, PROCESSES AND PLANS			
Current state	Gap	Proposed ideal state	Recommendations
New Zealand's response system and processes for emergencies, including the use of Coordinated Incident Management System (CIMS), are clearly set out by the CDEM Act and National CDEM Plan. New Zealand's response systems, processes and plans are used to respond to emergencies and to a lesser extent disasters e.g. Canterbury earthquakes. New Zealand has not experienced a catastrophic disaster and its current response systems, processes and plans have not been used or tested for an event of this scale. Planning has been completed and is also underway to: • develop response plans and frameworks for hazard scenarios that may lead to a catastrophic event • test these response frameworks through tier 3 and 4 exercises. Rapid disaster relief is a newly proposed concept within New Zealand.	New Zealand's response systems, processes and plans have not been tested for catastrophic events so it is unknown if they are fit for purpose to respond. Response plans and frameworks being developed for hazard scenarios that may lead to a catastrophic event have not yet been tested. Rapid disaster relief is not embedded across mandated national and local organisations or in its response systems, processes and plans.	New Zealand systems, processes and plans are: • tested and confidence gained that arrangements fit for purpose to respond to a catastrophic event • rapid disaster relief is embedded across mandated national and local organisations. *This is based on the evidence from Hurricane Katarina that systems, processes and plans cannot be scaled up to manage the worse credible scenario*	a) Assess the capability of the New Zealand's response system, processes and plans to respond to a catastrophic event, including the coordination of international assistance to inform future capability development. *For example, current response systems could be tested at a catastrophic event scale through the tier 3 and 4 exercises planned and learnings could be used to improve New Zealand's current system, processes and plans.* b) Embed rapid disaster relief in New Zealand's response systems, processes and plans and across mandated national and local organisations.

THEME 2: INTERNATIONAL ASSISTANCE COORDINATION

Current state	Gap	Proposed ideal state	Recommendations
The CDEM Act and National CDEM Plan clearly set out the response system at a national level to manage international assistance. The National Disaster Relief Forum (NDRF) is mandated to coordinate NGOs but does not have set processes to manage large numbers of INGOs. International assistance arrangements approved by Cabinet are for any large-scale, rapid-onset event but there is limited awareness of this at the regional level.	The coordination of pre-planned international assistance has not yet been tested for a catastrophic event. NDRF does not have the processes required to coordinate the response of INGOs and is likely to be overwhelmed as there would be far more stakeholders to coordinate (such as INGOs) than currently planned for in a catastrophic event.	International assistance arrangements to coordinate pre-planned international assistance for a catastrophic event response are: • tested, and confidence gained that arrangements are fit for purpose • embedded across relevant organisations. The coordination and management of pre-planned and unplanned INGO and NGO assistance by NZDR for a catastrophic event response has been: • tested, and confidence gained that arrangements are fit for purpose • embedded across relevant organisations. *This is based on evidence from Hurricane Katrina where 133 offers of assistance from foreign governments and 12 offers of disaster assistance from international organisations were received.*	a) Assess the capability of the international assistance arrangements to coordinate pre-planned and unplanned international assistance for a catastrophic event. *For example, international assistance arrangements could be tested at a catastrophic event scale through the tier and 4 exercises planned and learnings could be used to improve these arrangements*. b) Critically assess current arrangements and recommend options for coordination and management of INGOs (planned and unplanned) in response to a catastrophic event. c) Embed knowledge of international assistance arrangements across relevant organisations including raising awareness of the international assistance arrangements pre-approved by Cabinet

THEME 3: HAZARD SCENARIOS TO INFORM RAPID DISASTER RELIEF

Current state	Gap	Proposed ideal state	Recommendations
A classified hazard register is held at a national level but is not available at local level. CDEM has identified some hazard scenarios that may cause a catastrophic event e.g. an Alpine fault earthquake, Hikurangi subduction zone earthquake and tsunami, Wellington earthquake and Taupo caldera volcanic eruption. CDEM groups analyse hazards through group plans and this risk assessment informs their priority and subsequent investment in reduction and readiness.	No systemic process to identify maximum credible events that may cause a catastrophic event at a national level. The hazard scenarios that have been analysed have not had a consistent assessment of risk applied to it (that is publicly available). Risks assessments are not informing investment for reduction and readiness activities consistently across national and local scales.	Systemically identify potential maximum credible events that may led to disaster or a catastrophic event. Develop hazards scenarios for all potential maximum credible events to understand their impacts (such as network failures). *This is based on learnings from Hurricane Katrina that plans that respond to the worst-credible scenario need to be developed.* Risk assessments inform investment for reduction and readiness is consistently applied across national and local scales.	a) Assess risk assessments processes (national and local) to determine whether they adequately identify catastrophic event scenarios. This should also consider the mechanism to update as new science and risk knowledge emerges. b) Systemically identify potential maximum credible events that may lead to disaster or a catastrophic event and develop these into scenarios to understand their impacts. c) Determine how risk assessments inform investment in reduction and readiness activities for catastrophic events. *For example, consider whether the balance between likelihood and impact is suitable given overseas learnings about preparing for catastrophic events.*

THEME 4: ASSESSMENTS TO INFORM RAPID DISASTER RELIEF

Current state	Gap	Proposed ideal state	Recommendations
National guidance focusses on methods for completing needs assessments at an individual or family level, which is also well practiced. There is some reference to community-based assessments but in the context of emergencies not disasters or catastrophic events. A rapid disaster relief assessment for basic needs has been carried out for one national response plan (WENIRP). This process used a population-based assessment methodology to determine the amount of services, goods and equipment needed to meet people's basic needs.	There is no national guidance on methods for completing a rapid disaster relief population-based assessment for basic needs for a disaster or catastrophic events. There are no tools to apply the rapid disaster relief population-based assessment for basic need used in the WENIRP to other maximum credible events.	A modelling tool is developed and used to carry out a rapid disaster relief population-based assessment for basic needs. This involves the quantification of how many people will likely be affected, their potential locations and estimates of what and the amount of services/goods/equipment required to meet their basic needs (considering the likely impacts of the hazard scenario) as per international guidelines such as SPHERE. *This is based on the evidence from the Tohoku earthquake and tsunami where there were supply shortages and minimum standards were not met.*	a) Develop and apply a consistent methodology to enable rapid disaster relief population-based assessment for basic needs and apply it to all hazard scenarios that are likely to cause a catastrophic event. This will enable an understanding of how many people will likely be affected, their potential locations and estimates of what and the amount of services/goods/equipment required to meet their basic needs as per international guidelines such as SPHERE. *For example, this could be achieved by:* • *documenting and peer-reviewing the process (by experts from organisations with international experience) used for WENIRP and making the process, dataset and tools available to the sector* • *investing in a dataset and modelling tool to quantify how many people will likely be affected, their potential locations and estimates of what and the amount of services/goods/equipment required to meet their basic needs as per international guidelines such as SPHERE.*

THEME 5: PROVISION OF RAPID DISASTER RELIEF

Current state	Gap	Proposed ideal state	Recommendations
Lifeline vulnerabilities research and national response plan and frameworks have increased the sector's understanding of potential gaps in the provision of services/goods/equipment relating to 'just in time' supply chains and distance from international assistance.	Limited understanding of the implications of supply chain failures resulting in inability to meet people's basic needs and subsequent consequences of this.	Supply chain vulnerabilities that could potentially result in inability to meet basic needs are understood. These vulnerabilities are mitigated on a continuous improvement basis. *This is based on lessons learnt with delays in providing basic goods in response to Hurricane Katrina.*	a) Supply chains to meet people's basic needs are understood and assessed against lifeline vulnerability research to determine mitigations required. *For example, this work could inform:* • *hardening of critical infrastructure* • *pre-approvals for supply of international assistance* • *requirement to hold more stock or establish bulk supplies.*
Some work has been carried out to understand the different services/goods/equipment available that could be used to meet people's basic needs for emergencies. Unaware of an options analysis to understand the different services/goods/equipment available that could be used to meet people's basic needs in a catastrophic event. Some work has been done on water supply initiatives driven by WENIRP. There is no plan for managing people's basic needs for a catastrophic event.	An options analysis to understand the different solutions available that could be used to meet people's basic needs Sharing of learnings.	Different solutions (services/goods/ equipment) to meet people's basic needs are understood. They are analysed to enable appropriate decision making for any given scenario.	b) Carry out options analysis to understand the different solutions available that could be used to meet people's basic needs. Priorities should be informed by needs identified by worst credible hazard scenarios. *For example, potential solutions for mass emergency accommodation are identified and assessed. Solutions could then be selected for a given response plan and arrangements put in place accordingly.* c) Use catastrophic hazard scenarios to identify critical needs for services/good/equipment that: • could only be met by international assistance or significant shift in national investment • if not sent immediately would result in increased suffering
Not aware of any 'threshold' levels at a local or national level that immediately prompt specific organisations to provide services/goods/equipment to affected areas, using hazard scenarios.	Thresholds to immediately prompt specific organisations to provide services/goods/equipment to affected areas.	Thresholds are determined and understood to immediately prompt specific organisations at local, national and international levels to provide services/goods/equipment to areas, minimising delays *This is based on lessons learnt and implemented in the United States post Hurricane Katrina.*	d) Use catastrophic hazard scenarios to develop thresholds to immediately prompt specific organisations to provide services/goods/ equipment to affected areas. e) Ensure suggested arrangements are embedded across mandated national and local organisations and review as New Zealand's capability is developed.

7 Conclusion

Some time in our future, we will experience a catastrophic event impacting New Zealanders on a scale not experienced before in our country. Catastrophic event can be characterised by a hazard event that:

- has an extremely large physical and social impact on thousands of people across multiple regions
- displaces large numbers of people for extended periods of time, if not permanently (within their lifetimes at minimum)
- causes widespread devastation across multiple regions, including significant damage to buildings and infrastructure such as transport, power, telecommunication and water networks
- Requires major national and international resources and coordination in an extremely challenging environment
- overwhelms the capacity of local communities and mandated local and national organisations
- poses massive challenges to recovery and significant long-term effects.

It is likely following a catastrophic event that some people will be without food and water, shelter and medical care, meaning they will be without their basic needs. Those affected will need help to meet their needs (Alexander, 2015 and Wang, 2013). While it is expected those affected will work together to support each other (unofficial response) and their efforts will be supported by the official response, there is likely to be significant and time-critical unmet basic needs (Twigg and Mosel, 2017). The inability to meet these needs or any delays has the potential to escalate the severity of the impacts on people leading to suffering and worsening outcomes. For example, people's health will deteriorate due to untreated injury or pre-existing health conditions, lack of water, nutrition and exposure.

It is therefore important New Zealand understands its capacities and capabilities prior to a catastrophic event and builds in lessons learnt from countries elsewhere. This report is a starting point to understand the problem in a New Zealand context. It has started to define the ideal state proposing a new concept – *rapid disaster relief* – to unpack the current state and highlight the gap in meeting people's needs during a catastrophic event.

Multiple actions can be taken before an event and during response to minimise the gap between the official and unofficial response and ensure people's basic needs are met rapidly to prevent escalation of suffering. It is argued that failure to plan and prepare for catastrophic events could be interpreted as negligence as it does not anticipate basic needs that cannot be meet by improvisation (Alexander, 2015).

Lessons learnt from catastrophic event in other countries highlight that responses are not able to scale up from emergency or disaster response to a catastrophic event response as the complexity of the response grows exponentially with the size and impact of the event.

In New Zealand, official organisations need to understand the assumptions and biases within current readiness and response systems and processes, and recognise planning for and managing a catastrophic event requires a new way of thinking – rapid disaster relief.

This report recommends the following actions that might be undertaken to minimise the gap:

1. RESPONSE SYSTEMS, PROCESSES AND PLANS
    a. Assess the capability of the New Zealand's response system, processes and plans to respond to a catastrophic event, including the coordination of international assistance to inform future capability development.
    b. Embed rapid disaster relief in New Zealand's response systems, processes and plans and across mandated national and local organisations.
2. INTERNATIONAL ASSISTANCE COORDINATION
    a. Assess the capability of the international assistance arrangements to coordinate pre-planned and unplanned international assistance for a catastrophic event
    b. Critically assess current arrangements and recommend options for coordination and management of INGOs (planned and unplanned) in response to a catastrophic event.
    c. Embed knowledge of international assistance arrangements across relevant organisations including raising awareness of the international assistance arrangements pre-approved by Cabinet
3. HAZARD SCENARIOS TO INFORM RAPID DISASTER RELIEF
    a. Assess risk assessments processes (national and local) to determine whether they adequately identify catastrophic event scenarios. This should also consider the mechanism to update as new science and risk knowledge emerges.

b. Systemically identify potential maximum credible events that may lead to disaster or a catastrophic event and develop these into scenarios to understand their impacts.
c. Determine how risk assessments inform investment in reduction and readiness activities for catastrophic events.
d. For example, consider whether the balance between likelihood and impact is suitable given overseas learnings about preparing for catastrophic event.

4. ASSESSMENTS TO INFORM RAPID DISASTER RELIEF
    a. Develop and apply a consistent methodology to enable rapid disaster relief population-based assessment for basic needs and apply it to all hazard scenarios that are likely to cause a catastrophic event. This will enable an understanding of how many people will likely be affected, their potential locations and estimates of what and the amount of services/goods/equipment required to meet their basic needs as per international guidelines such as SPHERE.
5. PROVISION OF RAPID DISASTER RELIEF
    a. Supply chains to meet people's basic needs are understood and assessed against lifeline vulnerability research to determine mitigations required. For example, this work could inform:
        - critical hardening of infrastructure
        - pre-approvals for supply of international assistance
        - requirement to hold more stock or establish bulk supplies.
    b. Carry out options analysis to understand the different solutions available that could be used to meet people's basic needs. Priorities should be informed by needs identified by worst credible hazard scenarios.
    c. Use catastrophic hazard scenarios to identify critical needs for services/good/equipment that:
        - could only be met by international assistance or significant shift in national investment
        - if not sent immediately would result in increased suffering.
    d. Use catastrophic hazard scenarios to develop thresholds to immediately prompt specific organisations to provide services/goods/ equipment to affected areas.
    e. Ensure suggested arrangements are embedded across mandated national and local organisations and review as New Zealand's capability is developed.

Innovative solutions (potentially involving the private sector and non-government organisations) will be required to avoid similar situations in New Zealand.

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