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Adaptation Risk Investment

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Why adaptation is essential

- ***adaptation*** – actions to address unavoidable climate change, to minimise risk and disruptions, and to strengthen resilience and preparedness
- ***mitigation*** – actions to reduce GHG emissions and to modify actions, aiming to reduce the likelihood of further change which may have more severe, more damaging and more costly impacts
- climate responds to cumulative emissions, so unless they are close to zero risk increases over time
- it is certain the sea is rising and will continue to do so for centuries, and the same applies to temperature rise and resulting weather pattern changes, **so an adaptation response is essential**

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What is insurance?

- ***Insurance 101 –***
  - a way to manage risk, so if a risk happens and there is a loss you can be put back to where you were immediately before the loss.
  - it ***transfers*** risk from the insured to the insurer; it does not reduce the risk.
  - the insured pays a premium in return for the transfer of risk; the higher the risk, the higher the premium or a refusal to go on risk.
  - annual renewal, premium based on claims made, so weak long-term risk signal.
  - collects from the many to pay for the misfortunes of the few.
  - insurers income = premium less claims/expenses + investment.

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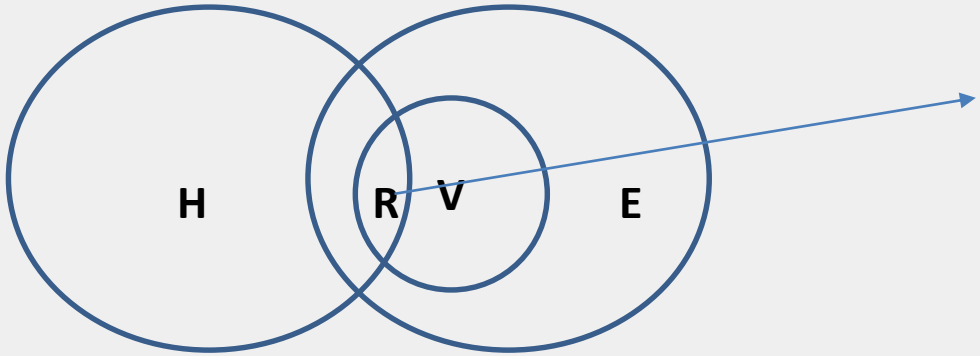
Risk probability of occurrence and impact

- where there are no people or assets there is no risk (desert, mid-ocean)
- **R** = **H** (probability and intensity of the hazard) x the **E** (people/assets exposed to the hazard) x **V** (people/assets vulnerable i.e. lack of resistance to damaging forces)
- within **R** there will be an area **I** (proportion of insured values at risk)
- well prepared regions have low vulnerability; poorly prepared high vulnerability



- this is the area at **R**isk from the **H**azard bc it is the area both **E**xposed and **V**ulnerable to the **H**azard.
- the higher the proportion of **R**isks that are **I**nsured, the lower the loss for individuals and communities.
- the more resilient the area, the smaller circle **V** and area **R**
- the lower the **R**isk, the more affordable and accessible the transfer of **R**isk to insurance within area **R**

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Why is insurance important?

- protects individuals, communities and institutions from unexpected events
- supports the economy
  - by reducing business uncertainty, encourages increased investment and reduces the capital business needs to operate
  - enables higher risk/return activities to support growth
  - feeds long-term, diversified investment of premiums that supports capital growth in wider economy
- saves taxpayers/government provisioning for catastrophic events
- signals through premiums the need for other risk mitigation measures
- is a major sector employer in its own right

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Insurance and mortgages

- Over $200 billion of home loans securitised by insurance to at least cover the mortgage
- Insurance responds to increasing risk and more frequent claims
  - by raising premiums
  - limiting exposure to certain risks e.g. $10,000 excess for flood
  - not accepting any risk e.g. damage from the sea excluded
- If insurance becomes more limited, banks will respond by shortening mortgage terms
- Shorter term mortgages are less affordable
- So property demand falls because insurance is not available and so do property prices

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Mokau, North Taranaki

2012 consent granted to sub-divide into 24 free-hold sections

Sections for Sale! You couldn't live closer to the sea!

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Wairarapa cliff-top bach

Bought in 2006 for $155,000, was 15m from cliff edge, owners told average erosion was 0.5m/year, so assumed they had 20 years use.

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Making risk understandable

The problem with probability

- Talking about low probability (1:100 year events) can mislead people into thinking it won't happen in their lifetime when it could happen tomorrow
- Context is important – how about a 1 in 4 chance of being flooded over the term of a 25 year mortgage? If there are 100 places that face 1:100 year events in NZ, then one will almost certainly happen in the next 12 months
- Managing risk intelligently requires aligning regulatory requirements around expected probability of events occurring:
  - » Building Code guidelines - 50 year horizon
  - » TLA infrastructure plans - 30 year (including flood)
  - » Long-term community plans - 10 year horizon

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Global interdependency, risk and capital

Why this matters

- If climate change risks are not well understood, then risks can aggregate and even threaten financial institutions because of critical interdependencies
- 2011 – one event in one country - flooding in Thailand halted electronic and automotive components with global shortages including increasing price of hard-drives by 20-40%
- Capital is deployed on basis of risk-adjusted returns, so under-estimating climate change risk leads to greater investment in higher risk activities
- Are we accounting for the risks properly?

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Financial institutions and environmental risk

What are the risks? (Mark Carney 2015)

- **Physical** - damage to property, supply chain disruption and business interruption from climate events impact investors and insurers of those assets and liabilities.
- **Liability** – if parties who have suffered loss from the effects of climate change seek compensation from those they hold responsible.
- **Transitional** – adjusting to a low-carbon economy due to policy, technology and physical risks. Speed of re-pricing of assets could be critical for financial stability.

Yet transition not easy….

- When Norfolk (Virginia) published its exposure to sea-level rise it got a credit down-grade

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A local and a global problem

Mission Bay

SH 16 North West Motorway

By 2050, average global flood losses will be $52 billion

Tamaki Drive

70% of the infrastructure in cities in 2050 have not been built yet, so there's time

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Climate Change impacts and the new normal

- as sea level rises (SLR) frequency, duration and extent of coastal floods increase.
- this is more pronounced if combined with storm surge, king tide, heavy rain/river flood, landslip, human or tectonic induced subsidence and poor infrastructure (above and below ground, built for 20th century climate).
- Auckland's highest sea level on 23 January 2011 (due to tide/storm surge) and deemed to exceed high water levels once in a 100 years.
- sea level projected to rise 30 cm between 2015 and 2065. On that basis the 23 January 2011 event would be expected to occur once every 4 years in Auckland, a 40 cm rise would be a 2 year recurrence and a 70 cm rise would mean recurrence at every month!
- $20b of NZ assets within 150cm spring high tide, but Auckland only 1,360 homes, 60 businesses, 56km roads.

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Risk identification

- **assess risk in relation to objectives** – start from an understanding of what it is we wish to avoid (loss of life, property, business interruption) then assess its likelihood
- **identify the biggest risks** – focus on worst case scenarios in relation to long-term change as well as short-term events
- **consider the full range of probabilities** – bearing in mind a very low probability may correspond to a very high risk if the impact is catastrophic
- **use the best available information** – proven science or expert judgment, a best estimate is better than none
- **take a holistic view** – assess system risks as well as direct risks; models are useful but human behaviour and interactions within a system can produce different possibilities (scenario planning helps)
- **be explicit about value judgments** – they are subjective, so be transparent and subject them to public debate

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Positive steps being taken

- New Zealand is a signatory to the UN Sendai Risk Reduction commitments
- Risk-based approach to natural hazards under the RMA (Tonkin and Taylor)
- CDEM's Plan now puts greater emphasis on Risk and Recovery
- BRANZ – cost of meeting 2080 conditions less than 1% of new house costs
- Local government focused - Risk Management Agency business case providing advisory and support function
- Funding of research around risk - needs to be well co-ordinated, single source shared data
- Right questions are being asked by a wide range of stakeholders in the public and private sector

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Adaptation options – long-term view

future losses will be bigger without adaptation

adaptation must lower loss probabilities below current values

calculate annual expected losses to inform adaptation cost-benefit analysis, consider:

- **how we build** e.g. requirements placed on developers like flood protection or land raising
- **where we build** in future e.g. don't consent where adaptation can't work
- **flood proof/flood resilient buildings**
- **retreat** where risk is too high/makes no economic sense to protect
- **upgrade of existing infrastructure** to 21st century needs e.g. storm-water drains
- **build new infrastructure** e.g. sea-walls
- **protect existing infrastructure** e.g. dunes, wetlands
- **improve flood warning systems and public education** – so there is time to reduce the impact
- **learn approaches from other cities** – e.g. Rockefeller 100 Resilient Cities

De-risking – a shared responsibility

will require mix of central and local government funding

- infrastructure
- research protection measures
- managed retreat
- subsidising individual low income/high risk homeowners

  to retrofit protection
- public awareness campaigns

insurance industry

- innovative pricing to recognises risk reduction from adaptation work
- products that enable greater risk sharing with property owner

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Sources

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- *'Risk Based Approach to natural Hazards under the RMA',* Tonkin and Taylor, 2016