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Incentivising resilience to adverse climate change events

Key points:

- Climate disasters are predicted to become bigger and more frequent (Ministry for the Environment 2023b). Therefore, households and businesses need to become more resilient to adverse climate weather events.
- Without accurate information about the total size of risks that people are exposed to, they are less likely to invest in resilience activities.
- In addressing the market failure of asymmetric formation, public good information about climate change weather events can improve resilience and minimise the economic, social and fiscal risks associated with climate change.
- Promoting the application of a standardised method to assess the cost of damage from climate change weather events will be critical for developing approaches that facilitate the comparison of the costs of resilience and risk.

This Insight explores three research questions:

- 1 What is the likelihood of uncompensated losses due to climate change?
- 2 What are the principles for incentivising investment in adaption and resilience?
- 3 What can New Zealand learn from overseas actions and experience of how to incentivise resilience?

With climate-related disasters predicted to become more frequent and severe, the

Government, businesses and households need to understand the following:

- likelihood of future events
- potential economic and social costs
- options to minimise costs based on understanding the risks, impacts, and associated trade-offs.

Of course, bearing the risk of natural disasters also includes accepting the costs if one occurs. To understand how much risk (and therefore cost) is acceptable, we need to know what's at stake.

Recent events have placed a spotlight on the cost of climate weather events

New Zealand experienced some of its largest climate-related disasters in 2023. The cost of damage and recovery from these events is high.

Current estimates of total insured damages from January 2023 to September 2023 value the cost of 2023's climate change-related disasters at \$3.56 billion across just under 120,000 claims (Insurance Council of New Zealand 2023).

The majority of this cost can be attributed to the Auckland Anniversary Weekend floods (\$1.84 billion) and Cyclone Gabrielle (\$1.65 billion).

These costs extend to more than just insurance payments

Not all losses will be insured, which leads to what's known as the 'insurance gap' – the difference between total losses and insured losses.

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Estimates of the protection gap for the Auckland Anniversary Weekend floods and Cyclone Gabrielle place around a third of physical asset damage as uninsured, equivalent to NZ\$2.3 billion (Munich Re 2023).

Damages to physical assets and production outputs are what are known as direct impacts in economic terms

In March 2023, MFAT published that initial estimates of Cyclone Gabrielle's impact on the New Zealand economy and exports were between \$500 million and \$1 billion. Crop losses are also not usually insured compared to property damages (Ministry of Foreign Affairs and Trade 2023).

In April, the Treasury estimated that the value of the North Island (NI) weather events physical asset damage to households, businesses, and infrastructure was between \$9 billion and \$14 billion (The Treasury 2023).

Table 1 Physical asset damage from NI weather events

Damage incurred	NZ\$ billion
Households	\$2.0 to \$3.5
Businesses	\$2.0 to \$3.0
Infrastructure	\$5.0 to \$7.5
Total	\$9.0 to \$14.0

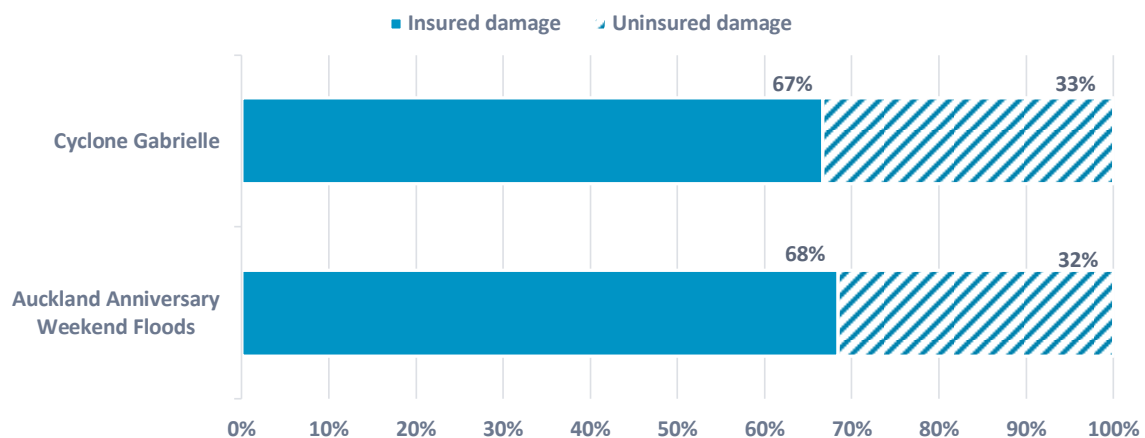
Source: The Treasury

Economic loss estimates should also consider social impacts

Intangible social costs like health, environmental and cultural impacts are also difficult to quantify, and they add another layer of loss that may go uncompensated (OECD 2018).

Newman and Noy (2023) explored this by including the value of a loss of life in their estimates of the global costs of extreme weather attributable to climate change. They found that, globally, the loss of human life represents 63% of the total costs attributable to climate-related disasters.

In New Zealand, high losses were caused by flooding following heavy rainfall, as well as Cyclone Gabrielle making landfall. Assets worth some US\$4.3bn were destroyed, of which around US\$2.9bn was insured.
- Munich RE (2023)



Source: NZIER, Munich RE

More recently, IAG has said they will stop offering ongoing insurance for properties in the Category 3 areas in response to the Government's Land Categorisation Framework (IAG 2023). Government guidance describes Category 3 as a situation where the risk of future severe weather events cannot be sufficiently mitigated, and some land use may remain acceptable, but the risk of injuries or death is considered too high to justify residential land use.

The action linked to this category is for central and local governments to assist without defining the parameters of that assistance (Department of Prime Minister and Cabinet 2023).

With private insurers already retreating from areas with high risk and climate-related disasters predicted to become more frequent and severe, the ability of governments to pay for damages is uncertain.

All of this leaves a question mark over the government's role in providing compensation for economic losses from climate disasters

Various support packages were announced both at a local and central government level. A billion-dollar flood and cyclone recovery package was announced through Budget23, targeting child mental health services, rebuilding and repairing infrastructure, training and employment, and future flood protection (New Zealand Government 2023).

However, this funding is equivalent to 13% to 20% of the estimated damage to just publicly-owned infrastructure, let alone the wider impacts currently not included in the cost.

We need to know how big this gap is and what can be done to narrow the gap and reduce uncompensated losses.

Market failure and the case for government intervention

The case for government intervention is motivated by more than the risk of finances for a few people. A good starting point is whether a market failure needs to be addressed through government intervention.

Market failures are defined by the occurrence of the following outcomes:

- inefficiencies in the allocation of resources
- asymmetric information
- the presence of externalities
- evidence of irrational choices
- failure to deliver public goods.

Government failure is defined as either:

- ineffective responses to address market failures
- failure to manage vulnerabilities and distributional issues
- inadequate provision of public goods, although determining the optimal level is challenging
- interventions that introduce unintended consequences.

Governments can improve private and public investment incentives in climate change adaption and resilience through effective mechanisms to address market failures.

Persistent insurance gaps, if temporary, are a market response to risks and cost pressures faced by the insurer. Similarly, an insurance retreat is a market response to the increased risk profile.

Insurance retreat is an unfortunate outcome for the owners of private assets. But not market failure. Market failures could emerge if information asymmetry exists about the risk of climate change weather events.

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The government has a key role in reducing barriers, like information asymmetries and uncertainty, to support efficient and equitable outcomes.

In the context of climate-change-related weather events and adaption to climate change, the government has a key role in communicating information about the risk in a transparent and accessible manner.

It is beyond the scope of this research to consider whether there is evidence of irrational choices. However, the change in conditions over time may force some choices to be revisited. For example, the risk profile of cliff-top houses with seafront views might change in response to how recent events have affected soil cohesion and hillslope stability after prolonged and heavy rain.

Table 2 outlines the barriers to improving and investing in resilience and recommends the approach needed to overcome the market or government failure that has been identified.

Table 2 Barriers and responses to adaption and investment in resilience

Barrier to resilience	Market or government failure to be addressed	Recommended approach
Inconsistent policy direction	Asymmetric information	Common decision-making frameworks and tools among central and local government
Conflicting initiatives and interests	A risk of market inefficiency	Ensure competition is high and market power is low
Inconsistent framing at various levels of government	Asymmetric information	Centralised guidance on the risks and risk management framework
Divergent risk concepts and inconsistent risk modelling	Asymmetric information and lack of public good	Standardise the assessment of risk and communicate the limitations of the assessment

Barrier to resilience	Market or government failure to be addressed	Recommended approach
Financial resource constraints	Market inefficiency	Ensure capital markets are competitive, externalities are internalised to the source, and sufficient public infrastructure is funded.

Source: NZIER

People need information to make better decisions about investment in resilience

Decision-making at all levels is based on the information people have at hand. This is true for individuals, households, businesses and policy-makers.

This means that incentivising investment in adaption and resilience critically depends on making information more accessible for people to help them appropriately assess the risks they may face.

Overcoming information asymmetries on the risks of climate change weather events is important for:

- market efficiencies
- avoiding inequitable outcomes
- overcoming uncertainty about investment options.

Two key objectives are at play – cost minimisation and opportunity maximisation

Information sharing by the government is also critical to better inform decisions about cost minimisation and opportunity maximisation in response to climates.

Investment in adaption and resilience can de-risk activities and contribute to lowering the potential cost of climate change event damage. However, adaption and resilience activities and investment involve considering the trade-offs.

Governments play a central role in correcting this market failure through the following activities:

- assessing the risks across the whole community
- communicating the risks to the community
- incentivising and coordinating pro-resilience activities and investments
- discouraging activity that increases risk and decreases resilience.

Investment in resilience involves economic and temporal trade-offs and ways of evaluating options

Climate change is progressing in a manner that represents the risks of more frequent and adverse severe weather events that pose a risk of damage to assets, lives and environments. Investment in resilience to this damage and expedient recovery could result in savings. However, the cost-effectiveness and efficiency of investing in resilience are not guaranteed, and a trade-off must be considered.

Economics tells us that we should invest in damage avoidance until the cost of damage avoidance exceeds the cost of the avoided damage. Investing in resilience is similar to this approach.

Resilience is a combination of recovery from and resistance to damage

Resilience is the combination of two concepts: defensive capacity and recovery capability. The defensive capacity of resilience is the ability to withstand adverse weather conditions to avoid damage. Recovery capability is the ability to bounce back (Perrings 2006).

Defensive capacity requires an investment in the ability to cope with infrequent adverse weather conditions beyond the average conditions. Therefore, the defensive capacity of assets requires an investment in assets to a level that is typically redundant until an

adverse event occurs. Examples could include high-capacity stormwater systems or strengthening housing well above average wind speeds.

Recovery capability requires investment in the resources, relationships, planning and institutional settings required to accelerate recovery to return to a functional state. This includes:

- emergency response
- disaster clean-up
- private asset repair and restoration
- public asset repair and restoration.

A policy that informs and incentivises de-risking can lower public and private costs

Policy tools and institutional frameworks influence decision-making by businesses, households and individuals. In the context of climate change adaptation and resilience, policy plays a key role in decreasing information asymmetries and incentivising changes that increase resilience to risks from climate events.

The conversation on compensation and risk management is evolving

Of course, decisions about adaptation and resilience to the risk of adverse events are not static. Risk management responses include options such as the PARA framework that is applied in the National Adaptation Plan (Ministry for the Environment 2022) and the ACTA framework for risk management.

The PARA framework includes the four dimensions of Protect, Avoid, Retreat and Accommodate. The major weakness of the PARA framework is that it does not explicitly address the transfer or sharing of risk, which is what the insurance model does.

In comparison, the ACTA framework includes:

- Avoid: when the cost of resilience is greater than the benefits

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- **Control:** when mitigation is feasible, and the costs of mitigation are less than the benefits
- **Transfer:** when the costs can be priced and shared effectively to decrease the financial impact, as in an insurance model
- **Accept:** when the cost of damage is unavoidable, the required investment in resilience would be greater than the benefits.

All of these options are making trade-offs between the benefits of resilience.

The issue of minimising risk from climate events is still mainly focused on the government as the key player to either compensate for losses or fund initiatives to minimise risk and losses.

To this effect, the government has proposed a work programme to improve natural hazard risk management through two key areas (Ministry for the Environment 2023a):

- A National Policy Statement on Natural Hazard Decision-making
- A comprehensive National Direction for Natural Hazards will be developed in the coming years.

However, there is a risk that the government is the “insurer of last resort” and provides a fallback for private insurers to reduce risk profiles and share the insurance costs in high-risk areas.

On the other side, the government is investigating ways to reduce risk through managed retreat and restricting property development in higher-risk areas through the National Policy Statement on Natural Hazard Decision-making.

These are hard lines to take, and local and central governments should consider ways to incentivise households and businesses to reduce risk.

Various initiatives are used overseas to reduce timeframes for insurance payouts, keep private insurance in high-risk areas affordable by reducing risk, and create new avenues to fund investment in resilience.

How are other countries incentivising investment in resilience?

Other countries incentivise resilience through raising awareness, risk reduction nudges and resilience bonds.

Increasing awareness and reducing timeframes for insurance payouts

Weather index-based insurance schemes automatically pay out to farmers in a region or area if certain preconditions are met (CGIAR and CCAFT, n.d.).

For example, if there is insufficient rainfall relative to a specified threshold in a given year, the insurance payment would trigger without needing individual claims processing and visits to each farm to assess damage/loss. Similar approaches are used already to support farmers during droughts.

Although this is not a silver bullet to address climate risks, it does speed up recovery times by making funds accessible quickly and with lower amounts of effort than traditional insurance.

Incentivising risk reduction activities

In the United States, USAA¹ members receive discounts on insurance policies if they live in states recognised as Firewise USA communities.

¹ USAA is an American financial services company that provides exclusively to members of the military, veterans, and their families.

This includes completing a community wildfire risk assessment, creating a 3-year action plan to reduce fire risk to homes, and completing annual educational and risk reduction actions (NFPA 2023).

In Germany, 'flood passports' have been introduced as a voluntary property-level mitigation measure. Flood passports involve a certified building survey and a detailed on-site assessment identifying how vulnerable or resilient a building is to flood risk.

Campaigns intended to increase the adoption of flood insurance increased adoption from 19% to 41% (Surminksi, Roezer, and Golnaraghi 2020). Such policies are an example of an outcome that is positive for reducing uncompensated loss, and it is also pro-resilience for enabling recovery.

Although these certificates and subsequent risk-reduction measures are not required by law, insurance providers have responded favourably by offering lower premiums and rewards to residents who invest in increasing their resilience to flood risk and have the documentation to back up their efforts (Meyer and Hatmann 2023).

This is similar to risk-based pricing. However, instead of increasing prices to unaffordable levels for high-risk areas, insurers incentivise investment in reducing the risk through mitigation and adaptation activities.

Catastrophe and resilience bonds

Earlier this year, Toka Tū Ake EQC added catastrophe bonds to their reinsurance portfolio (Toka Tū Ake EQC 2023). These bonds provide a means to speed up economic recovery in the event of a climate disaster.

Predetermined thresholds are set where, if reached, investors lose a portion of the principal they invested. If the thresholds are not reached, then funds are paid back to investors with (usually) attractive rates (Vajjhala and Rhodes 2015).

As an extension of catastrophe bonds, resilience bonds aim to provide greater levels of capital for climate-resilient investment by linking insurance and resilience projects while monetising avoided losses through the provision of rebates, which are then used to fund additional resilience projects.

These rebates can take the form of reduced insurance costs from disasters by implementing the bond's resilience project, similar to how progressive health insurance policies provide discounts on premiums when people make healthy lifestyle choices (Vajjhala and Rhodes 2017).

The European Bank for Reconstruction and Development launched the first dedicated resilience bond in 2019, raising US\$700 million for projects that fit the criteria under their Climate Resilience Portfolio (Bascunan, Molloy, and Sauer 2020).

At a more localised scale, resilience bonds are also being considered by California state legislators. A statewide ballot in 2024 will decide on a US \$15.5 billion bond issue targeted towards climate resilience and mitigation investments.

Recommendations

- 1 Investigate the size, scale and distribution of risks linked to climate change and events, and publish the research in ways that are in the public interest and overcome information asymmetries. This will require a multifaceted and multimedia approach.
- 2 Adopt a national framework across all forms of government to address the barriers to investment and incentivise investment in resilience, such as the ACTA framework.
- 3 Work with the insurance industry to manage risks and promote the adoption of private insurance when it is an effective risk-sharing mechanism.

- 4 Help households, communities, and businesses to better understand the risks and likely impacts they face from climate disasters by generating information and making it more accessible.
- 5 Promote the application of a standardised method to assess the cost of damage from climate change weather events.
- 6 Developed approaches that facilitate the comparison of the costs of resilience and risk consistently to ensure that options can be ranked.

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