

# Earthquake Risk Treatment

## Understanding Trade Offs and Building Buy-In

Hugh Cowan

*[hugh@hughcowan.com](mailto:hugh@hughcowan.com)*

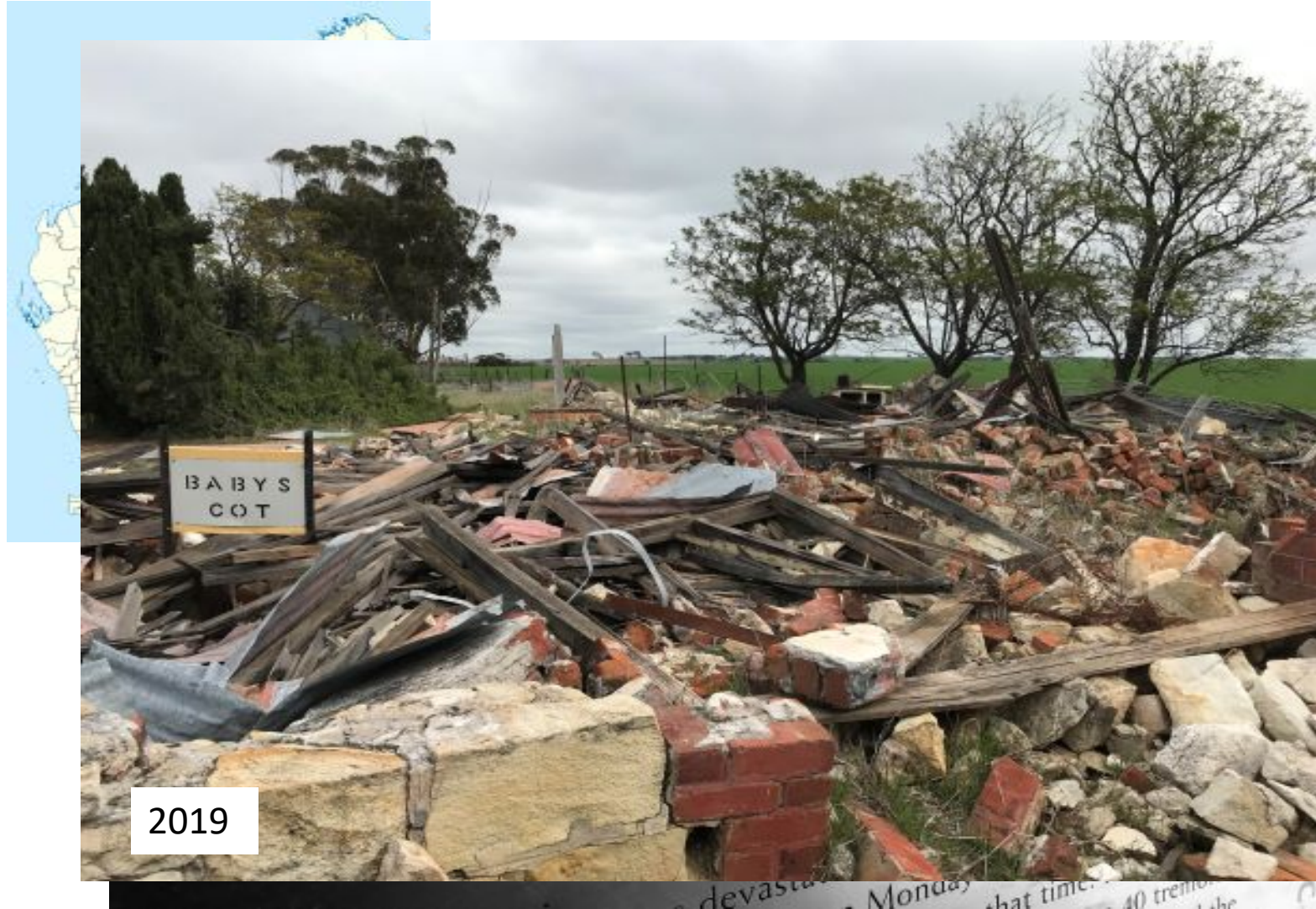
## Memory matters, but...



# Context can vary greatly

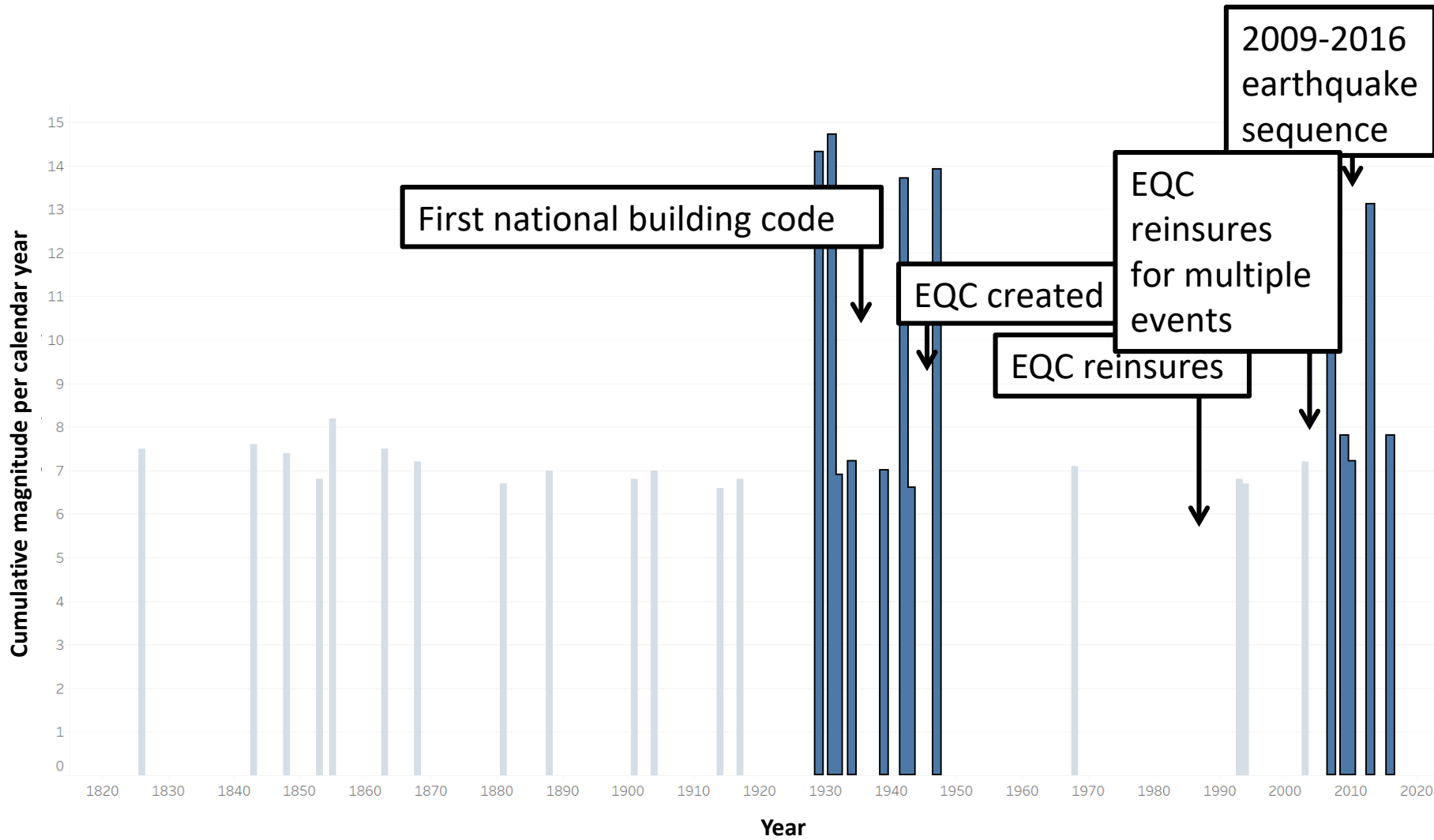


# Memory is intrinsic to learning



2019

# But unevenly distributed



**New Zealand earthquakes 1820-2016, magnitude >6.5**

# Risk perception vs risk tolerance?

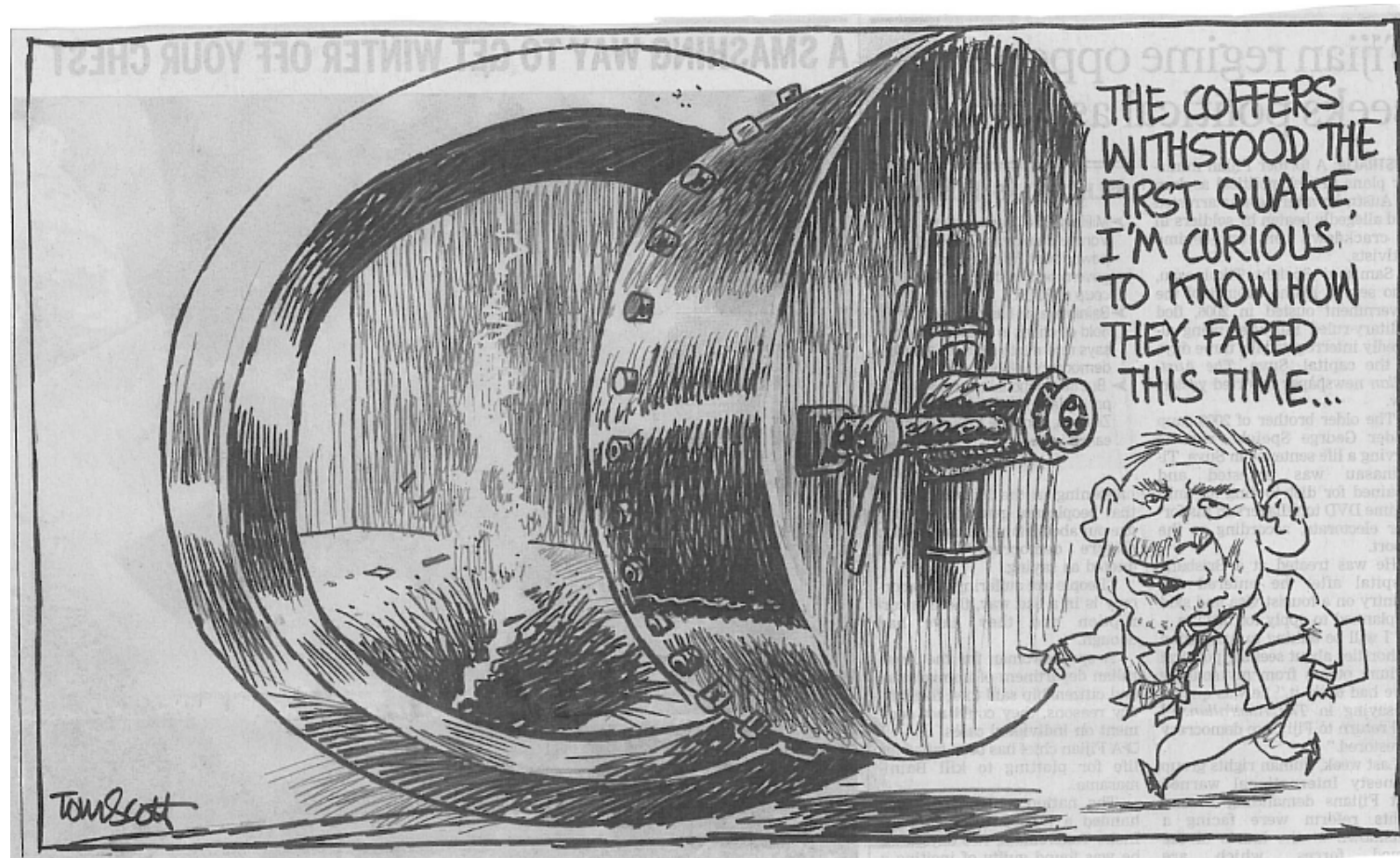
Which is the more memorable?

Or 100,000 benign daily accidents?



come?

# Risk proximity: space and time



*Dominion Post, Wellington, 8 March, 2011*



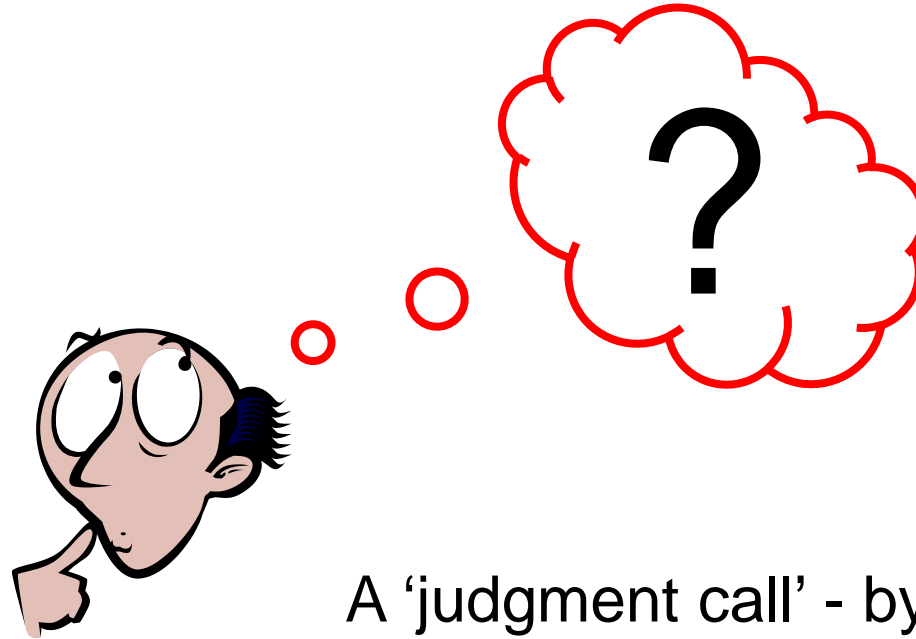
# The Mitigation Continuum

---

Central  
Control



Individual  
Freedom



A 'judgment call' - by needs or preference



# The Mitigation Continuum

---

Central  
Control



Individual  
Freedom

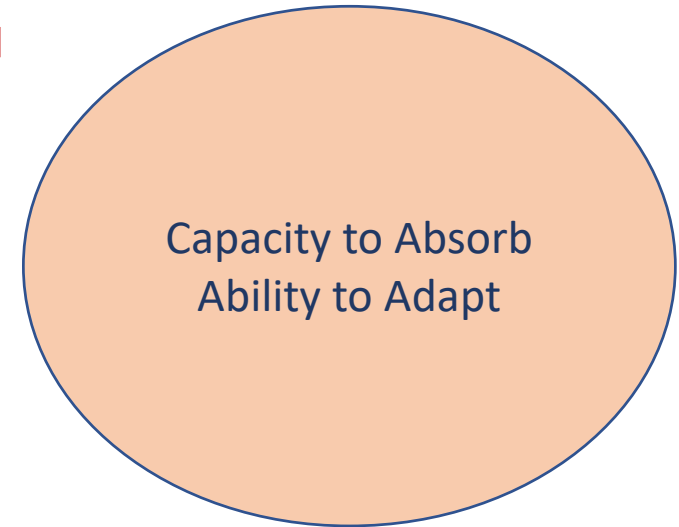
Design Codes and Land-use ←

Financial regulation ←

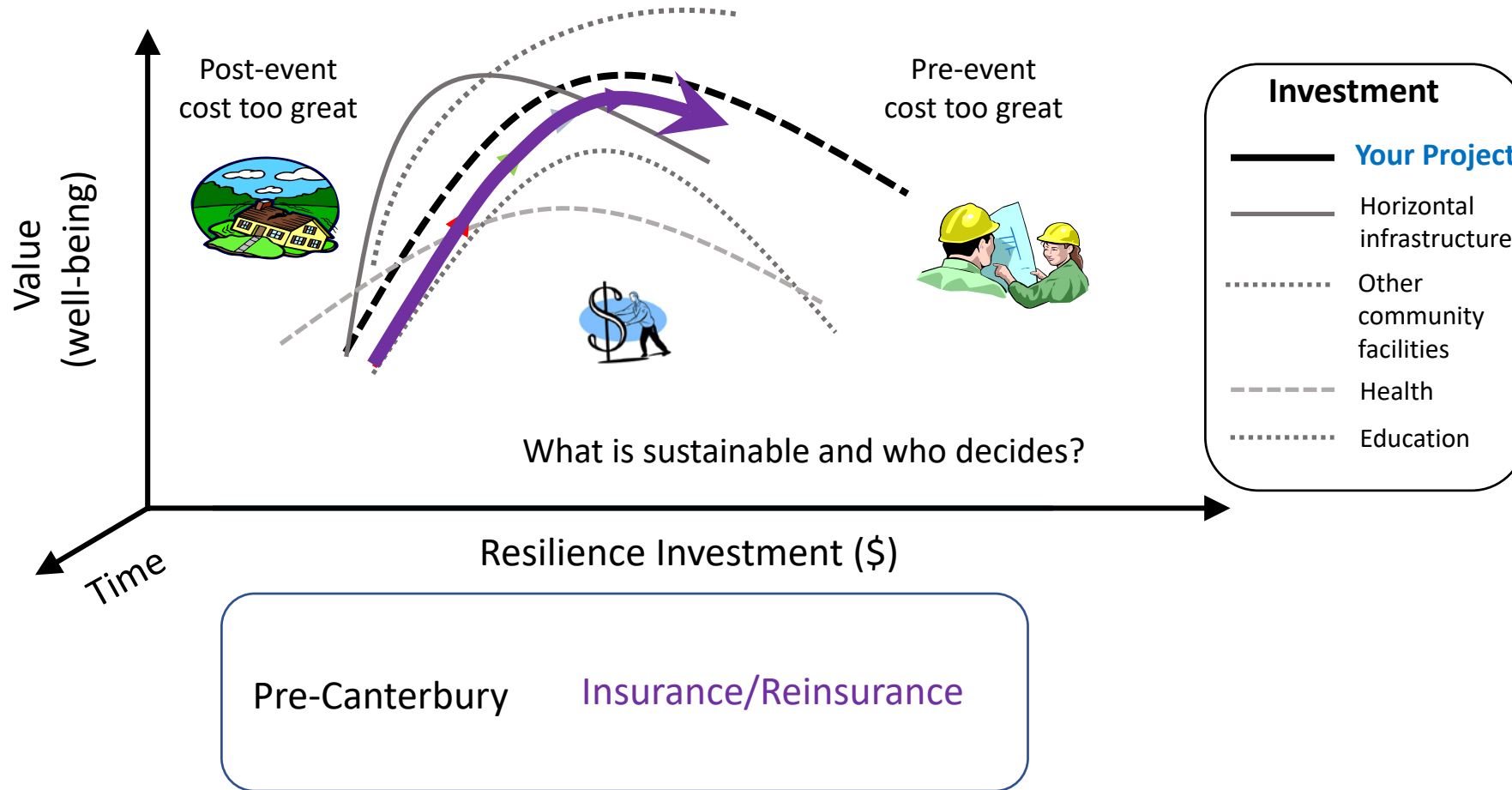
Compulsory insurance ←

Social Welfare ←

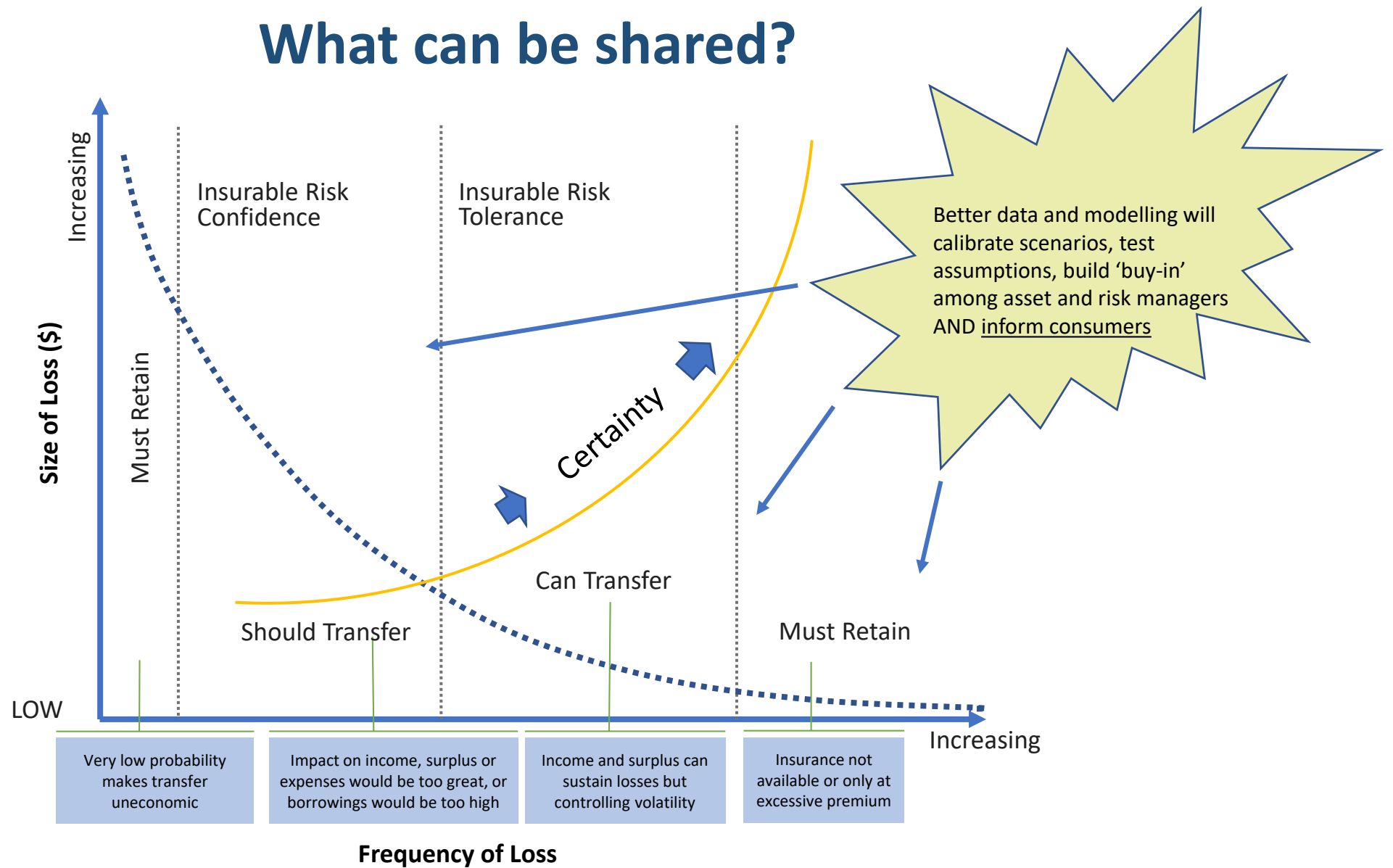
Capacity to Absorb  
Ability to Adapt



# Trade-offs

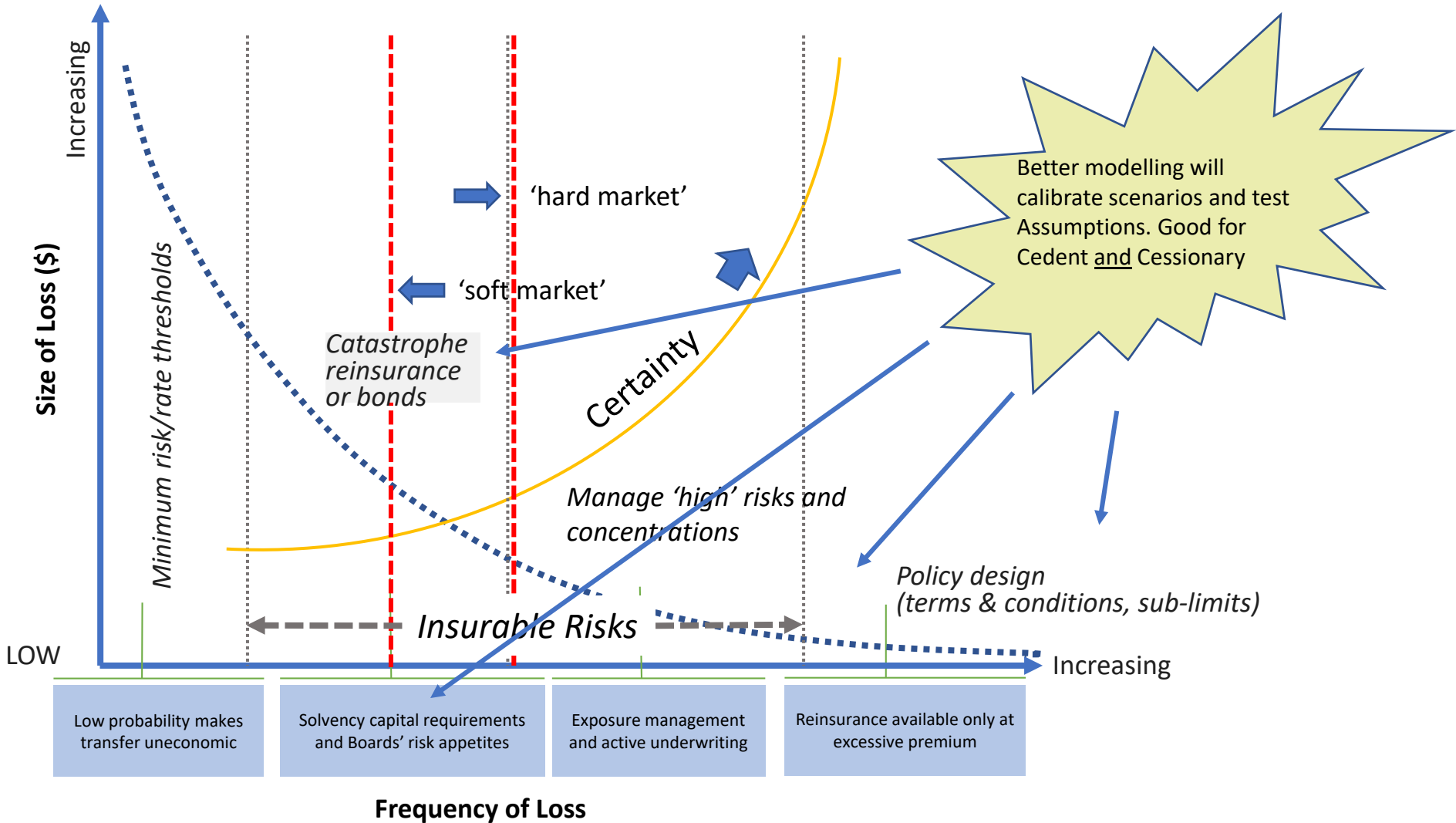


# What can be shared?



After Middleton, 2016 <https://www.lgnz.co.nz/assets/9190f8591f/42600-LGNZ-Risk-Financing-Guide-Final-WEB.pdf>

# Where do we meet the Markets?



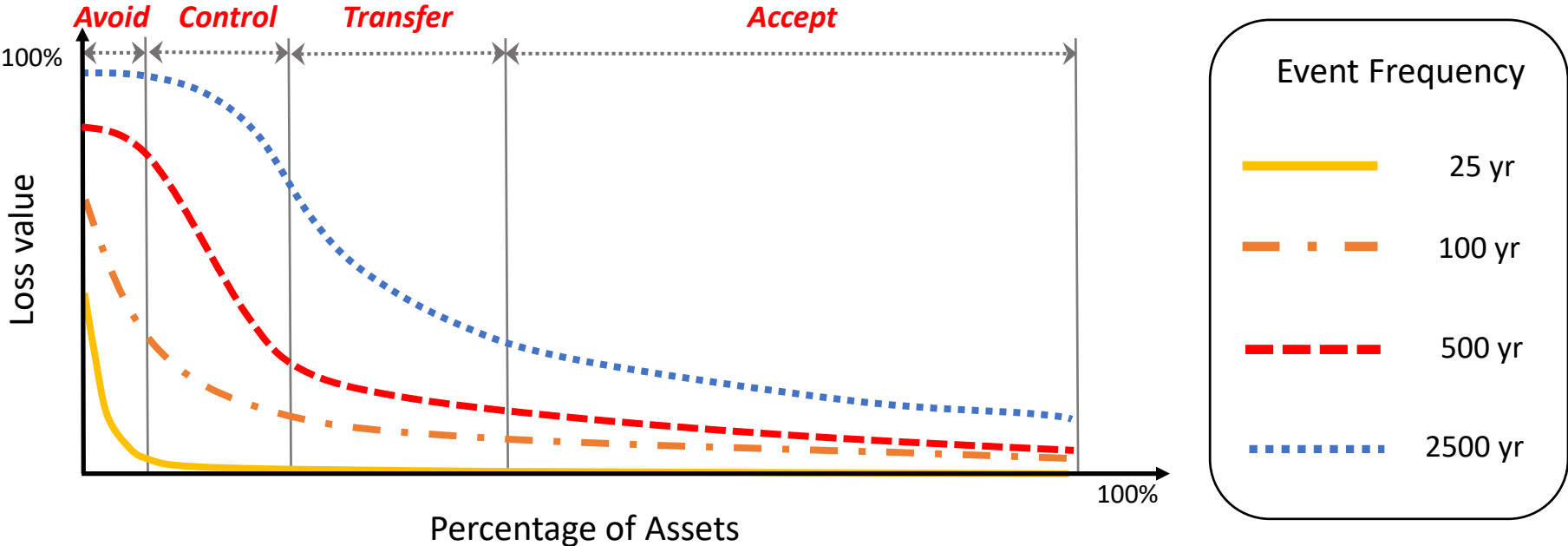
# From standards-based to risk-based thinking

**A**VOID - Reduce exposure with prudent land use

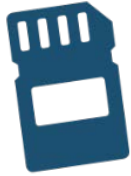
**C**ONTROL - Mitigate impact using design and building practices

**T**RANSFER - Insure value at risk to buffer loss and aid recovery

**A**CCCEPT - Adaptive response arrangements



# EQC priorities - next three years



## A RENEWED FOCUS ON THE STRATEGIC VALUE OF DATA AND INFORMATION

### Initial priorities:

- > Geotechnical data in high risk areas
- > Improved sharing of hazard information



## COORDINATED AND TARGETED SCIENCE INVESTMENT

### Initial priorities:

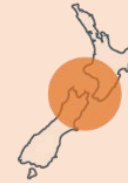
- > Research on the effects of risk-based insurance coverage
- > Improved volcanic and landslide hazard models



## ACCELERATING THE SYNTHESIS AND TRANSLATION OF RESEARCH OUTPUTS

### Initial priorities:

- > Engineering guidance for seismic improvements of buildings



## ENHANCING LOSS MODELLING/ IMPACT ESTIMATION PRODUCTS

### Initial priorities:

- > Replatforming existing capability and expanding the hazard types that can be modelled

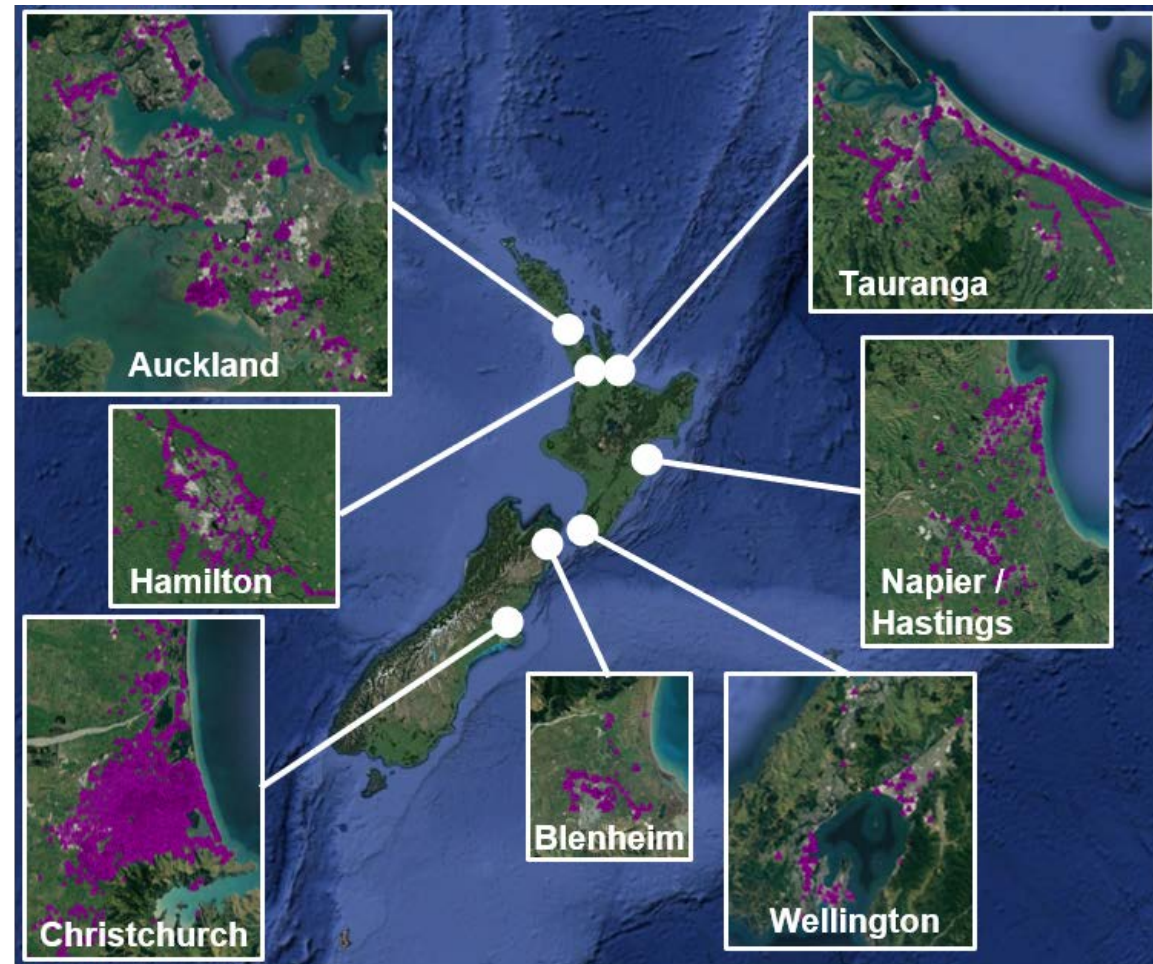


## DEVELOPING RECIPROCAL PARTNERSHIPS

### Initial priorities:

- > Local government and key regulators
- > Guidance and training for engineers and land use planners

# Models require adequate data and more consistent protocols



# Benefits of data sharing and model validation

- Less duplication of effort and cost
- Improved understanding of risk and variability
- Better predictions for similar sites elsewhere
- Growing value as data is available and used with other datasets
- Requires reciprocity, a work in progress!





# Translation and Partnership Required

Guidance document developed by:



**MINISTRY OF BUSINESS,  
INNOVATION & EMPLOYMENT**  
HĪKINA WHAKATUTUKI



*Ministry for the*  
**Environment**  
*Manatū Mō Te Taiao*

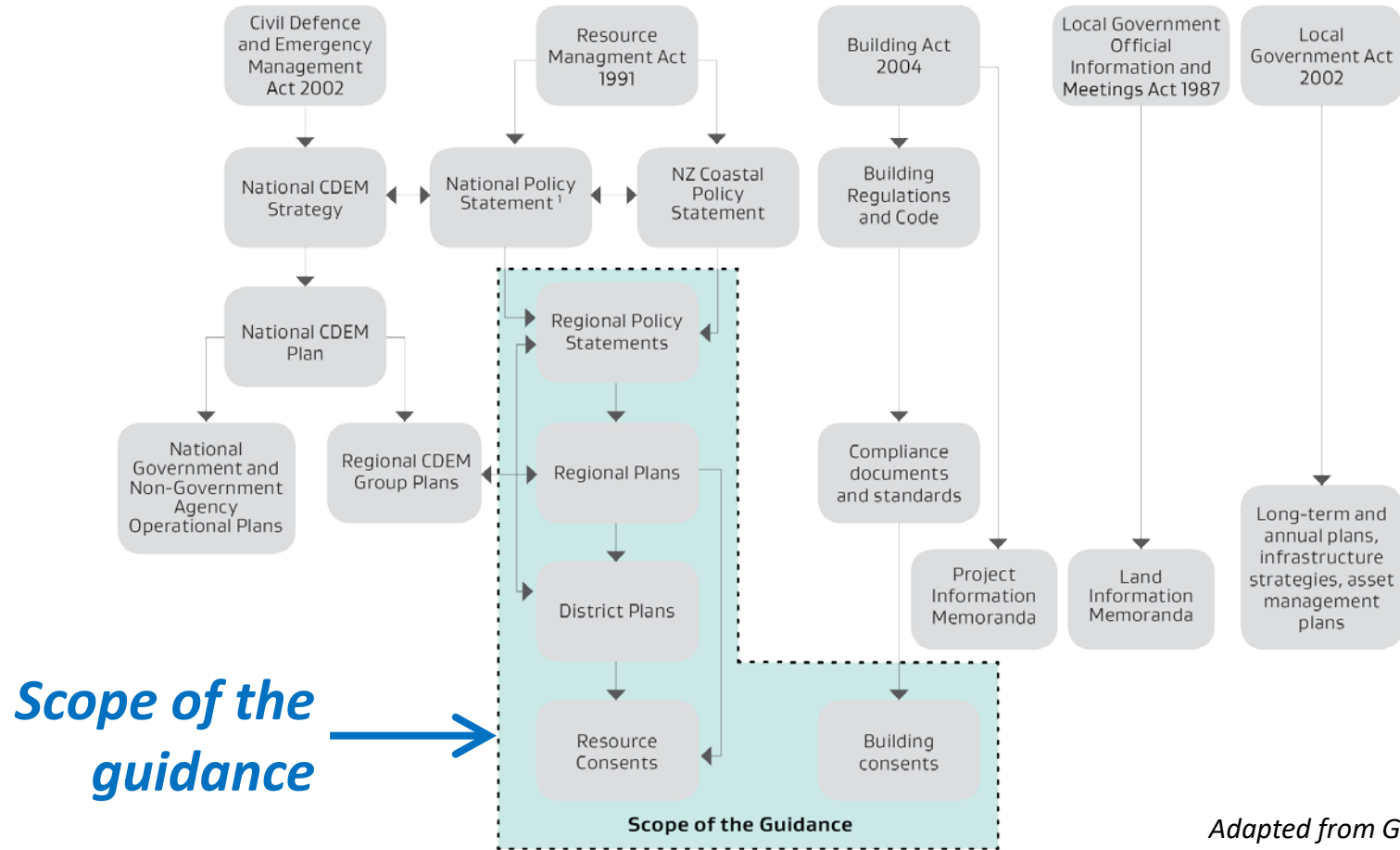
Workshops brought to you by:



# Don't forget the training!



# Where does it fit?

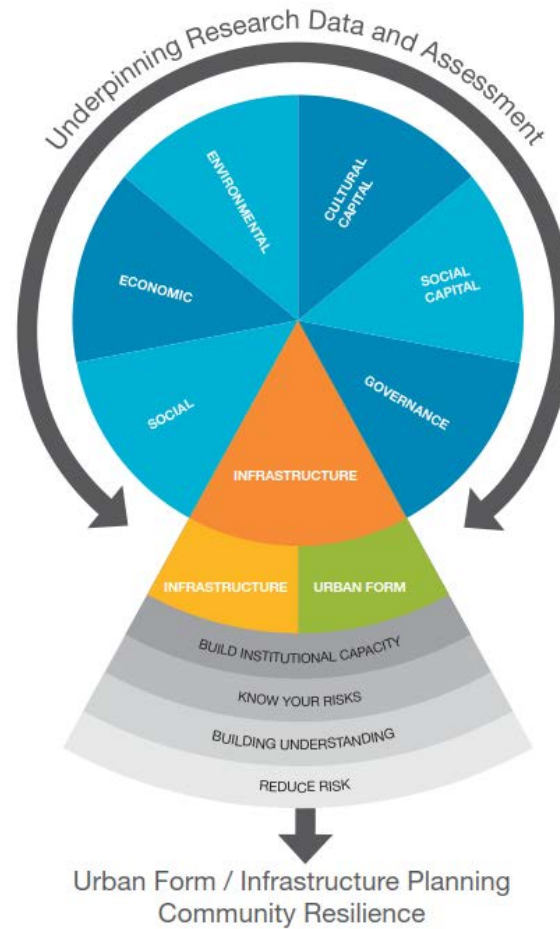
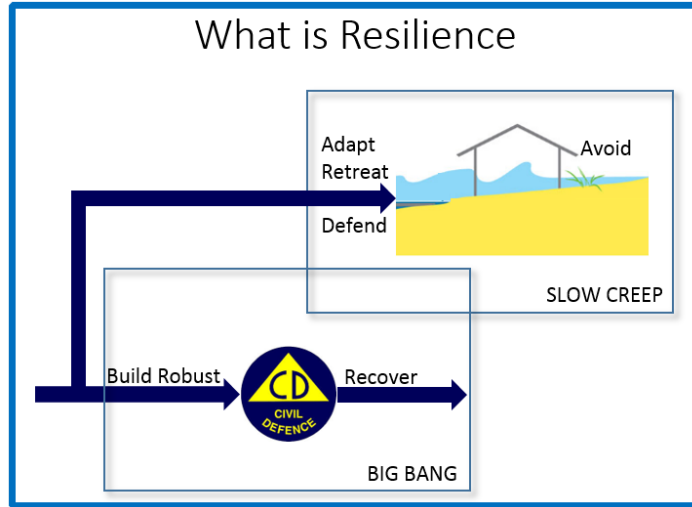


*Adapted from GWRC 2017 and National CDEM Strategy 2007*

Note:

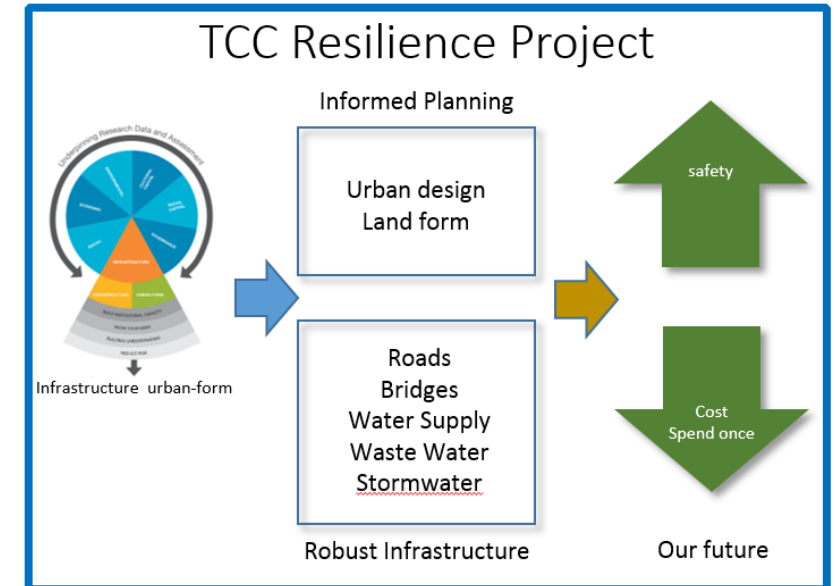
<sup>1</sup> The government has announced an intention to develop a National Policy Statement on natural hazards.

# Regional Initiatives – example: Tauranga City

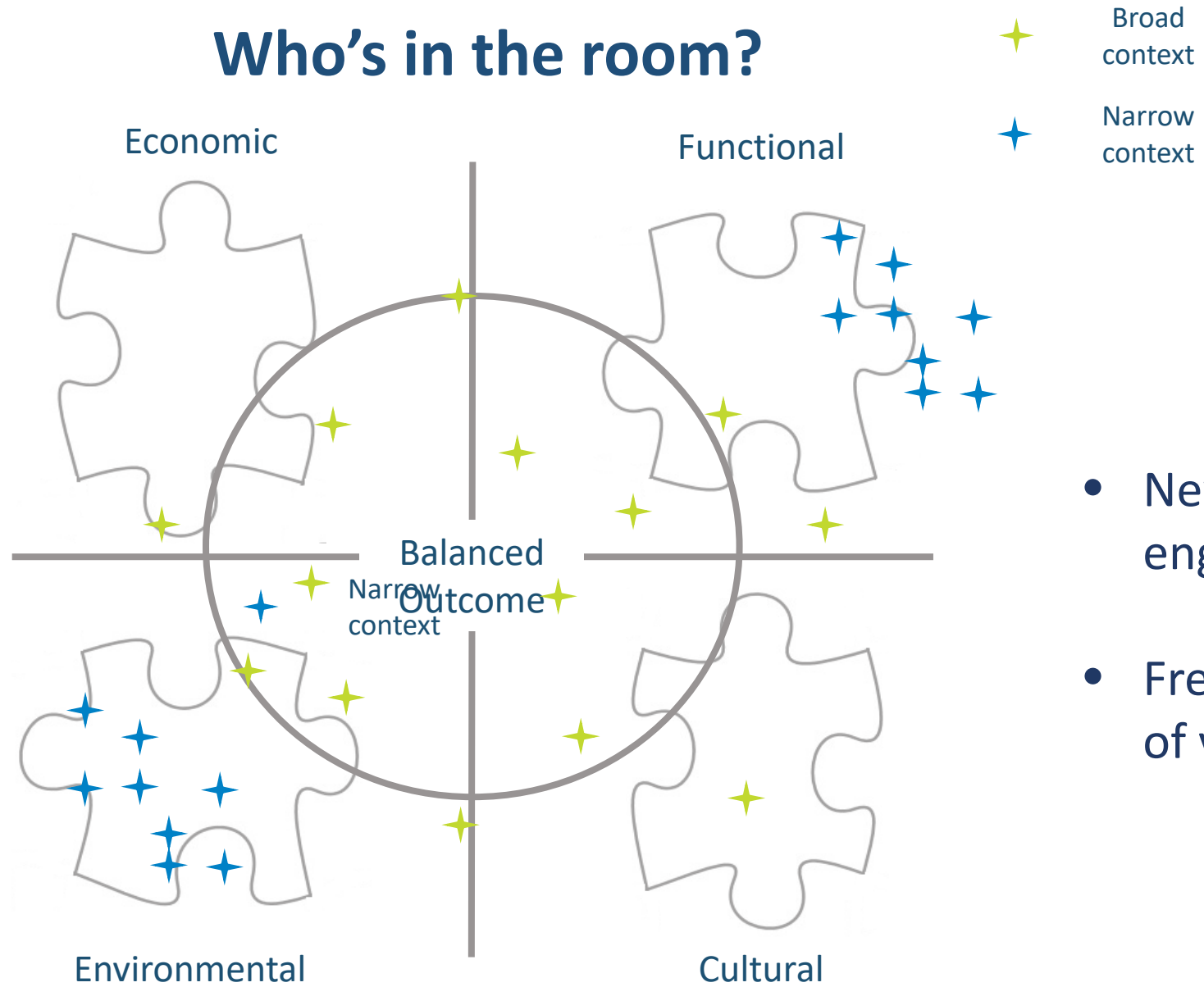


- Map natural hazards and quantify impacts
- Enhance existing infrastructure to ensure continuity of services
- Reduce exposure by focusing new development in safer areas
- Integrate resilience principles into urban design

- Tauranga City able to absorb disturbance, recover from disruption and act effectively in a crisis
- Take a proactive anticipatory approach to climate change



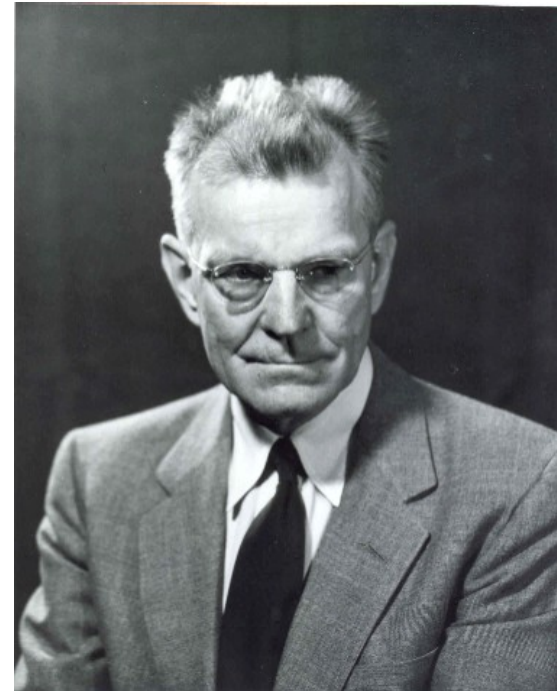
# Who's in the room?



# The Transformation Challenge

*"Our ignorance is not so vast as our failure to use what we know."*

M. King Hubbert



## Future states

- **Unwelcome surprises?**
- **Informed choices!**



*Blenheim – 2016 Kaikoura Earthquake*

# Acknowledgments

- Earthquake Commission
- Tonkin & Taylor (Sjoerd Van Ballegooy, Mike Jacka)
- Tauranga City Council (Steve Raynor)
- Pam Johnston and John Scott
- QuakeCore - Community of Practice