Australian National University

Submission:

Impact of Climate Risk on Insurance Premiums and Availability

ANU Institute for Climate, Energy & Disaster Solutions

This submission is the collated perspective of independent researchers that work at The Australian National University. The views and opinions expressed in this submission reflect those of the authors and contributors.

Lead authors: Timothy Higgins, Mark Howden, Kate Lawrence, Roslyn Prinsley, Caroline Schuster, Liam Taylor and Ning Wang

TEQSA Provider ID: PRV12002 (Australian University)
CRICOS Provider Code: 00120C

1 July 2024

Senator Mehreen Faruqi
Committee Chair
Select Committee on the Impact of Climate Risk on Insurance Premiums and Availability
PO Box 6100
Parliament House
Canberra ACT 2600

Re: Impact of Climate Risk on Insurance Premiums and Availability

Dear Senator Mehreen Faruqi,

Please find enclosed a submission by the ANU Institute for Climate, Energy and Disaster Solutions (ICEDS) for the Select Committee on the Impact of Climate Risk on Insurance Premiums and Availability inquiry process.

Based in the ACT, ICEDS connects industry, governments and communities with climate, energy & disaster-risk research from the Australian National University. Our goal is to advance innovative solutions to address climate change, energy system transitions and disasters. We facilitate integrated research, teaching and policy engagement across disciplines.

The enclosed submission contains contributions from experts in transformational adaptation, actuarial studies, economics, anthropology, climate science and disaster solutions.

Our network of ANU researchers will gladly offer further consultation.

Sincerely,

Professor Mark Howden
Director, Institute for Climate, Energy and Disaster Solutions

Table of Contents

Executive Summary

The Institute for Climate, Energy and Disaster Solutions (ICEDS) appreciates the opportunity to contribute to the Select Committee on the Impact of Climate Risk on Insurance Premiums and Availability. Climate change is intensifying and increasing the frequency of extreme weather events, significantly impacting infrastructure and communities in Australia. This results in higher insurance premiums and reduced availability, particularly in high-risk areas. By 2030, one in 25 homes may become uninsurable due to flooding alone, with coastal erosion and rising sea levels threatening many more. Recent catastrophic events, such as the 2022 Floods and Black Summer Bushfires, have highlighted the substantial economic losses and the growing need for effective management of disaster risk across the economy.

Climate risks and costs disproportionately affect disadvantaged groups, exacerbating socio-economic inequalities. Current insurance practices often fail to address these disparities adequately. International norms, such as the UNESCO Declaration of Ethical Principles and the UN Guiding Principles on Business and Human Rights, should guide fair and just responses to these challenges. Collaboration between government, the insurance sector and communities is essential to adapt to climate-related changes, build resilience, reduce risks and ensure equitable access to insurance. Enhanced data transparency, interdisciplinary research and innovative approaches are crucial.

This submission recommends that the Committee could:

1. Promote improved data collection, analysis, sharing, transparency and accessibility between insurers, government, academia and the public to enhance risk modelling, research and resilience-building efforts.
2. Consider how current insurance policies impact vulnerable communities and consider the role of government in following principles of justice and solidarity to distribute climate risks more equitably.
3. Consider how the government, the insurance sector and households hold interconnected responsibility to mitigate climate change, reduce exposure and build resilience against its impacts. This includes ensuring resilience measures are priced into insurance premiums.
4. Support research into innovative approaches to climate risk management, such as revenue-contingent loans, to ensure equitable and effective redistribution of climate risk across the economy.
5. Promote more investment from both the public and private sectors to prevent and reduce the intensity of climate hazards themselves.

Underlying Risks and Impacts

Increasing Risks and Costs of Climate Change

Climate change is driving more intense and frequent extreme weather events, affecting people and infrastructure in areas exposed to riverine flooding, sea level rise, coastal erosion, cyclones, bushfires and extreme heat.[1] Insurers face a greater likelihood that insured properties will be affected by more frequent and intense climate-related hazards. This is leading to higher premiums, reinsurance costs and a more complex insurance market.[2] It has already resulted in reduced availability of insurance, particularly in high-risk areas and increased insurance prices for almost all policyholders.[3]

In the short term, around one in 25 homes across Australia will likely be uninsurable by 2030 due to riverine flooding risk alone.[4] That number rises to more than one in 10 homes in the most affected regions.[5] Similarly, one in 10 homes within 150 meters of the coast are vulnerable to coastal erosion.[6] Sea level rise will make other parts of Australia uninhabitable, with up to 250,000 residential buildings directly vulnerable to the impacts of coastal inundation and a future sea level rise of 1.1 meters this century.[7] The practice of not offering cover "Actions of the Sea" represents another protection gap, where insurance coverage has very limited availability due to the inevitable nature of sea level rise risk to exposed properties.[8]

Recent catastrophic events have also shown the extent of losses facing the insurance industry. The 2019-2020 bushfire season in Australia, known as "Black Summer," resulted in estimated insured losses of $2.32 billion, making it one of the costliest natural disasters in Australian history.[9] Cyclones, too, pose a considerable threat. For instance, Cyclone Debbie in 2017 led to $1.7 billion in insured losses.[10] Even in an increasingly ambitious low-emissions scenario, the annual costs of disasters in Australia are expected to reach at least $73 billion by 2060.[11]

Climate Risk Information

Having accurate information when pricing climate risk into insurance is crucial, especially in a country like Australia that is highly susceptible to an array of climate-related events. Accurate data on different hazards allows for greater precision in risk modelling, leading to better risk predictions and more appropriate pricing of insurance premiums. Insurers and governments can then more effectively support building adaptive capacity, develop innovative products or risk-sharing mechanisms, manage residual risks effectively and distribute costs fairly. Currently, some parties lack sufficient information to inform risk models, research and adaptation efforts.[12]

[1] IPCC (2022)
[2] Actuaries Institute (2022)
[3] Actuaries Institute (2022)
[4] Climate Council (2022)
[5] Climate Council (2022)
[6] DCCEE (2011)
[7] DCCEE (2011)
[8] Insurance Council of Australia (2021)
[9] Ahmed, I & Ledger, K. (2023)
[10] PERILS (2017)
[11] Deloitte (2021)
[12] Surminski, *et al*. (2022)

Information Transparency and Governance

There would be considerable benefits from more transparent information sharing between insurance companies, the private sector (including consultancies), government, academia and the public. Investments in expensive technologies to collect and model weather data, which can improve the accuracy of weather-linked insurance products, are often supported by public funding, while the benefits accrue to private insurers to develop proprietary pricing models, with little public benefit or oversight.

Weather models on secondary perils improve pricing and are reliant on public data. Publicly funded flood studies and other climate research should be made accessible to ensure that the benefits of these investments are shared broadly.[13]

Information sharing is also essential in engaging communities in the development and implementation of climate adaptation and resilience measures to address local needs and vulnerabilities. This can also lead to more effective and equitable insurance solutions as resilience-building measures can be used to reduce premiums. Additionally, community involvement provides valuable insights into specific risks and challenges that can be used by governments and the insurance industry.

There needs to be better transparency in data sharing on climate risk. Ensuring transparency and open access to data will enhance the accuracy of risk assessments for all parties and support better policy and decision-making. This information sharing can support collaborative efforts in research and policy development on insurance policy and community resilience to climate risk.

Recommendation One: The Committee could promote improved data collection, analysis, sharing, transparency and accessibility between insurers, government, academia and the public to enhance risk modeling, research and resilience-building efforts.

Accurate Data for Complex Risk

The complex, compounding and cascading nature of climate risks complicates the risk calculations of insurers. The Intergovernmental Panel on Climate Change (IPCC) notes that climate change risks and impacts are becoming increasingly complex and more difficult to manage.[14] Multiple climate hazards will occur simultaneously, and multiple climatic and non-climatic risks will interact. Additionally, there is growing recognition that risks can arise from both potential impacts of climate change and from the responses to climate change.[15] These complex risks require insurers to adopt more sophisticated modeling techniques that can account for the interplay of various risk factors. Traditional models based on historical data are increasingly inadequate as they fail to capture the dynamic nature of climate change's impact on extreme weather.

Insurers are increasingly building models with larger amounts of data, often sourced from local, State and Federal government projects in addition to private contractors to account for this complex risk. The incentives to commercialize this data make it difficult for non-commercial actors, including governments, academia and households, to access data themselves to better understand climate risk and incorporate into policy, research and financial planning. Additionally, there are often significant gaps in data collection and understanding of climate risk and secondary perils, including floods, in regional and remote areas, where weather monitoring infrastructure is not readily available.[16]

As climate risks become increasingly complex, different sectors must collaborate to understand the multiple drivers and interactions of risks.[17] This implies a need for interdisciplinary research to gather more accurate data that can be integrated with existing resources from the insurance industry that are

[13] Surminski, *et al.* (2022)
[14] IPCC (2022)
[15] Simpson, N. *et,al.* (2021)
[16] ICEDS (2022)
[17] Simpson, N. *et,al.* (2021)

made more transparent. ICEDS is already pursuing projects in this way, partnering with flood-affected communities to build social infrastructure in the form of community groups, empowering citizen scientists to collect rainfall and streamflow data. This data can then both inform local responses and can be incorporated into the Bureau of Meteorology's forecasts, whilst the data collection process builds resilient social networks.[18]

Low-Likelihood Catastrophic Events

Climate change is expected to cause some extreme outcomes, for example the collapse of ice sheets resulting in extremely rapid sea level rise.[19] Given the high degree of uncertainty when assessing the likelihood of such climate-related outcomes, a precautionary approach considering worst-case scenarios is prudent. Atmospheric and global feedback loops and climate thresholds could increase the likelihood of extreme events.[20] Such catastrophic events could cause widespread devastation, overwhelming local and national risk management mechanisms.

Insurers and the government could better account for these low-probability, high-impact events. This precautionary approach can reduce the risk of insolvency for insurers; however, it could also lead to higher premiums for policyholders. The unpredictability of climate-driven catastrophic events makes it challenging for insurers to price risks accurately, as insurance models struggle to factor in the probabilities accruing because of climate change.[21] This underscores the need for better research, monitoring, transparency and governance models for climate risk assessment. Additionally, it reinforces the need for risk to be distributed fairly across the economy.

Interconnected Roles and Responsibilities

As highlighted by normative approaches under the United Nations, addressing the causes and impacts of climate change requires an inherently collaborative approach, where all actors work in partnership with each other to achieve just outcomes. In the same way, the government, the insurance industry and all sectors need to work collaboratively and recognise their interconnected roles and responsibilities in providing availability and affordability of insurance. All actors must collaborate to reduce the rate and degree of climate change, reduce the exposure of communities and adapt to climate change impacts.

Risk Reduction

In actuarial analysis, risk models link changes in climatic variables, primarily temperature, to economic outcomes, helping to quantify the costs associated with climate change. Increased temperatures are linked to increased frequency and severity of weather extremes and cause significant economic impacts.[22] According to the IPCC, human activities, primarily greenhouse gas (GHG) emissions, have unequivocally caused global temperature increases.[23]

Federal and State governments need to pursue rapid and concerted efforts to reduce GHG emissions in line with our commitments under the Paris Agreement to restrict global temperature increases.[24] Future success in reducing GHG emissions will not prevent all the ongoing effects of climate change.[25] However, mitigation and adaptation must progress simultaneously. The World Meteorological Organization reported that the annual average global temperature in 2023 was 1.45 ± 0.12 °C above pre-industrial

[18] ICEDS (2022)
[19] Kemp, L. *et al.* (2022)
[20] Ripple, W. (2023)
[21] Jarzabkowski, P (2024)
[22] IPCC (2022)
[23] IPCC (2022)
[24] Howden, M. (2024)
[25] IPCC (2022)

levels.[26] Projected GHG emissions make it likely that warming will hit the 1.5°C midpoint in the early 2030s and possibly in the late 2020s under the highest emissions scenario.[27]

The current emissions trajectory also makes it challenging to constrain warming below 2°C and if all the current mitigation policies continue, we are headed towards global warming of 3°C over the century, according to the UN Environment Programme.[28] Effective GHG emission reduction policies must be urgently implemented globally to change our course toward future temperature increase and its impact on rising insurance costs.

Distribution of Risks and Costs

Climate risks and costs are often disproportionately placed upon already disadvantaged groups.[29] Under-insurance is commonly reproduced along socio-economic and geographical lines, with those of lower socio-economic status or living in regional and remote areas more likely to bear the risks and costs of climate change.[30] Should a climate-induced disaster strike, such communities are likely to suffer further disadvantage. Especially if the responsibility for risk is continually shifted onto households – left with properties they cannot afford to fix and which will be difficult to sell at market prices, leading to further impacts on health, livelihoods and opportunities.

Normative approaches established under international law can help guide government and insurance companies' responses to distributing costs. As a member state of UNESCO, Australia's domestic policy should reflect UNESCO declarations. The UNESCO Declaration of Ethical Principles in relation to Climate Change expresses the concern that climate change could create morally unacceptable damage and injustice.[31] Article 4 highlights the need for justice and fair treatment, advocating for partnerships and inclusion in dealing with climate risk, especially for disadvantaged and vulnerable people. It emphasizes the importance of preventing harm and making decisions based on the best available scientific knowledge. Article 6 of the Declaration focuses on solidarity, implying that human beings collectively and individually should assist those most vulnerable to climate change and disasters, especially when catastrophic events occur. Solidarity means sharing knowledge related to the causes, modalities and impacts of climate change and responses to it equitably and in a timely manner.

The Australian insurance industry can also look to other international norms and standards to inform its approach to providing insurance in a changing climate. The United Nations Guiding Principles on Business and Human Rights (UNGPs) set out a clear remit for companies to respect human rights.[32]As climate change-driven extreme events impact a range of fundamental human rights (life, food and water, sanitation, housing etc.)[33] in a way that cannot be addressed by an individual policyholder, the insurance industry should consider the imperative to respond in a way that is consistent with obligations set out under the UNGPs.

The insurance industry currently understands risk-based premiums as crucial to risk signals. However, this can lead to significant and inequitable affordability outcomes that are reproduced along socio-economic and geographical lines, further inhibiting adequate resourcing within households to prevent losses.[34] Assessments of the 'protection gap' are generally defined as a social issue in the Environment, Society and Governance (ESG) auditing frameworks for insurers.[35]This overemphasizes a limited set of social concerns and downplays the interaction with environmental and governance factors. It can also play into stigma, implicitly blaming disaster-impacted communities for under-insurance as a social or cultural issue or financial illiteracy.

[26] WMO (2024)
[27] IPCC (2022)
[28] UNEP (2023)
[29] IPCC (2022)
[30] Actuaries Institute (2022)
[31] UNESCO (2017)
[32] United Nations (2011)
[33] IPCC (2022)
[34] Barry, L (2023)
[35] Vaughn, S (2023)

Some members of the Australian insurance industry have committed to participation in the United Nations Global Compact (UNGC). The UNGC is a voluntary initiative based on CEO commitments to implement universal sustainability principles and take steps to support UN goals. UNGC member organisations from the Australian non-life insurance industry include[36]:

- QBE Insurance Group
- Suncorp Group
- Allianz Australia Limited

Based on their UNGC memberships, these organisations have committed to[37]:

- Support and respect protection of internationally proclaimed human rights (Principle 1)
- Support a precautionary approach to environmental challenges (Principle 7)
- Undertake initiatives to promote greater environmental responsibility (Principle 8)

As such, these organisations should be held to a higher account in their response to the human impacts of climate change that their products are designed to protect against (e.g. home and contents insurance), adhering to Principle 1. Similarly, they can demonstrate adherence to Principles 7 and 8 by rewarding adaptive measures taken by policyholders and their communities that reduce exposure to climate hazards, as is consistent with risk-based pricing structures. Ensuring equity in access to insurance requires targeted policies that address the specific needs of those most impacted by rising premiums and a consideration of the fair distribution of costs.

It is important to note that not all climate risks can be insured against, such as human health impacts, and that whilst it is critical to ensure insurance is available and affordable, governments must remain committed to other adaptation measures. Additionally, even after adaptation measures are implemented, it is widely agreed that residual risks, those that cannot be entirely removed through adaptation measures, will remain.[38] These risks should be equitably distributed based on principles of justice and solidarity.

Recommendation Two: The Committee could consider how current insurance policies impact vulnerable communities and consider the role of government in following principles of justice and solidarity to distribute climate risks more equitably.

Exposure

Exposure represents the people and stock of property, infrastructure and other assets exposed to a hazard and can include other socioeconomic factors.[39] Growing urbanisation and population density in vulnerable areas increase exposure, thereby increasing the potential losses for insurers. There is growing acknowledgment that the voluntary and planned relocation of communities out of harm's way will become an important factor in national decision-making.[40] Communities impacted by consecutive climate-related disasters and the insurance sector are grappling with questions of how and where to rebuild, with relocation emerging as an increasingly necessary option to ensure future safety.

Given these circumstances, Australia will need to shift focus to the locations of its communities, towns and cities. Strategic planning across sectors and disciplines will be important to ensure communities, industry and governments are taking pre-emptive action to reduce risks, damage and losses from climate-related disasters.[41] ICEDS suggests that developing a National Relocation Strategy, built upon evidence-

[36] UNGC (2024)
[37] UNGC (2024)
[38] United Nations Office for Disaster Risk Reduction (n.d.)
[39] UNDRR (2017)
[40] Relocating Australian Communities at Risk (2024)
[41] Relocating Australian Communities at Risk (2024)

based risk assessment, is crucial for progressing relocation strategies that place the safety, dignity and agency of people at the center.[42]

Relocation could influence insurance premiums. By moving communities away from high-risk areas, the overall exposure to climate-related hazards is reduced, which is very likely to lead to lower insurance premiums for those who have relocated to safer places. Insurers can price policies more affordably when the risk of catastrophic loss is reduced through strategic relocation. This proactive approach enhances community safety and agency and could help to stabilize the insurance market by reducing the frequency and severity of claims associated with climate risks.

Adaptation and Resilience

Adapting communities and households to changing climate-related risk and building their resilience requires a coordinated effort between the insurance sector, government and households. The government plays a pivotal role in establishing and enforcing regulations, policies and resourcing that promote resilience, such as implementing and updating building codes, providing financial incentives for resilient infrastructure and facilitating public awareness campaigns about climate risks and mitigation strategies. The insurance sector, in turn, needs to incorporate these adaptation measures into their risk assessment models and pricing structures. By offering discounts or lower premiums for properties that adapted to changing risk, insurers can incentivize households and businesses to adopt practices that reduce their vulnerability to climate-related disasters.[43] This collaborative approach ensures that all stakeholders are actively engaged in creating a safer, environment that meets their needs and values on an ongoing basis. The Resilient Building Council has already created programs, including the Bushfire Resilience Rating, that has been used by insurers to integrate household-specific risk reduction actions into premiums.[44]

However, to effectively price these risk reduction activities into insurance premiums, more research is needed to accurately quantify the benefits of various adaptive measures. This includes understanding how different adaptation strategies, such as retrofitting buildings, improving drainage systems and other less well-understood community-level disaster preparedness programs such as Nature-based Solutions, can reduce the likelihood and severity of insurance claims. Research should be supported to focus quantifying the benefits of these measures and valuing their economic impacts, helping insurers to develop pricing models that reflect the true cost savings associated with reduced risk. By investing in comprehensive studies and data collection, government and the insurance sector can develop evidence-based policies and insurance products that not only promote adaptation but also ensure that premiums are fair and reflective of the reduced risks.

Recommendation Three: The Committee could consider how the government, the insurance sector and households hold interconnected responsibility to mitigate climate change, reduce exposure and build resilience against its impacts. This includes ensuring resilience measures are priced into insurance premiums.

Innovative Approaches to Climate Risk

The costs and risks of climate change can flow upward towards financial intermediaries or downward to climate-impacted communities, presenting a significant equity issue. New research should be supported to understand how climate risk can be equitably and effectively redistributed across the economy.

[42] Relocating Australian Communities at Risk (2024)
[43] Insurance Council of Australia (n.d)
[44] Resilient Building Council (2024)

Informal Insurance Alternatives

Self-insurance, household resource pooling and other informal insurance alternatives are relatively invisible in discussions of the protection gap. These include savings, pensions, remittances, informal loans from family members, or other kin and household-based collective investments.[45] Faith-based communities, too, play an increasingly important role in disaster recovery, particularly for Pasifika communities.[46] These alternative, socially embedded solutions can carry their own burdens, such as mounting pressures on family members, leading to social conflict.[47] Turning to religious communities for disaster response can also work at cross-purposes to conventional insurance-based assessments of protection and damage, leading to unorthodox approaches to adaptation and resilience.[48]

Further research on approaches to financing climate adaptation and disaster response outside of mainstream insurance could complement the existing focus on innovative approaches to insurance. These alternatives are generally more sensitive to localised, culturally specific, and faith-based responses than conventional financial products and services. However, care should be taken to understand the risks of social marginalisation, social conflict, and added burdens for already-vulnerable groups, when relying on community-based resource pooling as an alternative to individual insurance cover.

Revenue Contingent Loans

When farmers experience climate-related perils such as drought, existing government policy schemes provide support through grants and low-interest loans. These schemes can be criticized because they are financed by taxpayers, who are often less wealthy than the asset-rich farmers who benefit directly from them. While loans with subsidized interest are more progressive than grants since they require repayment, they still impose fixed repayment schedules regardless of the borrower's financial circumstances, potentially leading to defaults and foreclosures during periods of sustained financial hardship.

An alternative, more equitable policy proposed by ANU academics is revenue-contingent loans (RCL), inspired by the HECS model.[49] Under an RCL scheme, repayments are based on a proportion of the farm's annual revenue rather than fixed amounts, providing income smoothing and reducing the risk of foreclosure. The scheme is also consistent with sustainable farming practices. Considerations regarding the operations of this type of scheme have been researched, including collection arrangements through the ATO via business activity (BAS) statements, eligibility criteria to prevent adverse selection and making the loan a debt of the property rather than the individual.[50]

Although RCL was originally proposed for drought relief, the idea has been recently expanded for restoration of degraded agricultural land.[51] Further work is ongoing at ANU to more accurately model variability in farm revenue due to climatic variation and shocks, which will improve RCL design and estimates of the economic value of such schemes to borrowers, government, or private lenders. Such schemes could foreseeably be adapted to address other climate risks.

Unlimited Government Guarantee

A more comprehensive and feasible risk management system between policyholders, government and insurance companies could be formed. For example, the ‘‘unlimited government guarantee’’ for catastrophes can be established. A public mechanism or risk-financing instruments including catastrophe

[45] Bähre, E. (2020) and Zaloom, C. and James, D. (2023)
[46] Cox, J. *et al.* (2020) and Ngin, C. *et al.* (2020)
[47] Bähre, E. (2020) and Mulligan, J. (2023)
[48] Cox, J. *et al.* (2018)
[49] Botterill, L. *et al.* (2004)
[50] Botterill, L. *et al.* (2004)
[51] Chapman, B & Lindenmayer, D. (2019)

tax, government debt instruments and international loans can be considered for this. Governments can provide a safety net, ensuring that funds are available to cover catastrophic losses, which can stabilize the economy and prevent widespread financial distress. The presence of a government guarantee can affect the pricing and availability of private insurance, potentially leading to lower premiums as the risk is partially transferred to the government.

Recommendation Four: The Committee could support research into innovative approaches to climate risk management, such as revenue-contingent loans, to ensure equitable and effective redistribution of climate risk across the economy.

Intervening in Hazards

Incremental approaches are not keeping up with the spiraling increase in disasters caused by climate change. Making infrastructure more resilient only works to a point. We need to look at transformational solutions which can "stop disasters in their tracks."[52]

Australians need to take a step back and look at prioritising our nation's research, expenditure and response. Policies should aim to prevent disasters where possible and reduce their intensity when they are inevitable. Research programs like the Australian National University's Cyclone Intervention Initiative[53] and the ANU-Optus Bushfire Centre of Excellence[54] show that transformational solutions to disasters can be developed in our own backyard.

Technology that can prevent and minimise the risk of disasters is achievable, but it needs to be treated and funded, for what it really is—defending Australia and Australians. Why is it that Australia has the strategic foresight to commit $368 billion to acquiring submarines to be delivered in the 2050s but not to commit more than $1 billion over five years for disaster prevention?[55]

Similarly, current efforts to reduce tropical cyclone vulnerability—such as strengthening buildings, preparing for individual cyclones and public education—are insufficient. Cyclone-induced losses have doubled every 15 years over the last 30 years and the increasing coastal population exposes more people to these risks.[56]

Australia faces escalating threats from intensified cyclones along its east coast, necessitating transformative solutions. Cutting-edge research on cyclone intervention, such as aerosol injection into the atmosphere, shows promise in mitigating cyclone impacts.[57] In 2022, ANU launched an international collaborative research effort to explore how aerosols can alter cyclone formation and behavior, potentially reducing their intensity. Early results are promising, suggesting that specific aerosol treatments can significantly diminish cyclone energy.[58]

Innovative approaches, such as bushfire and cyclone intervention, could offer substantial economic, environmental and social benefits by developing new strategies to manage the growing risks of these hazards in a changing climate. Such advancements would also lead to more stable and affordable insurance premiums by reducing the frequency and severity of disaster related claims.

Governments supported the development of the COVID-19 vaccine in record time. This was facilitated through a sense of urgency spurring strong public–private partnerships. Australia's next budget should bring that same urgency to addressing climate-fueled disasters and support for large, collaborative research missions to develop these technologies quickly. That will take us further down the path of contributing to achieving the goals of the Sendai Framework and truly building resilience to disasters.[59]

[52] Prinsley, R. (2023)
[53] ICEDS (2023)
[54] Bushfire Centre of Excellence (2024)
[55] Prinsley, R. (2023)
[56] IAG (2020)
[57] Miller, J. *et al.* (2023)
[58] ICEDS (2024)
[59] UNDRR (2015)

Recommendation Five: The Committee could promote more investment from both the public and private sectors to prevent and reduce the intensity of climate hazards themselves.

ANU Roundtable - Disaster Finance and Insurance

The Australian National University (ANU) is hosting the Disaster Finance and Insurance Research Roundtable on Tuesday 6 August 2024. This event will bring together leaders from academia, disaster management, finance, insurance and adaptation to collaborate in the development of new models for financing resilience and insurance. Together, we will set a research agenda to deliver innovative tools and build collaboration.[60]

References

Actuaries Institute. (2022). *Home insurance affordability and socioeconomic equity in a changing climate*. Green Paper. Retrieved June 20, 2024, from https://www.actuaries.asn.au/public-policy-and-media/our-thought-leadership/reports/home-insurance-affordability-and-socioeconomic-equity-in-a-changing-climate

Ahmed, I., & Ledger, K. (2023). Lessons from the 2019/2020 'Black Summer Bushfires' in Australia. *International Journal of Disaster Risk Reduction, 96*, 103947. https://doi.org/10.1016/j.ijdrr.2023.103947

Bähre, E. (2020). Financialization, solidarity, and conflict. *Economic Anthropology, 7*(1), 159-161. https://doi.org/10.1002/sea2.12167

Barry, L. (2023). The moral economies of natural disasters insurance: Solidarity or individual responsibility? *Journal of Cultural Economy, 17*(1), 39–54. https://doi.org/10.1080/17530350.2023.2258909

Botterill, L., Chapman, B., & Egan, M. (2004). Income contingent loans for drought relief. *Farm Policy Journal, 3*(2), 59-67.

Chapman, B., & Lindenmayer, D. (2019). A novel approach to the sustainable financing of the global restoration of degraded agricultural land. *Environmental Research Letters, 14*(12). https://doi.org/.1088/1748-9326/ab5deb

[60] ICEDS (2024)

Clapp, J., & Isakson, S. R. (2023). Private finance for food system climate adaptation: Opportunity or contradiction? *Current Opinion in Environmental Sustainability, 61*, 101273. https://doi.org/10.1016/j.cosust.2023.101273

Climate Council. (2022). *Uninsurable Nation: Australia's most climate-vulnerable places.* Retrieved June 20, 2024, from https://www.climatecouncil.org.au/resources/uninsurable-nation-australias-most-climate-vulnerable-places/

Cox, J., Finau, G., Kant, R., Tarai, J., & Titifanue, J. (2018). Disaster, Divine Judgment, and Original Sin. *The Contemporary Pacific, 30*(2), 380-411.

Cox, J., Varea, R., Finau, G., Tarai, J., Kant, R., Titifanue, J., & Neef, A. (2020). Disaster preparedness and the abeyance of agency: Christian responses to tropical cyclone Winston in Fiji. *Anthropological Forum, 30*(1-2), 125-140.

Department of Climate Change and Energy Efficiency. (2011). *Climate change risks to coastal buildings and infrastructure - A supplement to the first pass national assessment*. Retrieved June 20, 2024, from https://www.dcceew.gov.au/climate-change/policy/adaptation/publications/climate-change-risks-coastal-buildings

Deloitte. (2021). *Update to the economic costs of natural disasters in Australia.* Retrieved June 20, 2024, from https://www.deloitte.com/au/en/services/economics/perspectives/building-australias-natural-disaster-resilience.html

Howden, M. (2024). *Australian climate action is heading the right way, just not fast enough.* Institute for Climate Energy and Disaster Solutions. Retrieved June 20, 2024, from https://iceds.anu.edu.au/news-events/news/australian-climate-action-heading-right-way-just-not-fast-enough

Insurance Australia Group. (2020). *Severe Weather in a Changing Climate (2nd ed.)*. Retrieved June 20, 2024, from https://www.iag.com.au/sites/default/files/Documents/Climate%20action/Severe-weather-in-a-changing-climate-2nd-Edition.pdf

Insurance Council of Australia. (2021). *Climate Change Impact Series: Actions of the Sea.* Retrieved June 20, 2024, from https://insurancecouncil.com.au/resource/actions-of-the-sea-vulnerability-study/

Intergovernmental Panel on Climate Change. (2022). *Climate Change 2022: Impacts, Adaptation and Vulnerability.* Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change. https://doi.org/10.1017/9781009325844

Jarzabkowski, P. (2024). *The uninsurable world: how the insurance industry fell behind on climate change.* The Financial Times. Retrieved June 20, 2024, from https://www.ft.com/content/b4bf187a-1040-4a28-9f9e-fa8c4603ed1b

Johnson, L., Shariff Mohamed, T., Scoones, I., & Taye, M. (2023). Uncertainty in the drylands: Rethinking in/formal insurance from pastoral East Africa. *Environment and Planning A: Economy and Space, 55*(8), 1928-1950.

Kemp, L., Xu, C., Depledge, J., Ebi, K. L., Gibbins, G., Kohler, T. A., Rockström, J., Scheffer, M., Schellnhuber, H. J., Steffen, W., & Lenton, T. M. (2022). Climate Endgame: Exploring catastrophic climate change scenarios. https://doi.org/10.1073/pnas.2108146119

Miller, J., Tang, A., Linh Tran, T., Prinsley, R., & Howden, M. (2023). The feasibility and governance of cyclone interventions. *Climate Risk Management, 41*, 100535. https://doi.org/10.1016/j.crm.2023.100535

Mulligan, J. M. (2023). Fractured insurance families: Securing care and navigating financialized social protections. *Journal of Cultural Economy, 17*(1), 1-17.

Ngin, C., Grayman, J. H., Neef, A., & Sanunsilp, N. (2020). The role of faith-based institutions in urban disaster risk reduction for immigrant communities. *Natural Hazards, 103*, 299-316.

PERILS. (2017). *Final loss estimate for Tropical Cyclone Debbie.* Retrieved June 20, 2024, from https://www.perils.org/news/perils-releases-fourth-and-final-loss-estimate-for-tropical-cyclone-debbie-of-aud-1-740m

Relocating Australian Communities at Risk. (2024). *Relocation Issues Paper: Strategies and actions in time.* Institute for Climate Energy and Disaster Solutions. Retrieved June 20, 2024, from https://iceds.anu.edu.au/relocating-australian-communities-risk

Resilient Building Council. (2024). *Free bushfire resilience rating app to help protect homes.* Retrieved June 20, 2024, from https://rbcouncil.org/2023/10/23/free-bushfire-resilience-rating-app-to-help-protect-homes/

Ripple, W. (2023). Many risky feedback loops amplify the need for climate action. *Science Direct*. Retrieved June 20, 2024, from https://www.sciencedirect.com/science/article/pii/S2590332223000040

Roslyn, P. (2023). *Defending Australia from disasters.* Institute for Climate Energy and Disaster Solutions. Retrieved June 20, 2024, from https://iceds.anu.edu.au/research/research-stories/defending-australia-disasters

Schuster, C. E. (2023). Forecasts: A story of weather and finance at the edge of disaster. University of Toronto Press.

Simpson, N. P., Mach, K. J., Constable, A., Hess, J., Hogarth, R., & Howden, M. (2021). A framework for complex climate change risk assessment. *TERI Information Digest on Energy and Environment, 20*(4), 527-528.

Surminski, S., Barnes, J., & Vincent, K. (2022). Can insurance catalyse government planning on climate? Emergent evidence from Sub-Saharan Africa. *World Development, 153*, 105830. https://doi.org/10.1016/j.worlddev.2022.105830

United Nations. (2011). *Guiding principles on business and human rights.* Retrieved June 20, 2024, from https://www.ohchr.org/documents/publications/guidingprinciplesbusinesshr_en.pdf

United Nations Environment Programme. (2023). *Emissions Gap Report 2023*. Retrieved June 20, 2024, from https://www.unep.org/resources/emissions-gap-report-2023

United Nations Global Compact. (n.d.). Retrieved June 20, 2024, from https://unglobalcompact.org/

United Nations Office for Disaster Risk Reduction. (n.d.). *Disaster risk reduction terminology.* Retrieved June 20, 2024, from https://www.undrr.org/terminology/residual-risk

UNESCO. (2017). *Declaration of ethical principles in relation to climate change*. Retrieved June 20, 2024, from https://www.unesco.org/en/ethics-science-technology/climate-change

Vaughn, S. E. (2023). The morality of investment stigma and insurance in climate governance. *Public Culture, 35*(3), 393-403. https://doi.org/10.1215/08992363-10742565

World Meteorological Organization. (2024). *Climate change indicators reached record levels in 2023*. Retrieved June 20, 2024, from https://wmo.int/news/media-centre/climate-change-indicators-reached-record-levels-2023-wmo#:~

=The%20global%20mean%20near%2Dsurface,1.27%C2%B10.13%20%C2%B0C

Zaloom, C., & James, D. (2023). Financialization and the household. *Annual Review of Anthropology, 52*(1), 399-415.

Institute for Climate, Energy and Disaster Solutions
+61 2 6125 9757
iceds@anu.edu.au

The Australian National University
Canberra ACT 2600 Australia
www.anu.edu.au

TEQSA Provider ID: PRV12002 (Australian University)
CRICOS Provider Code: 00120C