Building Resilience to Natural Hazards: developing a risk-based approach to planning

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Overview

• Context
  International drivers
  NZ regulatory context: CDEM, RMA and proposed changes to RMA

• Good practice risk management
  What is risk?
  Risk management process

• Tools

• Literature review and case study research findings

• Capability challenges for RMA practitioners

• Panel discussion
International Context: Disaster Risk Reduction (DRR)

1999
- United Nations Office for Disaster Risk Reduction
- Implement International Strategy for Disaster Reduction
- Focal point in UN for disaster reduction

2005

2015
- Sendai Framework for DRR 2015-2030
Sendai Framework for DRR

Scope and purpose
• Applies to natural and man-made hazards, small-large scale, frequent/infrequent, sudden/slow onset.
• Guide multi-hazard management of disaster risk across all sectors

Expected outcome
• Substantial reduction of disaster risk and losses in lives, livelihoods, health, economic, physical, social, cultural and environmental assets

Goal
• Prevent new and reduce existing disaster risk through implementing integrated measures to prevent and reduce hazard exposure and vulnerability and increase preparedness and resilience
7 Sendai Targets

- Reduce mortality
- Reduce number of affected people
- Reduce direct economic loss
- Reduce damage to infrastructure
- Increase number of countries with DRR strategies
- Enhance international cooperation to developing countries
- Increase early warning systems, information and assessments
4 Priorities for Action

- Understanding disaster risk
- Strengthening disaster risk governance to manage disaster risk
- Investing in disaster risk reduction for resilience
- Enhancing disaster preparedness for effective response and “Build Back Better”
THE NEW ZEALAND CDEM FRAMEWORK

Local risk reduction
- e.g. local RMA plans, river management, infrastructure design, Business Continuity Planning and ECCPs

CDEM Group plans and local arrangements
- CDEM Groups, local authorities

Government agency operational plans
- Health, MFAT, Police, MetService etc

Non-govt agency operational plans
- Lifeline utility, voluntary welfare, SPCA, etc

Central government policies for risk reduction
- e.g. Building Code, GeoNet, hazard research, sustainable land management, flood risk management

The Guide to the National CDEM Plan

National CDEM Plan

National CDEM Strategy

Civil Defence Emergency Management Act 2002

Figure 2: The New Zealand CDEM framework
### Based on the 4 Rs

| **Reduction** | Identify and analyse long-term risk to human life and property. Take steps to eliminate risk, if practicable and if not reduce magnitude of impact or likelihood of occurrence |
| **Readiness** | Develop operational systems and capabilities, including self-help and response for the public and specific programmes for emergency services, lifeline utilities and other agencies |
| **Response** | Action taken in civil defence emergency to save lives and protect property and help communities to recover |
| **Recovery** | Coordinated efforts and processes for immediate, medium and long-term holistic regeneration of a community after a civil defence emergency |
Definition of Natural Hazards

Any atmospheric, earth or water related occurrence (including earthquake, tsunami, erosion, volcanic and geothermal activity, landslip, subsidence, sedimentation, wind, drought, fire or flooding) the action of which adversely affects or may adversely affect human life, property, or other aspects of the environment.
Meaning of Effect

Unless the context otherwise requires, the term effect includes
(a) any positive or adverse effect and
(b) any temporary or permanent effect and
(c) any past, present or future effect and
(d) any cumulative effect which arises over time or in combination with other effects - regardless of the scale, intensity, duration or frequency of the effect and also includes
(e) and potential effect of high probability and
(f) any potential effect of low probability which has a high potential impact
Function for Regional & District Councils

**Regional Councils**
- The control of the use of land for the purpose of...the avoidance or mitigation of natural hazards

**District Councils**
- The control of any actual or potential effects of the use, development, or protection of land, including for the purpose of....the avoidance or mitigation of natural hazards

**Lead**
- Regional Councils allocate responsibilities through their Regional Policy Statements
- Potential for regional and district rules
Assessments of Effects on the Environment

Schedule 4
Section 7

• An assessment of the activity’s effects on the environment must address the following matters: any risk to the neighbourhood, the wider community, or the environment through natural hazards.
Special Role for Subdivision Controls

Section 106
- Refuse or impose conditions on subdivision consents
- Over-rides obligation to grant consent for controlled activities

Conditions on Subdivisions
- Esplanade strips or reserves
- Bulk, location, foundations, floor level heights
- Provisions to protect land from subsidence, slippage, erosion or inundation
- Requirements for filling, compaction and earthworks
Proposed RMA Changes

**Section 6**
- Add “the management of significant risks from natural hazards” to Matters on National Importance

**Section 106**
- To apply for significant risk from natural hazards
- Reference definition of natural hazards
- Specific assessment of risk of material damage to land

**Section 220**
- Enable conditions on subdivision consents to imposed to protect land from all hazards within the scope of the definition of natural hazards
ISO 31000 Risk Definition

Effect of uncertainty on objectives

- NOTES
- *an effect is a deviation from the expected (positive and/or negative)*
- *risk is often characterised by reference to potential events and consequences, or a combination of these*
- *risk is often expressed in terms of a combination of the consequences of an event (including changes in circumstances) and the associated likelihood of occurrence*
Uncertainty

The state, even partial, of deficiency of information related to, understanding or knowledge of an event, its consequences or likelihood

(ISO 31000:2009)
Natural Hazard Event

- Earthquake
- Storm
- Landslip

Effects & Consequences

- Range and cascading effects
- Differing likelihoods

Objectives

- Ultimate outcomes
- Goals
- Legislative imperatives
Natural Hazard Event
- Earthquake
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Effects & Consequences
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Uncertainty & Complexity
Natural Hazard Event

- Earthquake
- Storm
- Landslip

Effects & Consequences

- Range and cascading effects
- Differing likelihoods

Objectives

- Ultimate outcomes
- Goals
- Legislative imperatives
Risk Management is a Process

Establish the Context

Monitor and Review

Assess Risks
- identify
- analyse
- evaluate

Treat Risk

Communication and Consultation
Bow Tie Tool
Source-Pathway-Target-Consequence Tool

**Sources (Drivers):**
es, Winds, sea-level rise, tides, surges, waves, storms, ENSO, IPO, tsunami

**Pathways:**
eg, Overtopping, overwashing, breaching, overland flow, undermining

**Receptors:**
eg, People, property, communities, infrastructure, environment

**Consequences:**
eg, Loss of life, stress, material damage, loss of land, environmental degradation, cultural loss, economic impact
Findings - Good Practice for Natural Hazards

- Process
  - Establish context
  - Focus on uncertainty
  - Flexibility on assessment methods
  - Iteration and adaptation

- RMA Context
  - Align with RMA purpose and definition
  - Consider all hazards
  - Address climate change effects
  - Appropriate use of precautionary approach
  - Evaluate costs and benefits
Findings - Good Practice for Natural Hazards

• Dealing with Complexity
  Focus on understanding consequences
  “Fit for purpose” science and methods
  Clear communication of science and assumptions
  Use appropriate timeframes
  Effective engagement
Findings – Issues and Challenges

• Lack of clarity about overall objective (risk reduction?)
• Getting context and scope right
• Understanding and communicating the science
• Dealing with truly difficult issues
• Availability and adequacy of information
• Definitions
• Spoilers
Overcoming Barriers – national guidance

- Overall objective and principles
- Risk management process
- Agreed means to deal with hard issues
- Safe harbour
- Substantive guidance – thresholds for tolerance, what is significant?
- Definitions
Conclusions – Challenges for Planners

Knowledge
• Awareness of drivers/context
• Detailed understanding of RMA requirements

Capabilities
• Systems thinking and tools
• Understanding and working with complexity and uncertainty
• Communicating science, complexity and uncertainty
• Advising decision makers within RMA and other frameworks
Panel

• **David Berg** – Ministry for the Environment
• **Bryce Davies** – IAG
• **Sarah-Jayne McCurrach** – Ministry of Civil Defence and Emergency Management (DPMC)
• **Rick Liefting** – Waikato Regional Council