Disconnected Defenses: Extreme Weather Risk Across Corporates, Cities and Financial Systems

Extreme weather is already shaping financial outcomes across the economy.

Losses are no longer confined to isolated assets or sectors, but increasingly emerge through shared systems — including infrastructure, supply chains, insurance markets and public services — on which companies, cities and financial institutions all depend. Drawing on disclosure data from companies, insurers and subnational governments, this insight examines how extreme weather risks are being identified today, where perceptions diverge across actors and why those gaps matter for economic and financial resilience.

Key findings

Recognition is rising but not enough

62% of subnational governments disclosing to CDP across 80 countries **report being currently impacted by extreme weather.** Yet only 35% of companies reporting to CDP (3,890 of 11,261) identify extreme weather as a financially material risk.

Despite underreporting, US$2.9 billion in losses were recorded by companies in a single reporting year

The losses, reported by 3890 companies were led by heavy precipitation (US$1.5 billion). Operational shutdowns (US$266 million) and increased direct costs (US$309 million) dominate, showing that **extreme weather hits cash flows and business continuity before it hits balance sheets.**

Anticipated scale vastly exceeds losses to date, with 48% of disclosed extreme weather event risks expected in the short-term

Companies project **US$898 billion in future losses,** with flooding alone causing US$527 billion. The largest single financial risk effect is **lost revenue from reduced production capacity** — US$326 billion (36% of total) — confirming that operational disruption is the defining financial exposure.

Extreme weather is disrupting the public systems that businesses depend on

The sectors most exposed to climate hazards according to subnational reporting — **agriculture, human health, water supply, sewerage and waste management, and transport** – are the foundations of economic activity and business continuity.

Insurability is a critical but under-captured risk boundary

Companies anticipate **US$218 billion in asset impairment,** yet only 17 companies quantify impacts from reduced insurance availability on high-risk assets. Just 149 disclosing insurers anticipate **US$49 billion in future climate related claims liabilities,** however companies report only US$3.3 billion in future increases - suggesting that premium increases, coverage restrictions or insurer withdrawal could be significantly larger than companies currently anticipate.

A US$34 billion adaptation finance gap is compounding system-level vulnerability

Nearly half (46%) of subnational governments report budget constraints limiting adaptation and over 60% have active unfunded adaptation needs. These public finance shortfalls are accumulating risk exposures for every business and investor operating in those places.

Extreme weather is a systemic risk, not a firm-level one

Financial outcomes are shaped by shared dependencies — infrastructure reliability, insurance market conditions, supply chain continuity and local adaptation capacity — that require coordination across actors. **Companies and financial institutions are best positioned to absorb or reduce risk** when operating within systems where these dependencies are managed collectively and supported by adequate financing.

1. Where extreme weather risk is being identified

Climate related extreme weather events have generated approximately US$2 trillion in global losses over the past decade, illustrating that physical climate risks are already shaping economic outcomes.[1] This is supported by subnational governments disclosing to CDP. **Of 1,005 cities, states and regions across 80 countries reporting through CDP - ICLEI Track, 62% identify already being significantly impacted by extreme weather events.** Over 60% of subnational governments expect hazards impacting their jurisdictions to increase in intensity, frequency, or both, particularly extreme heat, urban flooding and drought.

Subnational governments also highlight where disruption is expected to land. Reporting shows the most impacted sectors include agriculture, human health & social work activities, water supply, sewerage, waste management & remediation activities, and transportation & storage.

The impacts of extreme weather events on these sectors not only disrupt livelihoods and create direct losses for households and businesses, but also create a ripple-effect of indirect losses across all industries because of their foundational role in a functioning economy. Thus, effective management of these risks is a matter of concern for the resilience of national economies, the financial resilience of businesses and firms, as well as stability of the financial system as a whole. In fact, **23% of subnational governments specifically highlight financial and insurance activities to be highly exposed to intensifying climate hazards** – signaling that subnational governments are recognizing extreme weather events as a financial risk.

Yet CDP corporate disclosures covering both real-economy and financial firms reveal that only 35% of the disclosers (3,890 of 11,261) identify extreme weather events as a financially material risk. **Despite the underreporting, extreme weather risks constitute 18% of all environmental risks disclosed; and companies report a combined US$901 billion in realized and anticipated losses over short- to long-term horizons, as defined by organizations.** Importantly, these impacts are not confined to distant timeframes. 48% of the disclosed extreme weather event risks are expected in the short-term, meaning up to two years, placing extreme weather squarely within organizational planning and investment horizons.

$2tn[1]

in global losses generated by climate related extreme weather events over the past decade

62%

of cities, states and regions reporting through CDP identify being significantly impacted by extreme weather events

23%

of subnational governments highlight financial and insurance activities to be highly exposed to intensifying climate hazards

35%

of corporate disclosures identify extreme weather events as a financially material risk

18%

of all environmental risks disclosed relate to extreme weather risks

$901bn

combined losses reported over short- to long-term horizons

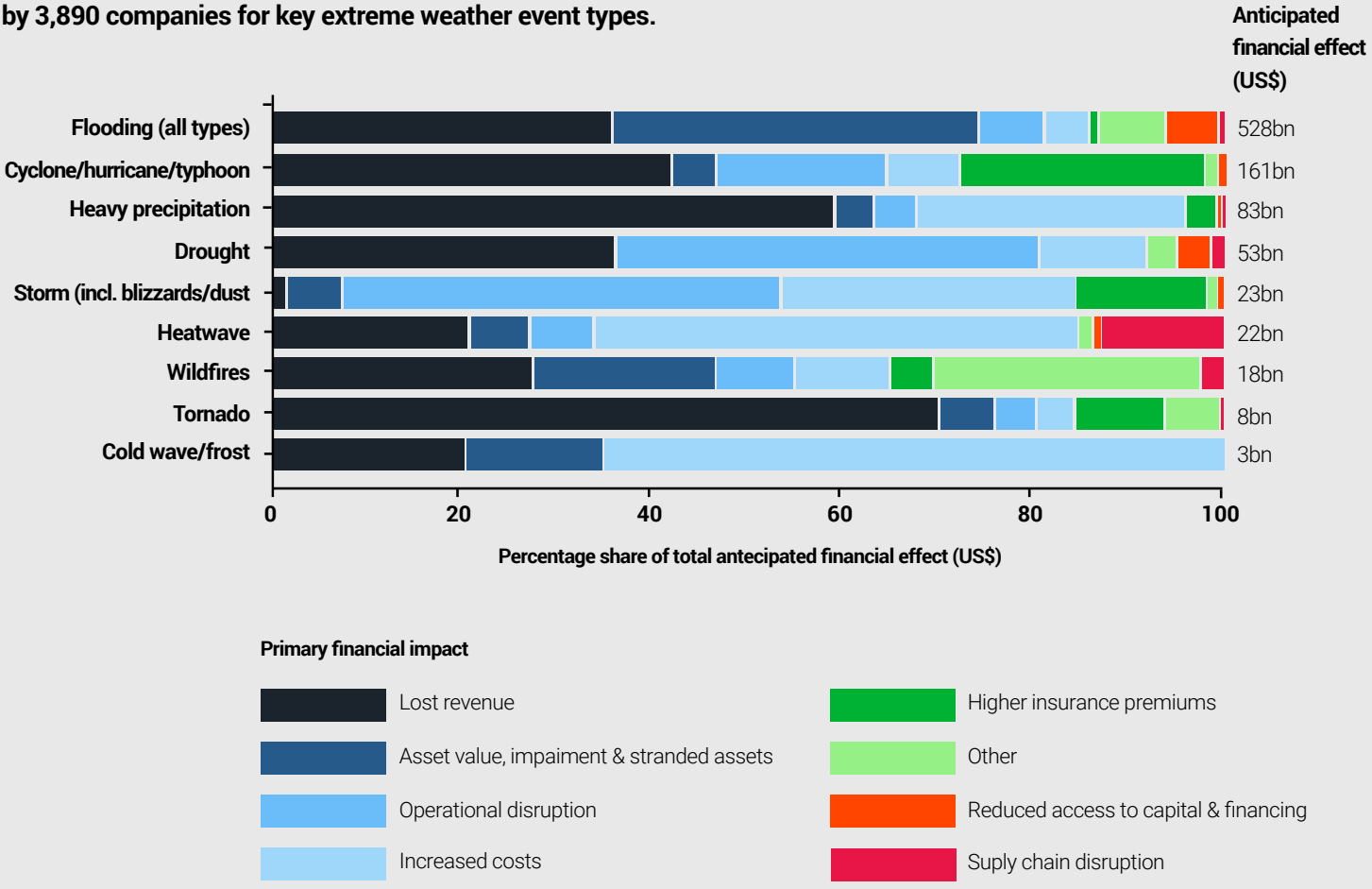
[1] ICC, 2024, The economic cost of extreme weather events

2. Loss drivers and limits of firm-level control

Companies report US$2.9 billion in losses occurring in the reporting year alone, with heavy precipitation being the largest single driver of reported losses, accounting for US$1.5 billion across real economy and financial firms. Forward looking disclosures indicate far larger expected impacts over time. In total, 3,890 companies anticipate US$898 billion in extreme weather impacts across short and long term horizons, as defined by organizations.

The profile of anticipated losses highlights where pressure is building. As outlined in Figure 1, anticipated financial impacts are highly concentrated in a a small number of extreme weather event types, led by flooding (US$528bn), cyclones (US$161bn) and heavy precipitation (US$83bn).

Figure 1: Primary financial effects anticipated over short-, medium- and long- term by 3,890 companies for key extreme weather event types.



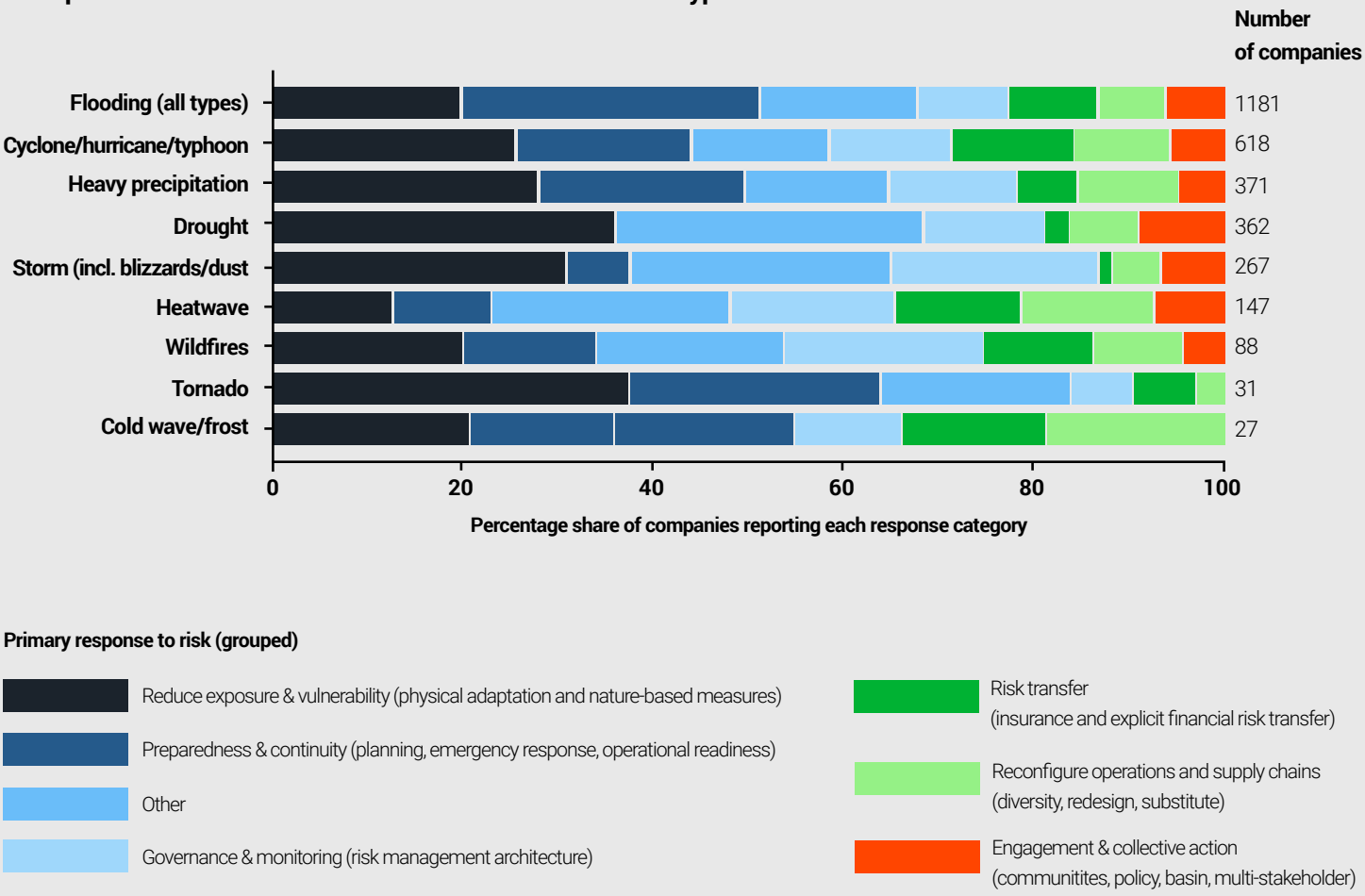
Source: 2025 CDP disclosure

While the financial risk associated with these hazards is being disclosed at company-level, the hazards themselves generate widespread disruption across shared systems, creating second- and third- order risks that extend beyond firm-level control. This underscores the importance of collective action.

As shown in Figure 2, companies are investing to reduce their exposure to these hazards. Reported responses are dominated by measures aimed at limiting direct exposure and vulnerability — such as physical adaptation — or maintaining operations through continuity and emergency response planning. Actions that rely on coordination with other actors or address shared system dependencies account for a much smaller share of reported responses.

At the same time, there is growing recognition that financial, ecological, social and economic resilience are closely interconnected. The interaction of these systems can give rise to systemic risks — defined by the TNFD as "risks arising from the breakdown of the entire system, rather than the failure of individual parts". In this context, systemic resilience can be understood as the dynamic capacity of the integrated system to minimize cascading damage to prevent a total collapse over time[2].

Figure 2: Reported response measures taken by companies to mitigate anticipated financial effects of each extreme weather event type



Physical risk management and adaptation strategies that strengthen individual entities without adequately reflecting system level dynamics may ultimately undermine financial resilience, as businesses depend on the stability and functioning of the socio ecological and economic systems in which they operate[3].

As companies increasingly channel investment towards managing extreme weather risks, there is an opportunity to better align these efforts with national and subnational adaptation plans. Doing so can help direct capital towards response measures that reduce risk at scale and support longer term resilience to extreme weather.

A more coordinated approach could also help address persistent public funding constraints. Around half of subnational governments report budgetary constraints limiting their ability to adapt to the effects of climate change (46%). Over 60% report seeking funding or financing for at least one adaptation project in their jurisdiction, highlighting an investment gap of at least US$34 billion.

46%

of subnational governments report budgetary constraints limiting their ability to adapt to the effects of climate change

>60%

report seeking funding or financing for at least one adaptation project in their jurisdiction

US$34bn

adaptation investment gap uncovered by disclosing subnational governments

3. How losses materialize and under-recognized insurance risks

In the reporting year, most losses came from operational shutdowns (US$266 million) and increased direct costs (US$309 million). This shows companies' perceptions of how they are being affected by extreme weather events at present. **Only US$25 million (around 2%) was attributed to higher insurance premiums. Yet within the sample of 149 insurers disclosing to CDP, 48% identify extreme weather events as a source of material financial risks.** This represents a mismatch – at present, most companies do not experience significant risk through rising insurance premiums resulting from extreme weather events, while the recognition of extreme weather events as a risk by insurers signals that companies have not caught up with how insurance conditions may tighten quickly following repeated shocks.

Looking ahead, anticipated financial impacts, are driven by lost revenue (including losses of US$326 billion from reduced production capacity) and asset impairment or early retirement (US$218 billion). This reveals that companies expect the most material exposures to relate to production continuity and asset viability rather than isolated one off costs. Only a small minority quantify constraints related to insurance availability, suggesting that insurability is not yet widely treated as a binding factor in risk and investment decisions. **Companies report US$218 billion in anticipated asset impairment or early retirement, yet only 17 companies quantify reduced availability of insurance on assets in high risk locations (US$58 million).**

When it comes to recognizing the risk of rising insurance premiums, **real-economy companies expect US$3.3 billion in future increases. This appears low relative to underlying risk dynamics: 149 disclosing insurers anticipate US$49 billion in future climate related claims liabilities, suggesting that premium increases, coverage restrictions or insurer withdrawal could be significantly larger than companies currently anticipate.** Within the limits of the reporting sample, the combined picture suggests that insurance is already part of the financial pathway of extreme weather risk, but that corporate quantification of insurance related dependencies remains limited relative to anticipated impacts on revenue and assets. Strengthening disclosure of insurance assumptions — including how availability, affordability and coverage affect financing, asset viability and recovery — will support clearer resilience strategies and better anticipation of system level impacts as insurance protection gaps widen.

Blind to the protection gap: Less than 1% of companies price in expected insurance withdrawal in high-risk areas, despite asset impairment ranking among the top anticipated financial impacts of extreme weather.

[2]Environmental Change Institute, University of Oxford (2025). Towards UK systemic resilience to international cascading climate risks.

[3]NGFS (2024). Nature related financial risks: A conceptual framework to guide action by central banks and supervisors.

4. Looking Forward: Roles in building system level resilience

Extreme weather is already affecting financial outcomes. The scale of anticipated disruption far exceeds the losses observed today — and what determines whether these impacts remain manageable or become destabilizing is how effectively risk is reduced across the systems in which organizations operate.

Extreme weather risk does not sit with any single actor. Financial impacts arise through shared systems — infrastructure, insurance markets, supply chains and public services — that shape exposure across entire regions and sectors. Companies and subnational governments are managing risk within systems they largely inherit, while national governments and financial authorities shape the structural conditions that determine how those risks accumulate or are absorbed. This system level perspective is increasingly reflected in supervisory and central bank analysis, including through the work of the Network for Greening the Financial System (NGFS), which frames physical climate risk as a potential source of systemic financial instability. Addressing extreme weather risk therefore requires alignment across actors to ensure that measures taken to strengthen resilience at the entity level do not inadvertently increase risk elsewhere in the system.

For companies (managing risk within shared systems):

Treat extreme weather as a system-exposed business risk, not only a site-level hazard

Corporate disclosures show that the largest anticipated financial impacts arise through production disruption and lost revenue, rather than direct physical damage alone. Managing this risk requires recognizing dependence on shared systems — including public infrastructure, utilities, logistics networks and emergency services — alongside firm-level assets and operations.

Explicitly integrate insurability into forward-looking risk assessments

While companies anticipate significant impacts to assets and revenue, disclosures show relatively limited quantification of changes in insurance availability, affordability and coverage. In contrast, disclosing insurers report extreme weather events as a material source of future claims liabilities, signaling that insurance related risk may transmit to companies more quickly and forcefully than current corporate disclosures imply. Insurability is not a peripheral issue: changes in premiums, terms or coverage can affect financing conditions, asset viability and location decisions well before physical damage occurs. Forward-looking risk assessment is therefore strengthened when insurance assumptions are made explicit and stress-tested.

Use disclosure to signal where collective risk reduction is needed

Many drivers of resilience — such as flood protection, water management, transport reliability and ecosystem condition — sit beyond the control of individual firms. Corporate disclosure can help identify where firm-level measures are insufficient on their own and where coordinated action with public authorities, supply chain partners and financiers is critical to reducing overall exposure.

For cities, states and regions (implementing the local conditions for resilience):

Make system-level risk visible

Public disclosure clarifies where hazard exposure, infrastructure condition, and service disruption intersect. By using disclosure to identify priority risks and adaptation needs — particularly in water management, waste systems and nature-based solutions — public authorities can help reduce uncertainty for private investment and enable coordinated risk reduction.

For national governments (enabling system wide resilience):

Address the structural conditions that determine whether adaptation is financeable at all

Subnational disclosure data points to a US$34 billion adaptation investment gap — but the more significant finding is that nearly half of subnational governments report budget constraints as a primary barrier to action. This is not a gap that local authorities can close through better planning alone. National governments are best placed to deploy fiscal transfers, concessional finance mechanisms and public investment frameworks that direct capital toward the highest-risk, lowest-capacity areas, where unaddressed adaptation need translates most directly into economic disruption and financial loss across the whole system.

Align fiscal, adaptation, and risk-management policies around shared economic exposure

Corporate and subnational disclosures consistently highlight common pressure points that directly impact macroeconomic performance. Ministries of finance can play a central coordinating role by integrating adaptation priorities, public investment decisions, and national insurance or risk transfer frameworks to avoid fragmented responses and reduce economy-wide exposure to physical climate risks.

For regulators and central banks (monitoring and mitigating system-level vulnerability):

Use supervisory tools to address systemic financial risks driven by physical risk accumulation

Where corporate and place-based data reveals concentrations of uninsured or underinsured physical risk in credit portfolios, insurance books or municipal bond markets, regulators and central banks have grounds to act within their existing mandates — through supervisory expectations around capital adequacy and risk management for climate-exposed assets.

Corporate resilience depends on reliable infrastructure, services and insurance. Public resilience depends on sustained investment, coordination and credible adaptation pathways. But the structural conditions that make resilience financeable — functioning insurance markets, adequate adaptation finance, reliable public infrastructure — are determined largely by national policy and regulatory frameworks.

Disclosure is how this becomes visible. By surfacing shared risks, finance gaps and system dependencies, it enables better decisions, more targeted investment and more coordinated action. As extreme weather intensifies, the quality of that coordination, and the commitment to addressing the structural conditions that constrain it, will increasingly determine the success of resilience efforts.

Enquiries

media@cdp.net

Authors

Farheen Altaf
Resilience and Adaptation Lead

Bianca Barilla
Policy Lead, Sustainable Finance

Manveer Gill
Sustainable Finance Lead

Analysis

Oliver Racher
Manager, Insights Analysis

Andrea Ortega Segundo
Technical Manager, Cities

Kristen Weller
Analyst, Cities, States and Regions

Acknowledgements

Amir Sokolowski, Camilla Kapustina, Claire Prescott, Jenny Holloway, Sapna Shah, Sue Armstrong-Brown, Usman Khan

CDP Worldwide
Dixon House
1 Lloyd's Ave
London EC3N 3DS

Tel: +44 (0) 203 818 3900
@cdp
www.cdp.net

About CDP

CDP is a global non-profit that runs the world's only independent environmental disclosure system. As the founder of environmental reporting, we believe in transparency and the power of data to drive change. Partnering with leaders in enterprise, capital, policy and science, we surface the information needed to enable Earth-positive decisions. We helped more than 22,100 companies and over 1,000 cities, states and regions disclose their environmental impacts in 2025. Financial institutions with more than a quarter of the world's institutional assets use CDP data to help inform investment and lending decisions. Aligned with the ISSB's climate standard, IFRS S2, as its foundational baseline, CDP integrates best practice reporting standards and frameworks in one place. Our team is truly global, united by our shared desire to build a world where people, planet and profit are truly balanced.

Visit cdp.net or follow us @CDP to find out more.