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From Disaster Response to Anticipatory Governance

why Aotearoa New Zealand's long-term resilience thinking must address global catastrophic risk and systemic vulnerabilities

Abstract

The Department of the Prime Minister and Cabinet's 2025 draft briefing on long-term hazard resilience is commendable in emphasising anticipatory governance. However, it still exemplifies broader limitations in risk assessment focusing on familiar local natural hazards while excluding global catastrophic risk. We examine how current risk reduction approaches remain trapped within frameworks addressing symptoms rather than systemic forces. Effective resilience requires expanding hazard scope to include global hazards: large-scale (nuclear) conflict, large global volcanic eruptions, and bioengineered pandemics. Building resilience to these and similar risks requires recognising cascade dynamics and implementing transparent approaches to generalised resilience to ensure basic needs.

Keywords anticipatory governance, disaster risk reduction, global catastrophic risk, polycrisis, metacrisis, resilience, systemic risk

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The Department of the Prime Minister and Cabinet (DPMC) and Ministry for the Environment presented the country in August 2025 with a draft long-term insights briefing (LTIB) on building New Zealand's long-term resilience to hazards (Department of the Prime Minister and Cabinet, 2025). This document represented a welcome shift towards proactive thinking on risk management and anticipatory governance, helping to counter the presentist bias described for New Zealand (Boston, 2017). The document is commendable in its recognition of the potential for catastrophe and emphasis on resilience as a foundation for prosperity. However, it is also representative of broader approaches to hazard and risk in Aotearoa New Zealand that reveal fundamental blind spots with the potential to undermine our collective preparedness for the 21st century's most consequential threats.[1]

By focusing primarily on familiar natural hazards and incremental climate risks, New Zealand's risk assessment frameworks are missing an entire category

of global catastrophic risks. These range from large-scale conflict (including nuclear war) and large volcanic eruptions around the world (in extreme cases causing volcanic winters), to bioengineered pandemics and failures with advanced artificial intelligence (AI), any of which could trigger cascading global system collapses. Such threats can begin far beyond our borders, yet seriously harm our island nation through the common consequences of major failures in the supply of goods and services to New Zealand and global systemic or institutional collapses.

upstream investment consistently produces superior outcomes compared with downstream crisis management; indeed, upstream investment in resilience is the cost-effective choice, delivering 'an average return of $15' per $1 invested (UNDRR, 2025b). The document acknowledges that hazards may have catastrophic consequences and that abrupt crises can occur, which marks a significant advance in New Zealand's risk discourse. That is, it shows movement beyond incremental thinking (e.g., recently predominantly around climate risk) towards recognising

Beyond discrete catastrophic events lies an even more fundamental challenge: the world faces rising systemic risk driven by interconnected global stresses.

Our analysis here examines how current disaster risk reduction approaches, both globally and in New Zealand, remain trapped within frameworks that address symptoms rather than the deeper systemic forces driving what scholars term the 'polycrisis', a web of interconnected global stresses that are pushing human systems towards dangerous disequilibrium (Lawrence et al., 2024; Søgaard Jørgensen et al., 2024). We argue that New Zealand must expand its hazard scope, adopt systemic risk frameworks that account for cascade dynamics and evolutionary pressures, and embrace institutional reforms that prioritise transparency, continuity in provision of basic needs, and transformational change over reactive crisis management.

Strengths of the draft long-term insights briefing

The draft LTIB establishes several important foundations. Most significantly, it represents a fundamental shift in thinking from reactive emergency response towards proactive resilience-building. This approach aligns with international best practice and evidence showing that

the risk of genuine global discontinuities that require coordinated national action (e.g., the Covid-19 pandemic).

Equally important is the draft briefing's explicit connection between resilience and long-term prosperity, rejecting the false economy of austerity leading to repeated disaster–rebuild cycles, in favour of investment in systems designed for stability and growth. The document also begins sketching an anticipatory governance approach, recognising that proactive identification and mitigation is a superior paradigm to reactive crisis management. These elements provide a solid foundation for thinking about more comprehensive reforms, even as they reveal the scope of work still required to address the full spectrum of risks facing New Zealand in an increasingly unstable global system (Arnscheidt et al., 2025; Lawrence et al., 2024; Søgaard Jørgensen et al., 2024).

Wider context: missing global catastrophic risk and systemic vulnerabilities

However, this draft LTIB, representing as it does much thinking at the forefront of risk analysis in the public sector, must be evaluated within a broader global risk landscape that extends far beyond traditional disaster risk reduction frameworks.

Missing from current approaches are global catastrophic risks (Arnscheidt et al., 2025; Bostrom and Cirkovic, 2008). These are risks with the potential to harm the entire world and overwhelm response capabilities. Such risks are often overlooked precisely because many originate from human activities and don't fit neatly within established frameworks like those of New Zealand's civil defence and emergency management apparatus, the Natural Hazards Commission or National Resilience Framework.

Global catastrophic risks include: seldom considered tail risks from climate change (Kemp et al., 2022); extreme pandemics potentially triggered by bioweapon or bioengineering advances (RAND, 2024); severe solar storms capable of disabling electrical grids for weeks or months (NEMA, 2024); nuclear war, nuclear winter, and electromagnetic pulse attacks causing agricultural failures and cascading infrastructure collapse (Blouin et al., 2024; Boyd et al., 2023); potentially climate-altering large magnitude volcanic eruptions comparable to Tambora 1815 (Wilson et al., 2023), particularly those abroad that could have an impact on critical global 'pinch points' (Mani, Tzachor and Cole, 2021); global catastrophic food failures (Wescombe et al., 2025); sophisticated global cyber-attacks targeting critical systems such as telecommunications or energy networks; catastrophic failures associated with deployment of advanced AI (RAND, 2025); or the cascading interactions of any of the above.

These risks (and others like them) share critical characteristics that distinguish them from conventional hazards. They typically originate elsewhere, probably outside New Zealand, yet spread via cascading impacts to cause global catastrophe, plausibly overcoming the capacity of response systems. External assistance may be unavailable when needed most, and such risk could threaten global critical infrastructure destruction rather than mere disruption, preventing rapid recovery. While individually unlikely in any given year, collectively these risks represent

Table 1: 14 Global Systemic Stresses: Illustrative Potential Impacts on New Zealand and Examples of Resilience Options*

Global Systemic Stress (chronic underlying processes)	Illustrative Potential Impact on NZ (chronic or abrupt hazards and crises)	Example Resilience Options for NZ (what could be done in anticipation)
Great Power Hegemonic Transition	Risk of great power (nuclear) war, trade route disruption, loss of security guarantees, forced alignment with competing powers, direct military involvement, critical shortage of industrial inputs and spare parts for essential infrastructure maintenance	Planning for nuclear war; diversify trade partnerships; develop sovereign trade infrastructure; strengthen regional cooperation with Australia; establish strategic stockpiles; develop domestic manufacturing capacity in key domains; build agricultural resilience to potential nuclear winter impacts (also relevant to 'volcanic winter' from large eruptions)
Zoonotic Disease Transfer	Increasing likelihood of potentially severe pandemic, mass death and disruption to society and economy, healthcare system overload/collapse, agricultural sector impacts from novel plant and animal diseases	Cooperate with Australia on vaccine manufacturing capacity; strengthen border management systems, biosecurity, health system, and exclusion/elimination plans
Propagation of Artificial Intelligence	Abrupt critical system failures in interconnected infrastructure (electricity, communications, transport, finance), loss of human decision-making capacity, potential for rapid cascading failures, irreversible changes to society (eg, surveillance/ totalitarianism)	Invest in research to understand transformations and safety options; develop AI governance frameworks; maintain human oversight of critical systems with 'kill switches'; invest in domestic technological capabilities; modular systems that resist synchronous failure; leverage useful AI for solution finding amid complexity
Climate Heating	More frequent extreme weather events disrupting critical infrastructure, agricultural productivity decline, coastal inundation of key ports and cities	Adaptation to agricultural challenges; accelerate renewable energy transition with distributed generation; implement managed retreat from vulnerable coastal areas; urban design for hotter/wetter cities ('sponge cities')
Political-Institutional Decay	Trade disputes, contagion of anti-institutional sentiment to NZ, inability to coordinate effective responses to global shocks, loss of public trust undermining policy implementation, broad societal failures	Resist global institutional decay by strengthening NZ institutional transparency and accountability; strengthen NZ local government (resourcing and scope of activities); invest in citizen-driven democratic engagement and decision-making to sustain trust; consider independent risk governance mechanisms such as Parliamentary Commissioner for Catastrophic Risk/Chief Risk Officer to ensure government accountability
Ideological Fragmentation & Polarisation	Breakdown of cooperative governance during crises, mis/ dis-information hampering effective responses, social fragmentation and uprising or conflict	Invest in civic education and democratic institutions; develop trusted information systems for crisis communication, invest in nurturing social cohesion rather than division
Concentrated Industrial Food Production	Global overdependence on few large food exporters. Local NZ vulnerability to supply chain disruption for imported agricultural inputs (liquid fuel, fertiliser, seeds, machinery), synchronous failure of global breadbaskets radically reconfiguring trade, massive price spike in foods imported to NZ	Develop a National Food Security Strategy (encompassing nuclear winter, volcanic winter, and catastrophic electricity loss); diversify crop production and reduce dependence on imported food and agricultural inputs; develop flexible export/ import pivot capability
Changing Energy Supply	Liquid fuel import disruption causing transport and agricultural collapse, renewable energy intermittency during nuclear/volcanic winter, risk of catastrophic electrical failure (solar storms)	Develop biofuel production capacity from local feedstocks (eg, canola, tallow, wood); establish minimum liquid fuel reserves for critical sectors (agriculture, transport); maintain non-electric alternatives (for solar storms)
Economic Headwinds	Nationalist and protectionist measures and trade wars close markets to NZ, international underinvestment in critical global infrastructure increases risk of failures (eg, trade disrupted by piracy), resource scarcity and choke points risk sudden supply failures, downturn in tourism to NZ	Develop diverse trade relationships (especially regionally), negotiate resource access agreements - eg, with Australia, disengage from volatile markets, invest in reliable resilient local public services for basic needs
Financial Interconnected-ness	Overdependence on few monolithic densely connected systems. Risk of digital payment system collapse, inability to conduct trade, economic contagion across financial markets, economic isolation from global financial networks	Create offline digital currency system; develop plans for manual/cash-based economic transactions during digital failures; stabilise NZ banks
Ecological Degradation	Loss of agricultural productivity, loss of ecosystem services, disruption to primary export industries (dairy, meat, apples, forestry)	Invest in agricultural diversity and regenerative farming practices; establish comprehensive biodiversity protection corridors

Global Systemic Stress (chronic underlying processes)	Illustrative Potential Impact on NZ (chronic or abrupt hazards and crises)	Example Resilience Options for NZ (what could be done in anticipation)
Toxicity	Contamination of water supplies and agricultural land (eg, microplastics and 'forever chemicals' [PFAS]), export market access restrictions due to contamination, changes in global human migration patterns as land/water availability shifts.	Develop comprehensive chemical monitoring and remediation capabilities; ensure strategic reserves of clean water; anticipate migration from degraded regions
Demographic Divergence	Strain and risk of failure of public services and infrastructure, labour shortages in key sectors, increased migration pressures	Plan infrastructure for anticipated population size; strategic immigration policies; invest in automation and productivity in critical sectors
Economic Inequality	Social revolution in major trading partner (eg, China, US), social unrest during crises, reduced social cohesion undermining collective response capability, political instability	Diversify export markets; strengthen community resilience programmes; ensure equitable distribution of essential resources during emergencies

*Note: The impacts and resilience measures in this table are illustrative only. We argue that a lot more work needs to be done so that New Zealand can understand these global stresses, the hazards they will trigger, the likely cascading consequences and the risk of irreversible systemic failures.
Cross-cutting principles:
Most important systemic vulnerability: trade isolation causing cascading failures across all critical sectors (food, energy, transport, communications).
Most critical resilience investment: all-hazards approach to global catastrophic risk governance, with systematic national risk assessment and public engagement.
Greatest resilience assets: New Zealand's geographic isolation, renewable energy capacity and potential, agricultural capacity, social capital and democratic institutions – if properly nurtured and leveraged through anticipatory planning.
Stress–trigger–crisis: under the stress–trigger–crisis model, any of the above stresses could trigger amplification of harms across any or all the other stresses, or could be triggered or compounded by global natural hazards such as major volcanic eruptions, asteroid impacts, solar storms and the like.

high-probability events over longer time frames – i.e., decades, or this century (Karger et al., 2023) – with some, such as severe solar storms, large magnitude volcanic eruptions and severe pandemics, being practically inevitable (Gluckman and Bardsley, 2021).

Beyond discrete catastrophic events lies an even more fundamental challenge: the world faces rising systemic risk driven by interconnected global stresses. At least 14 major chronic systemic stresses are simultaneously pushing human systems towards dangerous disequilibrium (see Table 1): great-power hegemonic transition, zoonotic disease transfer, propagation of AI, climate heating, political-institutional decay, ideological fragmentation and polarisation, concentrated industrial food production, changing energy supply, economic headwinds, fragile financial interconnectedness, ecological degradation, toxicity, demographic divergence, and economic inequality (Cascade Institute, n.d.). Although Table 1 is structured according to the Cascade Institute's list, several other organisations – for example, Policy Horizons Canada – have produced similar lists of systemic stresses (including, for example, severe risk from mis/disinformation, ecosystem collapse, cyber-attacks, AI, democratic breakdown), as well as expressing the expectation that these could overwhelm the world within the next decade (Policy Horizons Canada, 2024).

These stresses interact through what some researchers term the 'stress–trigger–crisis' model (Lawrence et al., 2024), where any major trigger event, whether a volcanic eruption in Indonesia blanketing south-east Asian ports with ash, catastrophic electricity loss disabling GPS and shipping operations, or nuclear conflict over Taiwan, could tip already-stressed global systems into cascading failure.

For New Zealand, this creates a paradox: while our geography, natural resources and social systems position us relatively well to weather such storms (Boyd and Wilson, 2021b; King and Jones, 2021), our greatest vulnerability lies precisely in the trade and supply chain collapse that represents the downstream consequence of virtually all global catastrophic risks (Boyd et al., 2023). For example, our Aotearoa New Zealand Catastrophe Resilience Project (NZCat) concluded that the major risk to New Zealand of northern hemisphere nuclear war is a protracted breakdown in trade threatening the supply of fuel for farm machinery, and other industrial inputs, and a nuclear winter that cools the climate and reduces agricultural yield (Boyd et al., 2023; Boyd et al., 2024; Boyd and Wilson, 2022).

Understanding these dynamics (and those of other major global hazards) and what to do to build long-term resilience requires examining five critical themes that reveal both the limitations of current approaches to risk management and pathways towards more robust preparedness: (1) the evolving landscape of disaster risk reduction and its constraints; (2) the blind spots in national risk assessment frameworks; (3) the dynamics of interacting crises and polycrisis; (4) the imperative to address systemic risk rather than just isolated hazards; (5) the underlying causes driving repeated global crises and the role of evolutionary dynamics in shaping both competitive behaviours and cooperative solutions. Only by grappling with these interconnected challenges can New Zealand develop the anticipatory governance capabilities necessary for long-term resilience in an era of accelerating global instability.

Limitations of contemporary disaster risk reduction

Disaster risk reduction has evolved considerably since the adoption of the Sendai Framework for Disaster Risk Reduction in 2015 (United Nations, 2015). This framework established comprehensive approaches across 187 countries through four priority areas: understanding disaster risk; strengthening governance; investing in resilience; and enhancing preparedness for recovery. The framework's ambitious targets include substantially reducing disaster mortality, economic losses and infrastructure damage by 2030. Yet recent assessments reveal fundamental limitations that mirror those evident in New Zealand's current approach (UNDRR, 2023, 2025b).

The 2025 United Nations Global Assessment Report on Disaster Risk Reduction demonstrates these constraints starkly (UNDRR, 2025b). While five hazards – earthquakes, floods, storms, droughts and heatwaves – account for 95% of recorded economic losses, this figure notably excludes pandemics, which tend to cause more harm than all other disasters

combined (Mamuji and Etkin, 2019). More troubling, the 2023 Sendai Midterm Review found that disaster impacts, in terms of costs, are actually increasing despite policy advances, with response still prioritised over prevention and significant shortfalls persisting in funding, stakeholder inclusion and international cooperation (UNDRR, 2023). According to the Global Assessment Report, global direct disaster losses reached $200 billion annually by 2020, but when cascading and ecosystem impacts are included, true costs balloon to an estimated $2 trillion.

Most critically, current frameworks exhibit what the report identifies as a fundamental blind spot: the failure to account for '1-in-100 or even 1-in-1,000-year events – those that, while having a low probability of occurring can cause catastrophic impacts when they do' (UNDRR, 2025b). Notably, the Covid-19 pandemic caused 27 million excess deaths as at June 2023 (Giattino et al., 2024), and many trillions of dollars in harm.

This systematic underestimation of tail risks reflects deeper conceptual limitations. The UN's new Hazard Information Profiles (UNDRR, 2025a), while including asteroid impacts and large volcanic eruptions, omit nuclear war, despite listing 'armed conflict' elsewhere. These profiles also ignore food system failures despite historical evidence linking major eruptions to famine (Büntgen et al., 2025; Wilson et al., 2023), and the likelihood of regional production shortfalls, or even synchronous global food failure (Wescombe et al., 2025), affecting trade and supply relations (Jehn et al., 2025). Even the recent UN Pact for the Future (UN General Assembly, 2024), which acknowledges that humanity faces 'rising catastrophic and existential risks', including nuclear war, lacks developed implementation mechanisms. These gaps reflect disaster risk reduction's continued focus on familiar, observable, generally local hazards rather than the low-probability, high-impact events. It is the latter that have repeatedly and fundamentally reshaped global systems, and which are precisely the risks that New Zealand's island geography makes it most vulnerable to through supply chain disruption (Boyd et al., 2023; Boyd et al., 2024; Boyd and Wilson, 2022; Skilling, 2022). The impact of external shocks was visible throughout the 20th century, including the 1918 influenza pandemic, the Great Depression and the first and second world wars, and worse has been seen throughout human history, with societal collapse being a (if not the) recurrent feature of human civilisations (Kemp, 2025).

National risk assessment blind spots and methodological shortcomings

New Zealand's approach to national risk assessment lacks several critical analytical outputs that have become standard practice among comparable nations grappling with complex risk landscapes. The United Kingdom maintains a detailed, publicly accessible National Risk Register (HM Government, 2025), alongside comprehensive chronic risks analysis (Cabinet Office and Government Office for Science, 2025), substantial parliamentary inquiry reports, including the House of Lords' examination of preparing for extreme risks (House of Lords Select Committee, 2021), and a National Resilience Action Plan (UK Government, 2025). The United States has commissioned RAND Corporation assessments of global catastrophic risks (RAND, 2024), enacted the Global Catastrophic Risk Management Act 2022, and established dedicated institutional frameworks for extreme risks. Even when such comprehensive approaches exist, significant methodological problems persist, as demonstrated by research showing that cross-border risk assessments vary dramatically even among neighbouring European Union countries (Kohler, 2023), revealing fundamental inconsistencies in how similar threats are characterised across borders and a need for cross-border collaboration. New Zealand's obvious partners in this are Australia and Pacific nations.

More fundamentally, national risk assessment methodologies historically suffer from two critical shortcomings that undermine their effectiveness regardless of scope or institutional support (Boyd and Wilson, 2023). First, they typically lack justification and transparency around foundational assumptions regarding time horizons, discount rates, scenario selection and decision rules, choices that have a dramatic impact on risk characterisation and subsequent resource allocation priorities. Second, they systematically omit the largest-scale risks facing humanity, namely global catastrophic risks and existential threats, despite these risks having expected annualised harms that may exceed the combined impact of conventional hazards by orders of magnitude (ibid.; Graham et al., 2025). Research demonstrates that even under highly conservative assumptions, considering only simple probability and impact metrics, applying significant discount rates, and limiting analysis to harms affecting only current populations, these omitted risks possess salience far greater than their absence from national risk registers would suggest (Boyd and Wilson, 2023).

> The institutional aversion to 'scaring the public' must be overcome, so that democratic resource allocation decisions can be collectively made.

All this points to a more fundamental challenge: the substantial uncertainty inherent in risk assessment processes requires much greater engagement with stakeholders and experts to legitimise key assumptions, encourage critique of existing knowledge, and address methodological shortcomings through deliberative public processes that support informed dialogue between citizens and government decision makers. The institutional aversion to 'scaring the public' must be overcome, so that democratic resource allocation

decisions can be collectively made. There is even the chance that such collective processes might build social cohesion against shared risks.

The DPMC's draft long-term insights briefing exemplifies these broader limitations through its narrow hazard framing. While the document identifies major natural hazards and some biological and technological threats, it notably excludes several risks that international research identifies as potentially catastrophic including many, if not most, of the global catastrophic risks listed above.

These hazards share a critical characteristic that places them outside New Zealand's traditional risk management frameworks: they typically originate elsewhere, yet spread globally through cascading impacts, potentially amplifying the global stresses in Table 1, and rendering external assistance unavailable precisely when needed most. Most conspicuously absent from those risk management frameworks are conflict risks, despite war (alongside infectious disease and major volcanic eruptions) being a defining feature of human history and New Zealand's remote island geography making it extraordinarily vulnerable to trade disruption from geopolitical instability. The omission is particularly concerning given recent UN resolutions prioritising nuclear war impact studies (United Nations, 2025), and the US National Academy of Sciences' 2025 report on nuclear conflict (National Academies, 2025). For an island nation whose resilience depends fundamentally on global trade stability (Boyd and Wilson, 2022; Green, Cairns and Wright, 1987), the exclusion of conflict scenarios from publicly facing national risk thinking represents a dangerous blind spot that could leave New Zealand unprepared for supply chain collapse triggered by distant conflicts, precisely the mechanism through which global catastrophic risks would most likely affect domestic wellbeing (Boyd et al., 2023; Boyd and Wilson, 2022).

Polycrisis: the interconnection of contemporary crises

Moving beyond individual hazard assessment reveals a more fundamental challenge: contemporary global crises are interconnected, potentially amplifying each other in ways greater than the 'sum of their parts', and in ways that demand approaches transcending traditional risk categorisation and assessment. Thomas Homer-Dixon, founder of the Cascade Institute, identifies four meta-processes underlying this dynamic: increasing global energy consumption; disruption to Earth's energy balance; rising human biomass; and expanding connectivity among populations (Homer-Dixon, 2023).

These processes create conditions where failures are more likely to cascade across highly connected, homogeneous systems, which are precisely the infrastructure networks characterising contemporary smart cities, global supply chains, industrial food systems and digital financial networks. As connectivity increases without corresponding diversity, systemic vulnerabilities multiply exponentially, creating a world where each crisis becomes a trigger for others: pandemics spread globally within weeks, cyber-attacks cascade across interconnected financial systems, supply chain disruptions ripple through just-in-time production networks, and climate impacts affect agricultural systems worldwide simultaneously.

> New Zealand's planning remains largely focused on localised natural hazards and incremental climate change, despite these many other global systemic stresses creating 'polycrisis' conditions.

Systemic risk: when stressed systems reach breaking points

This interconnectedness creates what researchers define as systemic risk, or the potential for multiple, interconnected system failures that can trigger more widespread collapse (Gambhir et al., 2025). The existence of at least 14 global stresses (Table 1) means any single hazard may serve as a trigger, but those underlying systemic stresses determine whether systems tip into crisis as per the 'stress–trigger–crisis' model (Lawrence et al., 2024).

This framework reveals why most current risk management approaches prove inadequate: they focus myopically on individual stressors, predominantly climate change, so prominent in public sector risk management at present, rather than examining how multiple stresses interact to create vulnerability. While positive interventions exist, including systems thinking, mapping systemic interactions, developing anticipatory governance and conducting preparedness exercises, addressing systemic risk requires confronting the deeper forces driving stress accumulation. These include: rivalrous dynamics preventing coordination; exponential technological advancement creating risks faster than assessment and response capabilities; and resource degradation amid coordination failures. Without addressing these underlying dynamics, societies remain trapped in strategies where aggressive, exploitative behaviours outcompete cooperative, long-term alternatives, even when cooperation would ensure collective survival.

This reality demands fundamental shifts in thinking about long-term resilience, and even the nature of 'hazards'. While the draft LTIB acknowledges the interconnectedness of hazards, it overlooks robust frameworks for systemic and cascading risks, continuing to treat hazards as largely discrete events rather than examining the generator mechanisms driving global stresses and an ongoing accumulation of global risk. New Zealand's planning remains largely focused on localised natural hazards and incremental

climate change, despite these many other global systemic stresses creating 'polycrisis' conditions. Addressing this requires adopting systemic risk frameworks that analyse cascade pathways, stakeholder interactions and power structures, while incorporating evolutionary and game-theoretic perspectives that can identify both maladaptive responses and transformational opportunities. Such approaches shift focus from responding to individual crises towards understanding and modifying the systemic rules that encourage or discourage risk generation, the difference between treating symptoms and addressing root causes.

The UK government's Resilience Action Plan specifically states:

> To respond to risks, we need to better understand their long-term drivers and systemic interdependencies. A key step is mapping our chronic risks, which are risks that pose continuous challenges, generally over a longer timeframe, that gradually erode our economy, community, way of life, and/or national security. (UK Government, 2025, p.12)

Given the cross-border nature of global catastrophic risk, this thinking, and the associated action, must be applied globally, including considering the various abrupt hazards to which these chronic risks give rise.

Metacrisis and human cultural evolution

While comprehensive approaches to polycrisis and systemic risk provide essential analytical frameworks, they may still miss deeper generative mechanisms that warrant acknowledgement, even if their full exploration exceeds this article's scope. What philosopher Daniel Schmachtenberger terms the 'metacrisis' encompasses underlying dynamics that generate global systemic stresses: rivalrous competition preventing coordination on collective threats; exponential technological advancement creating risks faster than assessment capabilities can respond; and resource degradation amid coordination failures. These dynamics may create what he identifies as a 'sensemaking crisis', where humanity cannot perceive problems at appropriate analytical levels, remaining trapped in frameworks designed for simpler challenges within human groups rather than contemporary interconnected risks at global scale.

Human cultural evolution offers relevant insights here. Cultural adaptation has historically produced robust solutions to complex challenges through incremental, collective processes whereby adaptive institutions and norms emerge gradually (Henrich, 2016; Richerson and Boyd, 2004). However, rapid contemporary change may undermine these solution-finding processes, potentially leading to maladaptive responses that compound rather than resolve global stresses (Merz et al., 2023). Game theory illuminates how individually rational decisions can collectively produce hazards. Exemplifying this dynamic is dairy conversion of farms, which benefits individual New Zealand farmers while potentially degrading collective water quality.

Understanding these deeper patterns suggests that effective 'long-term resilience to hazards' will require addressing root causes rather than symptoms, emphasising diversity over efficiency in critical systems, ensuring evolvable modularity rather than homogenisation, and governing 'vulnerability creating actors' appropriately (Arnscheidt et al., 2025). While full treatment of these metacrisis dynamics lies beyond this analysis, their existence implies that New Zealand's anticipatory governance approach should acknowledge and prepare for the possibility that current global systems may continue generating risks faster than conventional interventions can manage them, regardless of policy sophistication.

Recommendations for transformational resilience

Given all the foregoing, we now turn to what can be done to build long-term resilience for Aotearoa New Zealand. This analysis of contemporary risk dynamics, from narrow hazard framing, through polycrisis and systemic risk, to metacrisis generators, reveals both the limitations of current approaches and pathways towards more robust preparedness. The DPMC's draft LTIB, while commendable in its recognition of catastrophic potential and emphasis on anticipatory governance, exemplifies broader shortcomings that characterise risk management across the public sector. Addressing these limitations requires fundamental shifts spanning hazard scope, analytical frameworks, institutional design and public engagement approaches.

While it is not possible, and perhaps not even desirable, to prepare specifically for every hazard, there are common features of global catastrophic risks and resilience measures the benefit of which generalises across risks.

While it is not possible, and perhaps not even desirable, to prepare specifically for every hazard, there are common features of global catastrophic risks and resilience measures the benefit of which generalises across risks. As noted above, a critical common feature of global systemic failure, and a core driver of historical societal collapses (Kemp, 2025), is a shutdown in the flow of goods and services. No matter how this happens, it would have an impact on the provision of basic needs, such as clean water, nutritious food, energy for heating and transport, the maintenance of communications systems, and so on (Boyd et al., 2023). Generalisable, crisis- or scenario-agnostic resilience measures are noted in a recent futures report by the Finnish government, which mapped four

scenarios for the world in 2045. These measures include economic security, defence capability, investment in education and skills, and a sustainability transition, all coordinated through anticipatory governance that is mindful of systemic risk (Government of Finland, 2025). These generalities underscore the need for cross-silo and integrated cross-society risk assessment and long-term resilience-building.

Short political cycles systematically undermine long-term resilience planning, which requires dedicated independent institutions insulated from short-term electoral pressures.

Expand hazard coverage to include global catastrophic risk

The most immediate requirement involves expanding hazard coverage to include the global catastrophic and existential risks mentioned above that traditional frameworks systematically exclude (Boyd and Wilson, 2023). These collectively represent low-probability, high-impact events that could trigger supply chain collapse, which is New Zealand's primary vulnerability. Some of these risks are near-certainties over longer time frames and potentially dwarf conventional disaster impacts in expected annualised harm (Graham et al., 2025; UNDRR, 2025b). International precedents including the US Global Catastrophic Risk Management Act, RAND Corporation assessments and the UK's more comprehensive National Risk Register demonstrate that treating such risks seriously has become standard practice among comparable nations, though much more can be done.

Systemic analytical frameworks using stress–trigger–crisis models

Beyond expanded scope, effective resilience requires adopting systemic analytical frameworks that recognise interdependencies, cascade pathways, and the evolutionary dynamics underlying risk generation. The likes of the stress–trigger–crisis model provides a foundation for understanding how global systemic stresses interact to create polycrisis conditions where any single trigger can propagate across interconnected systems. This demands moving beyond sectoral silos towards integrated approaches that examine how competitive dynamics, technological acceleration and resource degradation create the underlying conditions generating continuous crisis. Resilience think pieces and actions in New Zealand should explicitly address this.

Strengthen forces that build resilience (geography, institutions, social capital)

A critical shift involves recognising forces that build resilience rather than focusing exclusively on risk drivers (notably, the draft LTIB did not address resilience factors in its section on risk and resilience). New Zealand possesses substantial advantages that current frameworks underutilise: geographic isolation, low urban density, plentiful food production capacity, abundant renewable energy potential, relatively strong democratic institutions, and established social capital. These assets require deliberate cultivation, including through regional cooperation initiatives, particularly with Australia and Pacific neighbours, on shared preparedness challenges, potentially including, for example, vaccine manufacturing and shipping resilience. Egalitarian institutions and transparent governance structures have demonstrated superior adaptive capacity in the face of historical collapses compared with hierarchical alternatives (Peregrine, 2021), and it appears that widening inequality and extractive hierarchies are a key driver of historical societal collapse (Kemp, 2025). This suggests that democratic and egalitarian deepening through citizens' assemblies and deliberative forums represents both a values commitment and pragmatic resilience strategy.

Public engagement and transparency through democratic deliberation

The question of public engagement reveals a fundamental tension between technocratic approaches that limit risk disclosure and democratic imperatives requiring informed consent for both action and inaction. Internationally, the UK House of Lords' report on extreme risks (mentioned above) included a presumption towards publication of security information, and stated that 'only through transparency and a healthy culture of challenge can we provide society with a reliable foundation to respond to emerging risks' (House of Lords Select Committee, 2021, p.5).

Citizens require access to comprehensive risk information spanning the full spectrum from conventional hazards to global catastrophic threats, supported by government-facilitated forums enabling structured public deliberation. But more importantly, information sharing needs to be solutions focused, including transparent information about resilience investment options, their costs, benefits and trade-offs across different time frames and scenarios. This could involve presenting alternative financing models through citizen assemblies or deliberative forums. This approach empowers rather than alarms populations, enabling discourse over the 'tough decisions' the draft LTIB acknowledges, in the context of opportunities, while ensuring that democratic legitimacy is sustained to stabilise long-term resilience investments.

Institutional reforms, including dedicated risk officers and cross-sector collaboration

Institutional reforms represent perhaps the most crucial component of transformational change for long-term resilience. Short political cycles systematically undermine long-term resilience planning, which requires

dedicated independent institutions insulated from short-term electoral pressures. Options include establishing a chief risk officer or parliamentary commissioner for extreme risks (Boyd and Wilson, 2021a), implementing three-lines-of-defence approaches that are standard in private sector risk management, all contributing to coordinating assessment and planning across all hazard categories. More immediate mechanisms include developing cross-sector collaboration mandates for information sharing, and especially joint exercises spanning government agencies, private sector actors and civil society organisations, enabling integrated understanding and prioritisation for resilience across, rather than within, institutional silos. Our own recent research found majority public support (56–63%) in New Zealand, across the political spectrum, for institutional reforms to manage global catastrophic risk (Kerr, Boyd and Wilson, 2025).

Basic needs continuity and 'Plan B' infrastructure

The challenge of ensuring continuity of basic needs (water, food, shelter, energy, transport, communications) under any scenario requires both strengthening existing systems and developing alternative 'Plan B' infrastructures and processes capable of functioning at a bare minimum level when primary systems fail. Basic needs should be defined in legislation, and their provision mandated and ensured indefinitely during global catastrophe. This is not just about hardening primary infrastructure; it involves distributed food production and transport capabilities, local energy generation (e.g., liquid biofuels), resilient inter-island transport, and backup communications systems (Boyd et al., 2023). Such redundancy represents not inefficiency, but essential insurance against the cascading failures that characterise contemporary risk landscapes. International models, including the US Global Catastrophic Risk Management Act, demonstrate explicit focus on basic needs continuity under catastrophic scenarios, providing templates New Zealand could adapt to local circumstances.

Intergenerational fairness in financing

Financing resilience investments (including plans, strategies and infrastructure) raises questions of intergenerational fairness that traditional cost–benefit analysis handles poorly. A potentially appropriate approach involves borrowing now to build resilience immediately while ensuring that both current and future citizens contribute according to benefits received. The aim is to avoid disadvantaging current populations through delayed action (abrupt hazards can strike at any moment), while preventing unfair burden-shifting to future generations. Resilience investment should align with national infrastructure planning, requiring the likes of the Infrastructure Commission's (and other agencies') current climate-focused mandate to expand towards comprehensive global risk consideration. Financing resilience could also be linked to excise taxes that protect human and social capital (e.g., taxes on tobacco, alcohol, gambling and junk food), and to risk mitigation measures such as using revenues from higher carbon charges. Given the above risks, the commodities and expertise needed for resilience should be sourced soon, as they may not be easily obtainable in some of the futures described.

Conclusion

These recommendations extend far beyond critiquing the Department of the Prime Minister and Cabinet's draft long-term insights briefing towards establishing principles applicable across all public sector risk and resilience thinking. The fundamental insight involves recognising that traditional approaches, whether focused on individual hazards, conventional disaster risk reduction (as per the Sendai Framework), or even systematic risk assessment, remain reactive to underlying forces generating continuous crisis. Building long-term resilience amid the metacrisis requires understanding how competitive dynamics, technological acceleration and coordination failures create the conditions necessitating resilience in the first place. That said, fixing root causes is hard, and so building resilience to the underestimated and non-linear threat of global systemic and catastrophic risk remains a necessity and requires an integrative approach across risk and resilience silos.

There is both sobering pause and strategic opportunity. New Zealand's geographic advantages, renewable energy potential, democratic institutions and social capital position it uniquely well to model anticipatory governance that addresses global catastrophic risk and resulting abrupt hazards, but also root causes, rather than merely managing symptoms. Regional cooperation with Australia and Pacific neighbours offers additional strategic opportunities to build collective resilience to global risk that is inherently cross-border. The result would be good for the wellbeing of New Zealanders, for populations depending on our food exports, and for humanity should some catastrophe ever threaten a global collapse.

By embedding systemic thinking, expanding the considered hazards, ensuring transparency, and implementing institutional reforms oriented towards management of risk rather than reaction to hazards, New Zealand can establish itself as a global leader in building resilience to 21st-century challenges through genuine democratic engagement with citizens and not technocratic solutions alone. The alternative of continuing reactive approaches that address symptoms while global stresses and underlying generators remain unchanged ensures that risks will continue to emerge faster than any intervention can manage them, potentially undermining the prosperity and security that resilience investments aim to protect.

1 This article extends the authors' submission to the New Zealand government on the DPMC and Ministry for the Environment's long-term insights briefing on building New Zealand's long-term resilience to hazards. The original submission can be accessed at https://adaptresearchwriting.com/wp-content/uploads/2025/08/250825-response-to-dpmc-draft-ltib_islands-for-the-future-of-humanity.pdf.

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