



A Guide to Toka Tū Ake EQC's targeted research investment

# Research investment priorities statement 2023

**Toka Tū Ake EQC has a role  
in research and education as  
a part of one of its functions  
under the Earthquake  
Commission Act 1993:**

**“To facilitate research and  
education about matters  
relevant to natural disaster  
damage, methods of  
reducing or preventing  
natural disaster damage,  
and insurance provided  
under this Act.”**



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# Statement intentions

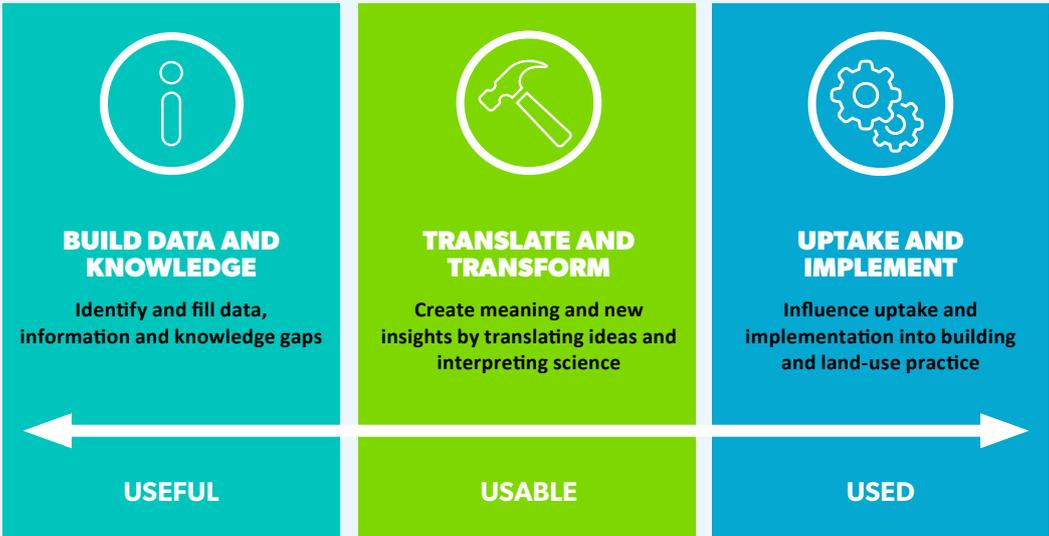
This *Research Investment Priorities Statement* outlines the research opportunities and gaps we see in the New Zealand natural hazard risk research landscape. The statement is organised around the strategic goals of Toka Tū Ake EQC, and describes in detail the areas we want to target with our research investment in order to progress those goals. The aim of this statement is to assist applicants to align their proposals with our strategic areas of interest.

## Resilience goal

Our vision is that natural hazards resilience becomes embedded in all aspects of decision-making for our homes, towns and cities.

Our resilience goal is to inform, enable and influence the choices and decisions that reduce vulnerability and the exposure of New Zealand’s built environment to natural hazard events. In simple terms, the result will be stronger homes, built on better land, served by resilient infrastructure, supported by affordable risk capital.

In pursuing this goal, we will invest in creating, integrating and translating information and knowledge to drive risk reduction actions and build readiness to improve resilience.



# Important changes to Toka Tū Ake EQC

Toka Tū Ake EQC is going through several important changes to better reflect the organisation today, the lessons learned from the past and to set us up for the future. We are going through these changes because our legislation has changed. Parliament has passed a new Act, the Natural Hazards Insurance Act 2023, which will come into force from 1 July 2024 and replace the EQC Act 1993. The aims of the new Act are:

- to enable better community recovery from natural hazards; and
- to clarify the role of the Commission and the cover provided by the Act; and
- to enhance the durability and flexibility of the legislation.

The Act further increases the scope and flexibility of our education and research functions so that Toka Tū Ake EQC may contribute more broadly to initiatives or policy, including cross-government initiatives, seeking to improve resilience to natural hazards.

There are three key changes for our research partners to note:

1. An update to our purpose (s3<sup>1</sup>), objectives (s128<sup>1</sup>), and functions (s129<sup>1</sup>) – relevant to our mandate to fund research and education.
2. The introduction of new criteria Toka Tū Ake EQC must consider as a condition to draw on the National Disaster Fund (s111(1)(c)<sup>1</sup>).

3. Our name change (s125<sup>1</sup>).

Research proposals to Toka Tū Ake EQC will need to align and comply with these.

## Our Resilience and Research function

The Act describes our legislative functions which includes:

- to facilitate research and education, and to contribute to the sharing of information, knowledge, and expertise (with the Crown, public and private entities, and the public generally), including in relation to:
  - natural hazards and their impacts
  - damage to residential buildings, residential land, and other property as a result of natural hazards, including how that damage might be prevented or reduced
  - community resilience to natural hazards
  - natural hazard risk management
  - planning for, and recovering from, natural hazards
  - natural hazard cover and the operation of this Act.

<sup>1</sup> Natural Hazards Insurance Act 2023 at [www.legislation.govt.nz](http://www.legislation.govt.nz)

## New criteria Toka Tū Ake EQC must consider for research investment

Another function of Toka Tū Ake EQC is to administer the Natural Hazard Fund. This is the fund that homeowners with fire insurance contribute to from their premiums through a levy. Drawing on the fund for our research activities requires we meet the following criteria.

That the Commission believes on reasonable grounds that the activity has the potential to:

1. provide a benefit to insured persons (whether or not the activity also has the potential to provide a benefit to persons who are not insured persons); or
2. reduce the future cost of providing natural hazard cover.

You will notice in our research proposal applications we will be asking more questions regarding who your research will potentially benefit and what the benefit is likely to be. We may also ask if it has an expected impact on the Toka Tū Ake EQC scheme. These questions are so that we may assess the potential benefit of the research.



## Name change

**Toka Tū Ake** – The foundation from which we stand strong, together

**Toka:** (noun) rock, large stone, boulder

**Tū:** (verb) to stand, take place, set in place, establish

**Ake:** (particle) to raise upwards

Toka Tū Ake EQC has adopted a new name to better represent the role our scheme plays in supporting New Zealanders.

Our new name reflects the whakapapa of our nation. Our land is constantly changing from earthquakes, volcanic eruptions, landslips and floods. Communities have lived alongside those perils for hundreds of years, and Māori have always believed the relationship and connection of people to land and nature is inseparable.

Our new name also reflects our role in providing a foundation for resilience against natural hazards, not only as a provider of financial resilience through insurance but also supporting good risk management, through robust science, research and data.

In July 2022, we changed our name from Earthquake Commission to Toka Tū Ake EQC. This was the first phase of our name change. The final step coincides with the Natural Hazards Insurance Bill coming into effect in July 2024. From then we will be known as Toka Tū Ake Natural Hazards Commission.

# Research themes

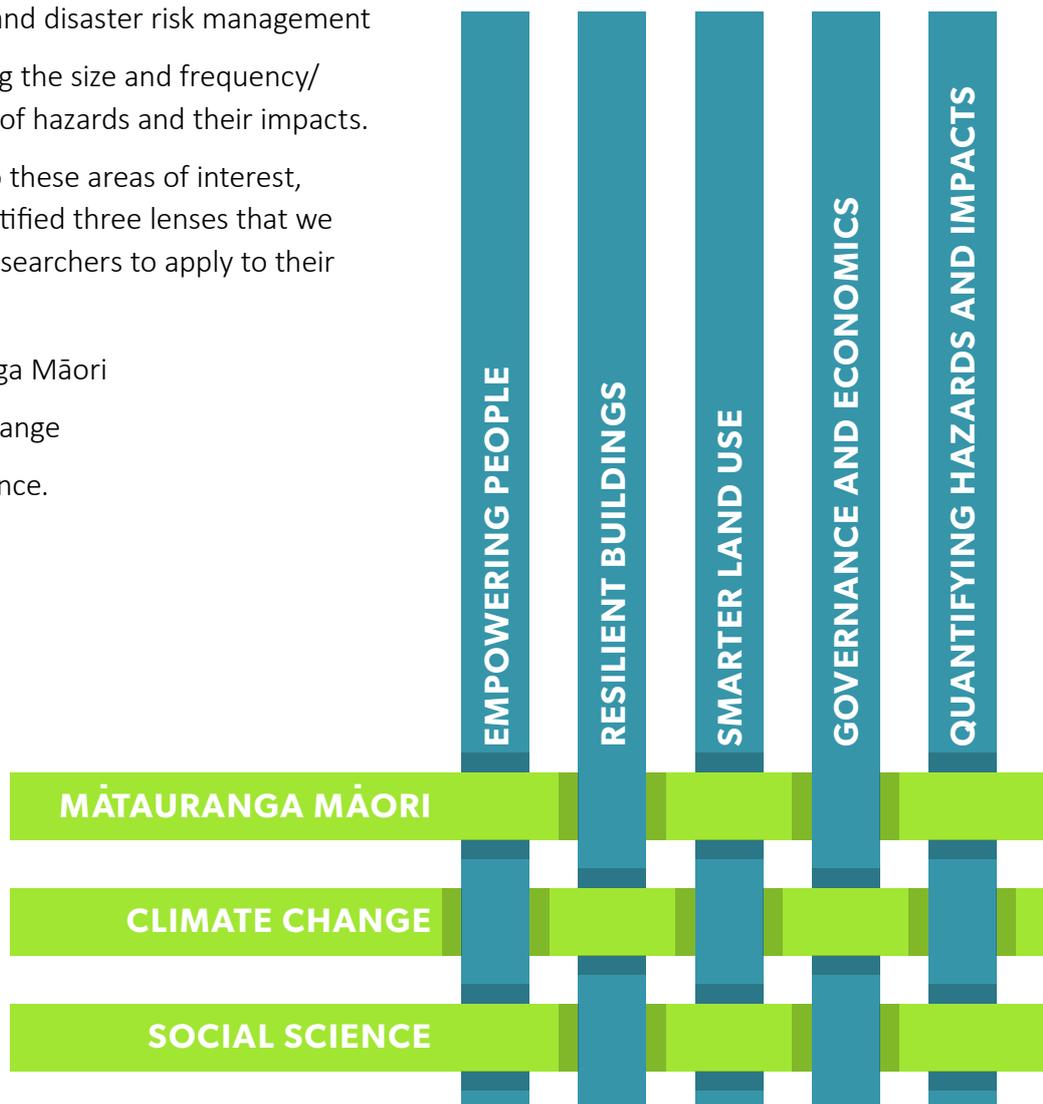
This *Research investment priorities statement* will serve as a guide for applicants to align their proposals with our strategic areas of interest.

The areas that will guide our investment are targeted at improving the understanding of:

- how people perceive and manage risk (risk and society)
- building performance (resilient buildings)
- land-use management (smarter land use)
- the governance and economics of disasters and disaster risk management
- quantifying the size and frequency/likelihood of hazards and their impacts.

In addition to these areas of interest, we have identified three lenses that we encourage researchers to apply to their projects:

- mātauranga Māori
- climate change
- social science.



These lenses are considerations that should be used by researchers to reflect on the philosophy and design of the research proposal. They cut across the research themes but are not themes unto themselves. Applicants are not expected to apply all the lenses to their proposals, but a strong proposal will have considered how the research might be strengthened by inclusion of mātauranga Māori, climate change and/or social science. Each theme is discussed in more detail below.

Extreme and unexpected rainfall events, as well as rising sea levels, associated with **climate change** are expected to significantly impact coastal communities and infrastructure already vulnerable to floods, tsunamis, and other natural hazards. Areas not previously considered to be at risk are also likely to change due to increased inundation and land erosion. Toka Tū Ake EQC is seeking to better understand how the hazards we cover may be exacerbated by climate change and impact our communities and the insurance cover we provide, for example:

- how climate change adaptation and longer-term natural hazard risk assessment is built into land-use planning
- the cost of climate change impacts, the cost-benefit of adaptation measures, and how EQC's liability will change over time as a result of changing climate; and
- generally, how climate change may influence the frequency and severity of natural hazards.

*Ka mua, ka muri*, a Māori proverb that describes “walking backwards into the future,” describes Toka Tū Ake EQC's acknowledgement that natural hazards are a significant part of Māori life and Aotearoa's history.

The inclusion of **mātauranga Māori** as a lens provides a unique Aotearoa focus, particularly relevant for natural hazards, and actively encourages Māori-led research and Māori engagement in our research. Some examples of research focus areas within the research themes, but with the lenses applied, are listed:

- Contributing to disaster risk reduction and resilience through distinctive indigenous research and development.
- Increasing the participation of Māori in disaster risk management.
- Understanding and/or developing mātauranga Māori approaches to the assessment of risk, hazard risk management and risk communication.

Toka Tū Ake EQC research has benefited in recent years from the integration of **social sciences** into our earth and engineering-focussed projects. Toka Tū Ake EQC seeks to better understand human behaviour in relation to response to, and preparing for, natural hazard events. Some examples of areas of research interest that include social science, include:

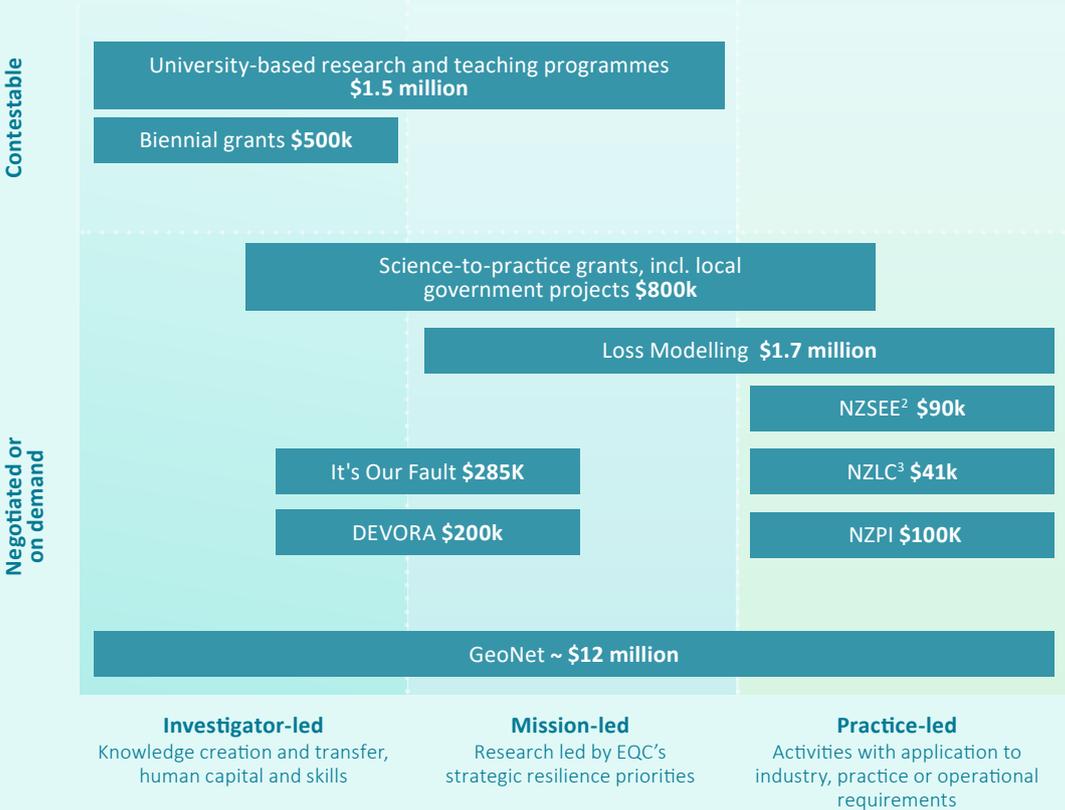
- Understanding mechanisms and success factors for the translation and communication of complex science to decision-makers, policymakers, practitioners, and the public.
- Understanding what drives people to accept, avoid or take action on risk.
- Increasing the participation of under-represented groups in disaster risk management, including Māori and Pasifika, socio-economically vulnerable communities and minority groups.

# Current funding

Our annual research investment is around \$19 million, of which \$12 million is allocated to our principal science investment in GeoNet. Six million dollars is invested in resilience and hazard science through university-based research and teaching

programmes, regional consortia (e.g. DEVORA and It's Our Fault) and funding of individual science projects (e.g. through Biennial Grants and science-to-practice grants).

## How our funding is allocated



<sup>2</sup> NZSEE: New Zealand Society for Earthquake Engineering.

<sup>3</sup> NZLC: New Zealand Lifelines Council.

Adapted from MBIE, National Statement of Science Intent, 2018.

## Working with other initiatives

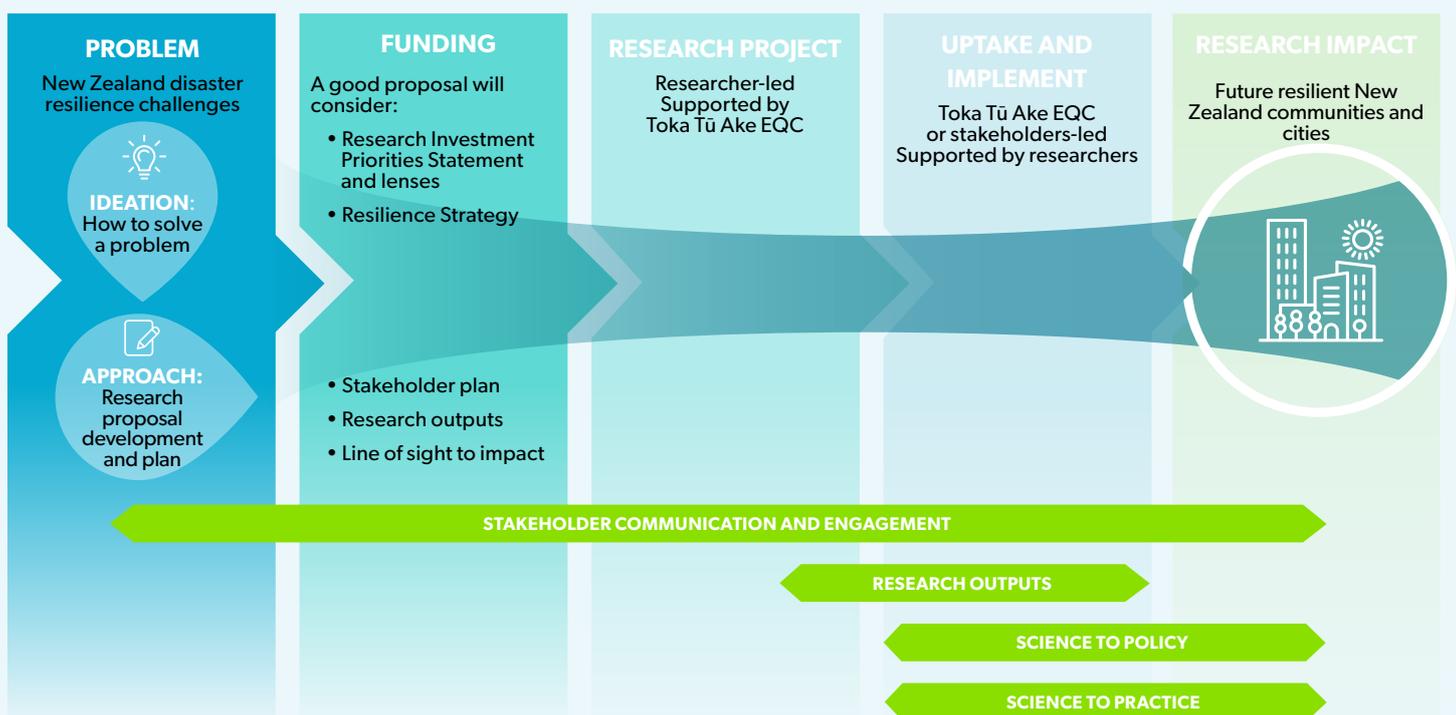
Toka Tū Ake EQC is supportive of research proposals that leverage and align with existing research investments, whether they be from Toka Tū Ake EQC or other organisations. A successful proposal will clearly articulate connections with existing initiatives and highlight the components and deliverables that are distinct to Toka Tū Ake EQC and the specific funding request.

Toka Tū Ake EQC is also interested in assisting researchers who wish to generate larger programmes of work with funding

from other sources. Toka Tū Ake EQC is happy to accept proposals for seed funding and projects designed to build capabilities.

Toka Tū Ake EQC discourages any attempt to boost funding through duplication of funding or ‘double-dipping’. If a project needs co-funding or partnering to reach its full potential and cover costs, Toka Tū Ake EQC will consider the proposal if the benefits to Toka Tū Ake EQC are clear and aligned with Toka Tū Ake EQC priorities. EQC appreciates clear and open communication.

## A successful Toka Tū Ake EQC funded project



A successful proposal will have a clear path to uptake of the research and how it will be or could be used. Toka Tū Ake EQC will not consider purely theoretical-based research that has a very loose line to application, uptake and impact.

We appreciate that the outcomes of some research may be aspirational, but should nevertheless provide a clear line of sight as to how any significant findings would be used to improve New Zealand’s resilience to natural hazards.

# Areas of research interest

Many of the focus areas listed on the following pages could fit in multiple categories. We recommend that you read all sections to get a complete picture of Toka Tū Ake EQC's priorities.



# 1. Empowering people

## How people understand and manage risk

- Understanding how people receive and understand risk information, and what that means for form and presentation of such information.
- Exploring risk perception and how this may impact or change an individual, or community's approach to managing risk.
- Exploring opportunities and trade-offs that drive community-based risk management decisions.
- Successful mechanisms for the translation and communication of complex science to policy makers, planners, practitioners, and other decision-makers, including the public.
- Novel methods for communicating risk, and for identifying and conveying uncertainty.
- Understanding what drives people to accept, avoid or take action on risk.
- Contributing to natural hazard risk reduction and resilience through distinctive indigenous research and development, including on:
  - taiao/environment – achieving disaster resilience through iwi and hapū relationships with land and sea
  - hauora/health – improving health and social wellbeing aspects of disaster resilience
  - mātauranga/knowledge – exploring indigenous knowledge and science and innovation regarding hazard risk management.
- Promoting the protection, preservation and progression of resilience opportunities and learnings in our papakāinga developments and wider communities.
- Improving socio-cultural and vulnerability inputs to risk modelling.
- Understanding the socio-economic profile and geographic distribution, as well as the social drivers of and solutions to un- and under-insurance.
- Increasing the participation of under-represented groups in disaster risk management, including Māori and Pasifika, socio-economically vulnerable communities and minority groups.
- Incentivising resilience: understanding barriers, motivations, incentives and other successful methods for encouraging individual, household, family/whānau, and community resilience.
- Exploring 'nudge' theory and practice for resilience outcomes.



#### Examples of currently funded initiatives:

- Biennial grants:
  - Improving school-based hazards education outreach programmes towards enhancing alignment with schools and communities
  - Long-term communication of volcanic risk for effective decision-making
  - Changing societal expectations and risk appetite, exploring influences on building earthquake resilience in lower seismic hazard zones
  - Papa Wiri: Te Ao Māori disaster risk reduction through participatory co-design of educational Tool
- Te Toi Whakaruruhau o Aotearoa
- He Whenua Taurikura - Māori Resilience Fund Development

## 2. Resilient buildings

### Understanding and improving building and land performance

- Understanding the characteristics of New Zealand's building stock, focusing on where and what buildings and infrastructure are most vulnerable.
- Exploring cost-effective retrofit for residential properties.
- Exploring low damage design/technology for residential properties and multi-storey buildings.
- Understanding the design guidance requirements for 'functional recovery'.
- Understanding the cost of building to different design standards, especially 'low damage'.
- Modelling fragility: how hazards of different types (particularly those where New Zealand-based fragility functions don't exist, e.g. tsunamis, landslides, some volcanic hazards) and intensities affect and/or damage our built environment.
- Understanding how fundamental architectural design principles (e.g. scale, form, layout, symmetry, etc.) increase resilience.
- Understanding the opportunities, trade-offs and possible risks to the resilience of the built environment to natural hazards, when considering carbon-neutral or climate-conscious developments.
- Understanding of potentially hazardous non-structural building elements, covering for each element: proliferation, primary risk factors and best pathways to improve performance.
- Exploring novel, non-structural ways to incorporate resilience measures into buildings and land.
- Methods of reducing risk and building resilience in post-disaster and residential repair and rebuild contexts.
- Exploring practical 'build back better' techniques for post-disaster repair, reconstruction, and rebuild of residential property (particularly with respect to flood and landslide resilience).
- Understanding the range of challenges for building owners and local authorities in the later stages of implementing the Earthquake Prone Building Policy, including how future changes to New Zealand's design guidance could affect this regime.



#### **Examples of currently funded initiatives:**

- Resilient buildings project
- Whole-of-Building approach to improve seismic retrofits of buildings in New Zealand
- Low damage seismic design
- Biennials:
  - risk-targeted design for functionality
  - embodied carbon A driver for change towards seismically resilient high-density housing
  - low-cycle fatigue, strain-aging, and residual-capacity testing of reinforcing steels to guide repair strategies and support functional recovery
  - more resilient wall building structures
  - MĪMIRŪ: The application of an endangered indigenous construction practice onto a prototype timber portal frame to assess seismic resilience and impact for use on future whareniui
- University programme:
  - engineering for stronger homes and better land in Aotearoa New Zealand

# 3. Smarter land use

## Understanding, improving and managing land use

- Understanding how new and emerging governance and development control mechanisms (such as national direction, spatial plans and district and regional planning policies and rules) could better control the location, density and design of development to reduce vulnerability and exposure to natural hazards.
- Understanding the challenges and opportunities for local and central government to better avoid or reduce exposure to natural hazards through land-use planning.
- Investigating and evaluating how to assess and plan for high-consequence, low-probability hazards.
- Understanding the barriers to implementing existing guidance and frameworks related to natural hazard risk management, especially around what level of risk is 'significant' for land-use planning.
- Understanding best-practice long-term spatial planning approaches.
- Developing risk-based adaptive planning instruments and determining how they would incorporate changing hazards and risks over time because of a warming climate.
- Exploring the potential for incorporating risk modelling into land-use planning.
- Investigating the costs (e.g. financial, social, cultural, environmental) of poor land-use outcomes, and what led to them.
- Exploring how to develop, collate and/or acknowledge mātauranga Māori in land-use planning processes to understand risk and respond to it.
- Understanding the costs, benefits and policy implications of creating 'red zones'.
- Recommendations for best practice managed retreat, utilising domestic and international examples.
- Exploring innovative natural hazard risk reduction methods that contribute to reducing climate change and related impacts, such as the use of native flora to mitigate the impacts of flooding.



### Examples of currently funded initiatives:

- It's Our Fault
- DEVORA
- Slope stability guidance
- RiskScape case studies for land use planning

## 4. Governance and economics

### Understanding the governance and economics of disasters and disaster risk management

- Investigating financial mechanisms and incentives for reducing risk and building resilience.
- Modelling the direct, indirect and/or intangible costs of disasters, including projected costs for a warmer climate.
- Measuring and modelling the economic costs of social impact, including establishing a 'standardised' methodology for doing so.
- Investigating trends in insurance markets and insurance uptake, nationally and internationally, particularly in relation to insurance retreat under climate change and across different demographic groups.
- Understanding the consequences and cascading effects of risk-based insurance pricing, particularly to the accessibility of insurance within communities.
- Understanding the Natural Disaster Fund's financial exposure to a range of hazard scenarios, under a range of market conditions.
- Better understanding barriers to and opportunities for implementing policies that reduce risk and build resilience.
- Understanding optimal governance structures for natural hazard risk management – at the national and local level.
- Understanding the full cost (economic, social, environmental etc) of managed retreat.
- Understanding the true costs of rebuilding following a disaster, including disruption, legal, carbon and social costs.
- Building the evidence base for investment in risk reduction and resilience – a review and compilation of cost-benefit analyses of different interventions.
- Understanding the consequences of taxation on carbon as applied to building resilience.
- Investigating the relative effectiveness of alternative mechanisms for delivering post-disaster insurance for large-scale events (e.g. cash settlement, managed repair, project management offices, insurer-led, government-led).
- Exploring the use of disclaimers, caveats and other 'uncertainty' statements on hazard risk information; what that means for use by various parties, and what solutions there might be to uptake.



#### Examples of currently funded initiatives:

- Climate risk and the insurance sector, the law, policy, and economics of climate-related financial disclosures
- Tribunals and post-disaster dispute resolution: a Christchurch case study

# 5. Quantifying hazards and impacts

## Data and models to quantify the magnitude and frequency of hazards and their Impacts

- Developing consistent national approaches to mapping and modelling natural hazard risks, such as liquefaction and tsunami inundation, with a focus on consistent and interoperable data and information.
- Improving hazard models, especially for 'underdeveloped' hazards (such as slope stability, flooding, storm surge, tsunami and fire following earthquake), which contribute to improved risk modelling.
- Understanding how climate change will affect the frequency, severity and geographic extent of natural hazards that EQC covers (e.g. via economic regional summaries).
- Updating models (including green field sites) of hazards and their impacts to incorporate changes expected based on climate models.
- Developing tools or nationally consistent approaches to multi-hazard or cascading-hazard risk assessment and scenario development.
- Developing and testing the use of innovative risk visualisation methodologies.
- Interrogating and assessing existing data to better understand current and future inequalities within communities exposed to hazards, including those exacerbated by climate change, in order to achieve more equitable outcomes for these communities.
- Quantifying and assessing multi-hazard risk, cascading risk, and compound risk.
- Exploring mātauranga Māori related to different hazards and their impacts.
- Exploring assessment, evaluation, and management of risk from a Māori/ mātauranga Māori perspective.



### Examples of currently funded initiatives:

- Biennials
  - Seismic hazards from earthquakes in the locked zone offshore Wellington
  - Sensing unrest in New Zealand's largest city detailed mapping of seismicity in Auckland
- Science to practice and targeted research:
  - Identifying and forecasting earthquake-and rainfall-induced landslides
  - NZVHRM Volcano Hazard and Risk Modelling

