

# Sustainable Hazard Management in New Zealand : Developing Practice Frameworks<sup>1</sup>

## *Gestion à long terme des risques en Nouvelle-Zélande: développement de plans d'action.*

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**Abstract:** In 1996 the New Zealand Government began replacing the nation's response-oriented counter-disaster approach with one grounded within a risk-based sustainable hazard management framework. Based on the goal of achieving community resilience and continuity through risk management, local and national emergency management systems are being established that are designed to enable communities to become more physically and economically robust through an ability to reduce the negative consequences of natural and technological hazards. It is a deliberate attempt to link land-use management, and risk reduction through Sustainable Hazard Management (SHM). By incorporating SHM and public risk management into the theory-in-use of the emergency manager, the likelihood of achieving community resilience and effectiveness in overcoming problems presented by disaster impact is greater.

**Keywords:** Emergency management; community resilience; risk management; Sustainable Hazard Management; community empowerment; hazard analysis; land-use management.

**Resume:** *En 1996, le Gouvernement néo-zélandais commença à remplacer une approche anti-désastre basée sur la réaction, par une approche à long terme dont la structure de gestion du danger était basée sur les risques. Ayant pour but de renforcer le potentiel de réaction de la communauté et d'obtenir un effet à long terme par la gestion des risques, des systèmes locaux et nationaux de gestion des urgences sont mis en place. Ceux-ci ont pour but de permettre aux communautés de devenir plus robustes tant physiquement qu'économiquement, en réduisant les conséquences négatives des dangers naturels ou technologiques. C'est une tentative délibérée d'association de la gestion des sols et d'une réduction du risque, par une gestion à long terme danger (« Sustainable Hazard Management », SHM). Incorporer SHM et la gestion du risque public dans une théorie à l'usage du gestionnaire des urgences, permet d'accroître les chances d'obtenir une communauté à fort potentiel de réaction, et l'efficacité à surmonter les problèmes lors d'un désastre n'en sera que plus grande.*

**Mots Clefs:** Gestion de l'urgence ; potentiel de réaction de la communauté ; gestion du risque ; gestion à long terme du danger ; prise en charge de la communauté ; analyse du danger ; gestion du sol.

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## 1. Introduction

A major influence dominating international scientific thinking since the late 1980's is the United Nations report, *Our Common Future*, (World Commission on Environment and Development, 1987). The report examined the critical social and economic problems facing the Earth and formulated proposals to solve them in ways that ensured sustained human progress without depleting the resources of future generations.

Frequently referred to as the Brundtland Report, *Our Common Future* introduced the term 'sustainable development', defined as 'meeting the needs of the present without compromising the ability of future generations to meet their own needs'. The goal of sustainable development is to create a new era of economic growth as a way of eliminating poverty and extending to all people the opportunity to fulfill their aspirations for a better life.

### 1.1 Linking Sustainable Development Concepts and Emergency Management Practice

In the 1990's, the concept of sustainable development started to exert itself on emergency management. A focus on sustainable development issues prompted some policy makers and researchers to realise that the conventional emergency management approach (known as Comprehensive Emergency Management - CEM) does not provide sufficient community protection from disaster impact (Burby et. al., 1998; Mileti et. al., 1999). CEM developed during the late 1970's to address the lack of policy and operational integration in emergency management, and a failure to link preparedness and response, on the one hand, with recovery and mitigation on the other.

While some issues have been resolved through CEM, the approach has not been very successful in achieving risk management, and it has not adequately linked emergency management with other necessary social processes, such as land-use management (EMCD, 1999). The concept of 'Sustainable Hazard Management' offers a link between these issues.

Sustainable Hazard Management (or SHM), refers to creating places that are less vulnerable to natural and technological hazards and which are resilient to those events. It has five basic elements: environmental quality; quality of life; disaster resilience; economic vitality; and inter- and intra-generational equity (Mileti, et. al., 1999). In this context, reducing the risk from hazards, reducing losses from disasters and working toward sustainable communities go hand-in-hand. It requires an open-system orientation, characterised by a public risk management<sup>2</sup> process.

By incorporating these approaches into the theory-in-use of the emergency manager, the likelihood of achieving community resilience and effectiveness in overcoming the problems presented by disaster impact is greater. Amongst other attributes, SHM recognises a time dimension to the management of hazards. In like manner, public risk management enables emergency management to be contextualised into a wider arena of relevant actions and activities. Both time and context dimensions are important, because an effective emergency management approach needs to be problem-focused as well as process-oriented. It also has to be inter-disciplinary and inter-governmental, allow for private and public sector input, and to be flexible enough for members of the wider community to have input. And, at the same time, solutions need to be applied for the present as well as the future.

### 1.2 Future Role of Emergency Managers

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<sup>2</sup> Public risk management is a process to decide what to do where a risk has been determined to exist. It involves identifying the level of tolerance the community has for a specific risk or set of risks and determines what risk assessment options are acceptable within a social, economic, cultural and political context. The process must be open since it has to factor in benefits as well as costs of control for statutory or socially approved requirements to manage the risk. It requires public communication and consultation.

These factors point a direction to where emergency management should be heading. There are six inter-linking areas of future activity that emergency management practitioners should assume responsibility for:

1. Assisting in the creation and management of community resilience, development and growth by being able to recognise resources and risks, and help communities choose a level of risk appropriate to their circumstances.
2. Helping to manage communities as sustainable entities, with the understanding that reducing losses from disasters alone is too narrow a goal.
3. Linking emergency management concepts and practices with sustainability through long-term hazard and loss reduction and through employing risk management processes.
4. Helping to reduce community losses as well as assisting in the process of enhancing the long-term equilibrium between human and natural environmental interactions.
5. Helping to ensure appropriate emergency response mechanisms are in place, are operable, and capable of satisfying risk environment needs.
6. Linking emergency management concepts and practices with wider community management practices and processes.

The SHM approach emphasises the point that it is human beings, and not nature, that cause disaster losses. Losses stem from choices about where and how human development proceeds. Recognising this truth, and building processes and practices around it, should strengthen a community's social, economic and environmental resiliency, and vice versa. Having SHM in its toolbox will enable emergency management to assist communities maximise gains and not just minimise losses.

This approach also underscores the astute message made by DeSanto when he wrote that 'emergency management is an essential aspect of environmental stewardship' (1990). The SHM approach thus provides emergency management with a very specific role in applied stewardship. Furthermore, a likely outcome is the ability of communities to exercise better choice about levels of acceptable risk and their consequence.

### **1.3 Reform as a Forerunner for Emergency Management Development**

New Zealand has undergone significant public sector reform since the mid-1980's and with it, wide-ranging social and economic transformation. As part of the reform process, in 1996 the New Zealand Government also determined the need for change in the nation's emergency management arrangements. Key reforms that have been precursors to replacing the nation's response-oriented counter-disaster approach with a risk-based sustainable hazard management framework are:

1. Redefining central government role in relation both to the private sector, and to local government (regional and territorial). The *State Owned Enterprises Act 1986*, for example, has brought about efficiencies in government trading operations.
2. Restructuring local government. Amendments to the *Local Government Act 1974* have increased local authority abilities to produce quality outcomes for their communities, require them to produce and report on annual plans, and to adopt a ten-year financial strategy. This strategy should cover statutory responsibilities, including environmental risks and asset management.
3. Institutionalising sustainable management. The *Resource Management Act 1991* directs local authorities to control the effects of activities on the environment, rather than the activities themselves. The Act puts in place a comprehensive set of processes for local authorities to plan and consult on future development and integrates consideration of the hazardscape into the wider land-use management framework. This theme is continued in a range of other legislation, many explicitly based on a risk management framework, such as the *Hazardous Substances and New Organisms Act 1996*, the *Building Act 1991*, the *Biosecurity Act 1993*, and the *Maritime Transport Act 1994*.

4. A risk management guideline jointly developed by Standards Australia and Standards New Zealand (Standards Australia, 1999).
5. Establishment in 1990 of a Ministry of Research, Science and Technology (MoRST) to provide policy advice to Government, particularly on funding issues for research science and technology; and a Foundation for Research, Science and Technology (FRST) to purchase research and science in accordance with national priorities. Associated with these developments is the establishment of a Public Good Science Fund from existing science funding structures to ensure an integrated approach to the purchase of public good science and technology outputs.
6. Restructuring research providers in 1992 into ten Crown Research Institutes (CRI's). The CRIs are monitored for their financial and strategic performance by a range of agencies to ensure that the science infrastructure of New Zealand is maintained and dedicated to yielding benefits to New Zealand.
7. The Foresight project, led by MoRST, and commencing in 1998 ensures that all sectors of New Zealand have a say in developing an integrated strategy for setting the priorities for Government's investment in science and research.
8. Establishment of a quality assured National Qualifications Framework to give individuals flexibility and choice in their education and training. Qualifications are registered and providers are accredited to assess and award credits. This has led to the creation of Industry Training Organisations (ITOs) to develop new skill standards and qualifications to meet the needs of specific sectors.

## **2. Emergency Management Reform**

An important step to make emergency management consistent with and to take advantage of, these reforms was taken in 1996. Government re-defined its responsibility as 'establishing and maintaining the emergency management framework', and 'identifying the principles, roles and responsibilities of all agencies in the sector'. Government also agreed to a set of principles for the emergency management sector. These principles apply across all aspects of emergency:

1. Acceptance of individual responsibility and self-reliance, including the owner of any property being responsible for its reconstruction
2. Acceptance of community responsibility and self-reliance
3. Acceptance that routine events and emergencies are best handled at local levels where possible
4. Recognition of risk reduction, readiness for, and response to emergencies, and post-impact recovery as a continuum of activities
5. Adoption of horizontally (inter-agency) and vertically (inter-governmental) integrated emergency management systems
6. Recognition and involvement of volunteer organisations
7. establishing community-level risks via an all-hazards approach
8. Declarations of emergencies at the most appropriate level of government by elected representatives
9. Emergency management structures underpinned with appropriate technical information and expertise.

### **2.1 New Ministry**

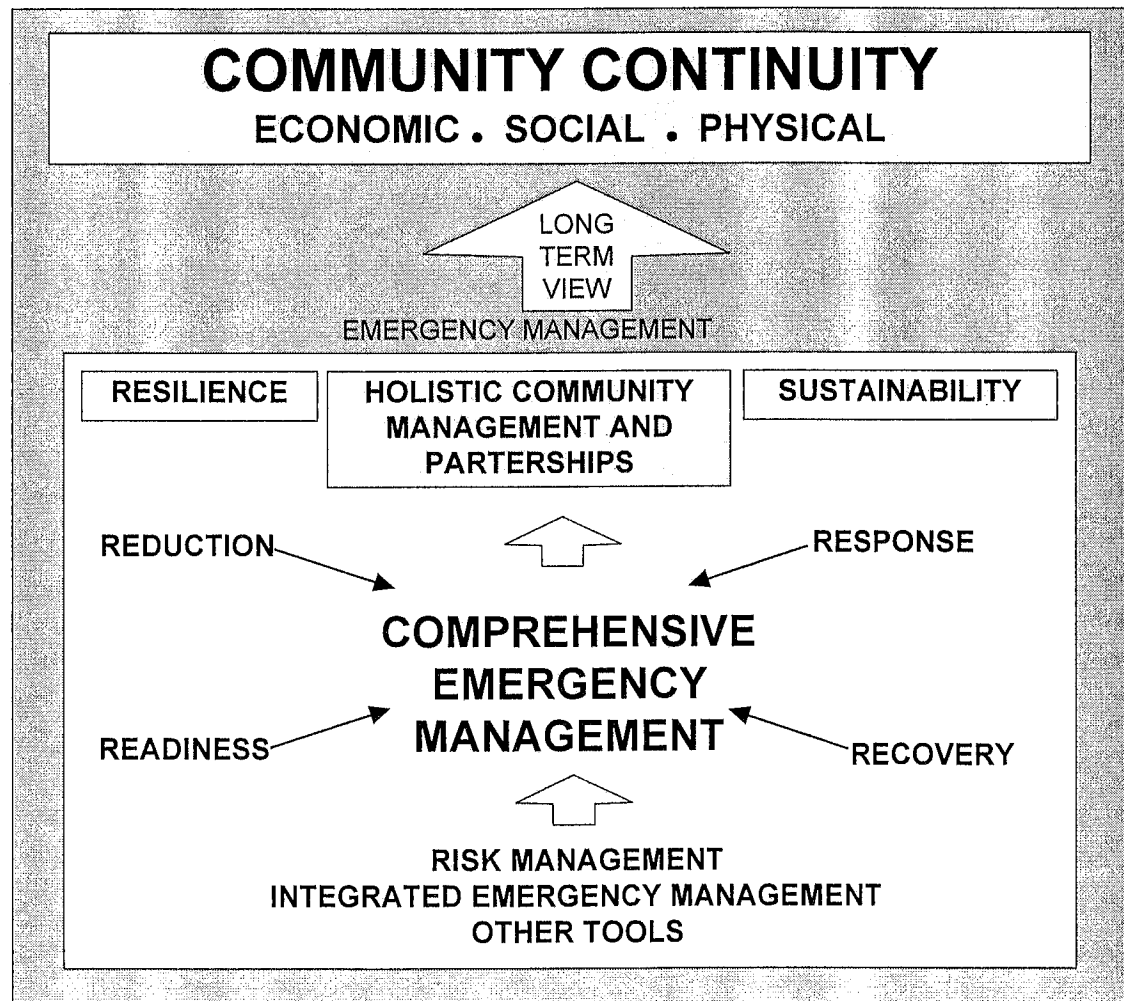
To ensure appropriate implementation of these principles, Government agreed to establish a new Ministry, with a policy and purchase role within the emergency management sector, as well as an operational role for national response and recovery issues.

Furthermore, in 1998 Government approved arrangements to rationalise local measures so as to ensure better provision of emergency management at the sub-national level. The new Ministry will come into being on 1 July 1999. In addition to those stated above, the Ministry added two further principles in order that emergency management can be correctly contextualised. They are:

1. Risk management to be the cornerstone of emergency management practices and procedures.
2. The emergency management framework to be sustainable and flexible to provide for long-term solutions to risk situations.

The key features of New Zealand's risk-based emergency management approach are sustainability, resilience, integrated community management and partnerships. Figure 1 illustrates the relationships of these core concepts with Comprehensive Emergency Management (CEM) and public risk management.

Figure 1: Key features of New Zealand's risk-based emergency management approach



## 2.2 Local Government

Consistent with its role of establishing and maintaining the emergency management framework for New Zealand, central government also approved a model for the delivery of emergency management at the local level. The model has been developed in consultation and collaboration with local government, to ensure it has practical application and is flexible enough to be implemented in a wide number of different contexts.

The approved model is for Emergency Management Groups (EMGs) throughout the country. EMGs are consortia of existing local authorities that are tasked with overseeing risk-based emergency management. Working within frameworks provided by the new Ministry and the Local Emergency Management Strategy, structures, processes and direction will be defined. Encapsulated within this will be periodic hazard analyses, vulnerability assessments (including trend and consequence analysis), and application of appropriate risk assessment tools, and a risk-based emergency management process. Three advantages stem from this:

1. They will enable a consistent approach to a particular issue from the different local authorities represented on the EMG.
2. They will provide for the coordination of resources and help ensure that emergency management considerations are integrated into the many relevant local authority activities and responsibilities.
3. They ensure wide involvement of the community in understanding their hazards and making choices about their management.

### **3. Specific Programmes**

The New Zealand approach is a deliberate attempt to link land-use management, risk (hazard) reduction, and sustainable development. It requires an effort to understand how the natural and created environment can produce risk, and how to keep people and property out of the way of hazards in a way that supports economic and social development.

#### **3.1 Preparing New Legislation**

New emergency management legislation, to replace the current *Civil Defence Act 1983*, is currently under preparation. Based on the agreed Government principles, the new Act will ensure a framework exists within which decision-making that is relevant to emergency management can be made consistently, while allowing flexibility for differing circumstances. The purpose of the proposed new Emergency Management Bill is 'to improve and to promote community resilience and continuity through comprehensive, integrated and risk-based emergency management'.

With reference to the principles of individual and community responsibility and self-reliance, the Bill prescribes that *resilience* will be undertaken through planning endeavours that will reduce the occurrence of emergencies, reduce vulnerability and minimise adverse effects by managing risks generally (rather than just responding to risk). This will be assisted by partnerships between stakeholders (including EMGs coordinated both locally and nationally), informed decision-making, planning and development decisions incorporating emergency management goals, objectives and targets, and inter-disciplinary approaches to decision-making.

Emergency Management Groups will be responsible for implementing the legislation at sub-national level, and will be subject to a duty to improve and promote community resilience and continuity through comprehensive, integrated and risk-based emergency management.

To coordinate emergency action across government, a National Emergency Management Strategy (NEMS) is proposed which will outline goals, objectives and

measurable targets to guide emergency management action; and provide the vision and values, criteria for determining priorities for action, and themes for strengthening emergency management action. This Strategy will be linked to EMG plans that must not be inconsistent with NEMS. In order to achieve another agreed principle that structures are underpinned with appropriate technical information and expertise, the Bill provides for the establishment and maintenance of information systems. The Bill also stipulates that relevant agencies will have competent staff.

### **3.2 Providing Comprehensive Training and Education**

New Zealand's revised approach to emergency management is in line with international trends. They recognise that tomorrow's emergency managers will be required to tackle problems they have not confronted before and to act as a broker to work out solutions. This requires them to understand complex physical and social systems, conduct sophisticated cost-benefit analyses, and broker long-term solutions relating to land-use management and resource allocation. Education in hazard management and emergency preparedness therefore needs to complement skills-based training and be expanded to include inter-disciplinary and integrated programmes.

The new Ministry is tasked to identify and promote new professional development initiatives, oversee and/or assist in establishing new initiatives, and monitor the overall efficacy of professional development programmes in achieving Government's outcomes for emergency management. Themes that are influencing the New Zealand programme are:

1. Greater emphasis on pre-disaster mitigation requiring multi-disciplinary knowledge and broad policy development skills
2. Higher levels of inter-agency coordination (across public and private sectors) requiring inter-personal and business planning skills
3. Making the most of the latest research and technology necessitating the continual updating of research knowledge, information technology and data analysis skills
4. Maintaining a response capability in the face of more widely spread and highly committed resources requiring contract management and logistical planning skills.

Two specific training courses for emergency managers under development as a joint venture with Australia, risk management and land-use planning, illustrate the new approach. The New Zealand training programme also recognises that a broad range of individuals across a range of organisations require education and training to effectively carry out relevant emergency management tasks. The need for flexibility and diversity in training programmes is therefore paramount.

### **3.3 Developing the Necessary Tools**

Currently, there are gaps in the emergency management toolkit, both in the devices available and in the way that many existing ones are used. In particular, there are gaps in:

1. The application of a systematic and all encompassing approach to risk management across all hazards
2. The translation of expert and technical information that can be readily turned into emergency management strategies and policies.

One area in particular where new tools as well as improved means of generating and presenting information is needed is in investigating ways to improve the implementation of planning mandates. This includes plans and risk reduction prescriptions contained in devices such as building codes and land-use policies. These need to be linked more firmly with wider risk management practices. Neither risk management, strategy nor planning development for

emergency management will have little lasting effect unless the range of structural and non-structural tools within other community management processes are aligned. This requires linking emergency management strategy and plan development processes to the wider policy development and operational processes of public and private systems.

The Foresight project, initiated by the Ministry of Research, Science and Technology (MoRST) is helping to meet needs such as these. Foresight is enabling the natural hazards information sector to align its research agenda to fit the needs of the new emergency management environment. Through this process, purchasers, information providers, and end-users can see what research is required, and where research strategies need to head. With applicability, availability and robustness as central themes for all research and information, improving tools in the following areas are considered a top priority:

1. New knowledge on realistic modeling; emphasis on loss modeling and social impacts; time-varying hazards to focus mitigation efforts on most appropriate hazards
2. New skills in vulnerability modeling, consequence and trend analysis
3. New technology emphasising inter-linking of GIS mapping; GPS linked monitoring networks to offer near real-time data of event potential, response and post-impact recovery; 'expert' decision-making tools
4. New relationships within broader sectors of the economy that are potentially impacted in emergency events
5. New applications for practical information on individual vulnerability of assets to natural hazard events; customised plans to assist in lowering risks and raising preparedness; post impact information to assist minimising ongoing losses and help in planning recovery strategies.

The establishment of EMGs, which offers higher levels of inter-agency co-ordination, resourcing and professional skills should, in time, provide a stronger 'demand pull' for new tools and improved information. Placing universities and public research organisations on a business footing will also make these resource-holders better placed to respond to new demands, with the added advantage that products are market tested and aggressively marketed elsewhere.

#### **4. Conclusion**

The opportunity to reassess the fundamentals of emergency management through Sustainable Hazard Management, allows the sector to be observed from a new and expanded standpoint. Hence, the focus of emergency management is shifted from being a primarily preparedness and response-oriented system to one which can incorporate the need to provide balanced attention to the maintenance and ongoing development of communities in the face of uncertainties wrought by natural and technological hazards.

The occasion to reappraise fundamentals also highlights the linkages that emergency management has between hazard management, environmental stewardship, land-use planning, public risk management, and public administration. At the same time, greater efficiencies can be achieved through enhanced co-ordination of resources and resource-holders, and greater co-operation through integrated management programmes.

There is still a lot to be done, and many questions need to be asked by the practitioner, researcher, policy-maker and citizen before answers can be provided. However, in New Zealand, the process has started, and with it, a new era in public safety has arrived.

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