SYSTEMIQ

Returns on Resilience and Adaptation: Driving Growth, Stability and Competitiveness

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This interim report seeks to position resilience as a core pillar of economic and financial decision-making, by clarifying the returns on resilience investments for people, economies and businesses.

In a world of rising volatility, demand is growing for insights, tools and strategies to build resilience. There are several definitions of resilience. At the core, resilience is the capacity of households, communities, businesses, and economies to thrive in a changing world, to absorb and to quickly recover from shocks.

Resilience is built through — and enables — both adaptation and mitigation. Without adaptation, households, communities, and economies can become trapped in spirals of repeated shocks, with the most vulnerable at greatest risk. Without mitigation, risks will escalate beyond what we can adapt to. And mitigation measures themselves must be resilient to remain effective over the long term.

As climate and nature shocks become impossible to ignore, awareness of the urgent need for investments in resilience and adaptation is rising in governments, business and civil society. COP30 presents an opportunity to advance the resilience and adaptation agenda.

But economic and financial decision-makers still lack clarity on how to build resilience. In response, this report draws on insights and contributions from individuals associated with over 120 organisations, 50 publications, and four consultations at international forums to support the resilience agenda through three deliverables:

A shared narrative:

> communicating the centrality of resilience to human development, economic growth and business strategy, in terms and metrics that meet demand from economic and financial decision-makers.

A strong evidence base:

> synthesising data, insights and case studies on the costs of inaction, returns on resilience interventions, and financing needs, to provide decision-makers with the information and tools to assess and prioritise finance and policy. Based on this initial period of work, we find evidence that investing in resilience can deliver strong returns for human health, gross domestic product (GDP) growth and jobs, and that markets for resilient solutions see strong projections, albeit from a small base.

Clarity on breakthrough actions:

> identifiying the actions that address systemic barriers to scaling investments in resilience, to seize the opportunity at COP30 to drive concerted action.

This interim report is a draft for discussion and improvement. Between now and COP30, we hope to partner with many of you to strengthen each element. We welcome comments and suggestions, which can be sent to resilience@systemiq.earth. Annex 1 outlines potential modes of collaboration. Please reach out if you are interested to be involved.

Unless cited from an external source, all numbers are subject to refinement. These numbers should not be cited or attributed; this is indicated with square brackets. A draft evidence base will be published in the coming weeks, to be finalised ahead of COP30. See Annex 4 for an outline of evidence outputs we are working to synthesise with partners.

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This document sets out ideas and proposals for discussion and improvement. We welcome comments and suggestions. The views expressed in this document are preliminary and subject to revision.

The lead authors of this report are Guido Schmidt-Traub, Patricia Ellen, Veerle Haagh, Julia Turner, Annabel Mahgerefteh, Paul Limpens, Nikita Jesaibegjans, Vinicius Natacci, Tassilo Bismarck and Alexandra Philips.

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Foreword

It is clearer now than ever that we need to act decisively in the face of climate urgency. I have seen the cost of inaction rising. In the past year alone, Brazil has faced unprecedented floods in the south, droughts in the Amazon, and heatwaves in our cities.

These are not isolated events. They are part of a deeper shift, where climate and nature shocks are colliding with economic fragility and social inequality. Events in Porto Alegre in 2024 showed with painful clarity how adaptation policies, if embedded earlier in infrastructure planning, could have made a real difference.

When we first began talking about adaptation and resilience, many believed that focusing on it meant surrendering on mitigation. That belief is fading. Extreme events are getting closer, harder to ignore, and more deeply felt. Adaptation is no longer an afterthought. It is a condition for stability.

That is why I have made adaptation and resilience central to COP30 in Belém. Our ambition is clear: to shift from negotiation to implementation, and to elevate climate solutions, especially those that protect lives, preserve capital, and promote equity.

We must also be honest: adaptation is different. It is deeply local, tied to specific geographies, communities, and governance systems. That makes it harder to finance through traditional mechanisms.

Yet this very local nature is also its strength. Around the world, communities are rethinking how investing in infrastructure, finance, and nature can work together to build more resilient futures. Their experience must shape - not follow - the global agenda.

Adaptation is also a global challenge and responsibility: natural disasters have social and economic impacts on large parts of the world; with ripple effects extending across value-chains and communities in an interdependent global economy.

In Belém, we are building a **mutirão**, a collective effort that brings together finance ministries, city governments, investors, scientists, Indigenous peoples, and community leaders. This interim report is a first step on that path. By clarifying the case for action, it helps move us from concepts to commitments, from diagnosis to delivery.

Between now and COP30, we will work together to sharpen the evidence, crowd in local and global voices and help turn these insights into breakthrough actions. There is no time to waste. Investing in resilience is not only wise, it is essential. Let Belém be the moment we move from awareness to alignment, and from ambition to action.

Ambassador André Aranha Corrêa do Lago
COP30 President-Designate

Summary of findings

Investing in resilience, including resilience to climate and nature impacts, is the surest way to build stronger communities, economies and companies.[1] By anticipating and investing today in the ability to manage future climate and nature shocks, economic and financial decision-makers will drive growth, stability and competitiveness.

As the World Resources Institute (WRI) highlights, resilience offers a "triple dividend": it reduces losses, unlocks economic gains, and generates social and environmental benefits.[2] These returns on resilience are multi-dimensional and context-specific. To reflect this, this report assesses resilience for people, economies and businesses through a shared lens: first, how it mitigates risks and, second, how it unlocks returns. This framing captures both sides of the resilience equation - the costs avoided and the value created - and shows how investing in resilience delivers high investment returns across the economy.

1 *Rockstrom et al. (2023) cites this definition: 'resilience as the capacity to live and develop with change and uncertainty, which is well beyond just the ability to 'bounce back' to the status quo. It involves the capacity to absorb shocks, avoid tipping points, navigate surprise and keep options alive, and the ability to innovate and transform in the face of crises and traps', while the IPCC defines resilience as 'a system's ability to anticipate, reduce, accommodate, and recover from disruptions in a timely, efficient, and fair manner'.*

2 *World Resources Institute (2022). The Triple Dividend of Building Climate Resilience: Taking Stock, Moving Forward`*

For people: development is resilience, and resilience is development.

Mitigating risks

- Without development, households and communities are unable to withstand disruptions and bounce back from shocks. A 10% increase in GDP per capita reduces wellbeing losses from climate impacts by 2.4% and cuts the number falling into extreme poverty by 5%.[3]
- Prosperity without resilience is fragile. Hurricane Maria in 2017 caused damages equivalent to 226% of Dominica's GDP – demonstrating a single disaster can obliterate economic gains when resilience is insufficient.[4]
- Without action, climate change will increase inequality – with an estimated three to four percentage point rise in Gini index[5] by 2050.[6]

Unlocking returns

- **Health and livelihoods:** Resilient health systems could help to avert an estimated [more than 1] million[7] additional deaths per year by 2030 caused by climate and nature impacts, and help to prevent 78 million people suffering from hunger per year by 2050[8].

3 *World Bank (2024). Rising to the Challenge: Success Stories and Strategies for Achieving Climate Adaptation and Resilience.*
4 *World Bank (2018). A Caribbean crystal ball: What can experience from Caribbean islands tell us about investing in climate resilience?*
5 *The World Bank defines the Gini index as "the extent to which the distribution of income or consumption among individuals or households within an economy deviates from a perfectly equal distribution. A Gini index of 0 represents perfect equality, while an index of 100 implies perfect inequality".*
6 *Moyer et al. (2023). How many people will live in poverty because of climate change? A macro-level projection analysis to 2070; Gilli et al (2024) Climate change Impacts on the Within-Country Income Distributions*
7 *Systemiq synthesis 2025. See Annex for further detail.*
8 *Systemiq synthesis 2025. See Technical Annex 4 for further detail.*

For economies: resilience drives inclusive growth, stability and security.

Mitigating risks

- Climate change could cut GDP by 3 - 8% and nature loss by up to 10% in Emerging Markets and Developing Economies (EMDEs) by 2030, with climate impacts alone rising up to 12 - 20% of GDP by 2050.[9]
- 1.5°C warming could drive labour productivity losses of 2-3% by 2030, equivalent to 80 million full-time jobs and $2.4 trillion in lost GDP[10] – rising significantly with 3°C warming to 18% in low-exposure sectors and 25% in highly exposed sectors.[11]
- Countries with higher climate vulnerability face an average increase of 1.2% in sovereign borrowing costs.[12] This is compounded by an amplified perception of sovereign risk; just a one unit increase in climate vulnerability increases sovereign credit spreads for two-year debt by up to 23% for high-risk countries.[13] In the 50 most climate-vulnerable countries, external debt payments will average at least 15.5% of government revenue in 2024 – the highest level since records began in 1990.[14]

Unlocking returns

- **Growth:** Implementing country-specific adaptation strategies can deliver GDP gains of up to 15% by 2050 in Small Island Developing States (SIDS).[15]
- **Stability:** Resilience reduces volatility and sovereign borrowing costs. A 10-point improvement in a country's Notre Dame Global Adaptation Initiative (ND-GAIN) score is linked to a 37.5 basis point reduction in sovereign bond spreads.[16]
- **Strength and security:** Singapore's water resilience strategy has enabled it to meet 40% of its water needs independently, safeguarding from supply shocks and securing essential resources.[17]

For businesses: resilience is competitiveness.

Mitigating risks

- Without adaptation, the world's largest companies could face $885 billion in annual costs by the 2030s and $1.2 trillion by the 2050s,[18] including asset losses of up to $560 - 610 billion per year by 2035, and knock-on effects of 6.6–7.3% declines in company earnings.[19]
- Resilience avoids business losses. For example, a $4 million adaptation investment enabled AstraZeneca to avoid $2.5 billion in potential output loss.[20]

Unlocking returns

- **Value creation:** McCain Foods increased potato yields in New Zealand by 25% using regenerative agriculture practices that boost resilience and productivity.[21]
- **Market opportunity:** global demand for adaptation and resilience solutions are projected to reach between $500 billion and $1.3 trillion by 2030.[22]

9 *Network for Greening the Financial System (2024). NGFS Climate Scenarios for central banks and supervisors; NGFS (2023). The Green Scorpion: the MacroCriticality of Nature for Finance*
10 *International Labour Organization. (2019). Working on a Warmer Planet: The Impact of Heat Stress on Labour Productivity and Decent Work*
11 *Orlov, A., Sillmann, J., Aunan, K., & Aaheim, A. (2021). Effects of climate change on combined labour productivity and supply: an empirical, multi-model study. The Lancet Planetary Health, 5(7), e455–e465*
12 *Buhr, B., Volz, U., Donovan, C., Kling, G., Lo, Y., Murinde, V., & Pullin, N. (2018). Climate Change and the Cost of Capital in Developing Countries: Assessing the Impact of Climate Risks on Sovereign Borrowing Costs. London: Imperial College London, SOAS University of London, UN Environment.*
13 *Gonzalez et al. (2025). Asymmetric sovereign risk: implications for climate change preparatio*
14 *Debt Justice (2024). Debt payments in climate-vulnerable countries: 2024 projections. Debt Justice, May 2024.*
15 *World Bank (2024). People in a changing climate: from vulnerability to action*
16 *IMF (2021). Why Climate Change Vulnerability Is Bad for Sovereign Credit Ratings*
17 *Singapore's National Water Agency (2018). PUB pushes the frontier of water technology*
18 *S&P Global Sustainable1. (2025, March 10). For the World's Largest Companies, Climate Physical Risks have a $1.2 Trillion Annual Price Tag by the 2050s.*
19 *Ibid: World Economic Forum and Accenture (2024) Business on the Edge: Building Industry Resilience to Climate Hazards*
20 *WBCSD (2024). Business Leaders Guide to Climate Adaptation and Resilience*
21 *Potatopro (2024). Regenerative agriculture increasing yields and reducing GHG emissions*
22 *BCG & Temasek (2025). The Private Equity Opportunity in Climate Adaptation and Resilience*

An estimated $[280] billion investment is needed in resilience each year by 2030: an economic lifeline that hardly anyone is using. $[54] billion flows into investments in climate resilience each year - just one-fifth of what's needed.[23]

This report identifies a suite of interventions across sectors, including agriculture, health, infrastructure and water. Among these, new analysis by the Boston Consulting Group (BCG) identifies the 15 solution areas across food, water, health, infrastructure and communities that can deliver the greatest socio-economic returns.

Public finance must do the heavy lifting with careful targeting for greatest impact. Of the $[280] billion needed per year, some $[196] billion must come from public sources.[24] This is based on estimates of the potential public vs. private financing split.[25]

The private sector plays a critical role in resilience investment. Unlocking the estimated $[84] billion from private investment will offer investors and financiers credit security, access to a growing investment theme, and a frontier for new financial products.

- **For lenders and investors,** resilience protects collateral and improves loan repayments. A US study found resilient homes built to wind-resilient codes saw 50% fewer mortgage delinquencies post-hurricanes compared with pre-coded homes.[26]
- **Resilience is an emerging investment theme.** Six high-potential solution sub-sectors are seeing double-digit growth, from climate intelligence to adaptive agriculture.[27]
- **The insurance sector can contribute more resilience financing.** The insurance sector could unlock $100–200 billion in climate finance annually for EMDEs, by de-risking resilient infrastructure, expanding the lending capacity of financial institutions and enabling blended finance structures.[28]

With its unprecedented focus on adaptation and resilience, COP30 presents an opportunity to scale interventions that unlock growth and development. Based on stakeholder consultation, a suite of "breakthrough actions" with political and technical momentum is materializing. These bring together partners to tackle systemic barriers that prevent investment in resilience at-scale today. We are continuing to engage with individuals and organisations to crowd-source additional ideas and identify where momentum is strongest.

23 *Systemiq synthesis 2025. See Technical Annex for further detail.*
24 *Systemiq synthesis 2025. See Technical Annex 4 for further detail.*
25 *United Nations Environment Programme's Adaptation Gap Report (2023) identifies around one-third of adaptation finance as typically sourced from the private sector. Independent High Level Expert Group (2024), in both Raising Ambition and Accelerating Delivery of Climate Finance and The State of Delivery: Progress Report of the Global Climate Finance Agenda, estimates that 60–65% of total climate and nature finance can be publicly financed, with 35–40% possibly coming from private sources.*
26 *Insurance Institute for Business & Home Safety and CoreLogic (2023) Joint Study*
27 *Boston Consulting Group and Global Adaptation and Resilience Investment Working Group (GARI). (2023). The Climate Adaptation Opportunity: A Market for Resilience Solutions and the Role of Private Equity.*
28 *Insurance Development Forum (June 2025). Bridgetown Initiative, From Risk to Resilience: How Insurance Can Mobilise Disaster Finance and Climate Investment in Vulnerable Economies. June 2025.*

1 Navigating a Volatile World

Around the world, people want to achieve better lives, safety and security – for themselves and future generations.

Governments want to deliver economic growth and security, improve living standards and create jobs. Businesses want to expand and grow profits.

Yet, these aspirations are under threat, as communities, countries and companies face a new era of fragility and volatility. Structural forces — economic, geopolitical, and technological — are dismantling the foundations of global stability, trust and cohesion. Inflation, debt distress, trade wars and inequality have surged. Communities that feel left behind have been drawn to polarising narratives that offer false certainty and give voice to their concerns and resentments. The AI revolution is disrupting industries and traditional models of politics and media. Multilateralism is facing unprecedented challenges, just as growing power rivalries are spilling over into regional conflicts and tensions. Climate and nature risks are another major stressor. The assumptions that have underpinned the last decades of global growth — integration, cooperation, predictability — no longer hold.

Resilience is an effective response to this uncertainty. At the core, resilience[29] is the capacity of households, communities, businesses, and economies to thrive in a changing world, to absorb and to quickly recover from shocks.

Resilience is built through — and enables — both adaptation and mitigation. Without adaptation, households, communities, and economies can become trapped in spirals of repeated shocks, with the most vulnerable at greatest risk. Without mitigation, risks will escalate beyond what we can adapt to. And mitigation measures themselves must be resilient to remain effective over the long term.

We need a compelling resilience narrative and strategy to build strength, drive growth, and enhance competitiveness. A central question for economic and financial decisionmakers is where and how to direct investment to deliver maximum returns for households, communities, companies and countries.

A growing body of evidence shows that investing in resilience, including to climate and nature impacts, is the surest way to build stronger people, economies and businesses. A track record of investment has emerged over the last decade across diverse geographies. Together, these experiences show that smart investment, sound policy, and effective business strategy can work in tandem to drive development, create jobs, boost growth, and enhance macroeconomic stability.

29 *Rockstrom et al. (2023) cites this definition: 'resilience as the capacity to live and develop with change and uncertainty, which is well beyond just the ability to 'bounce back' to the status quo. It involves the capacity to absorb shocks, avoid tipping points, navigate surprise and keep options alive, and the ability to innovate and transform in the face of crises and traps', while the IPCC defines resilience as 'a system's ability to anticipate, reduce, accommodate, and recover from disruptions in a timely, efficient, and fair manner'.*

Anticipating and managing acute shocks (like floods or hurricanes) as well as slow-onset changes (such as chronic drought, sea-level rise, or ecosystem degradation) enables today's economic and financial decision-makers to reduce visible disruptions, avoid structural deterioration and unlock returns.

Strategic investment in resilience can blunt the economic and human costs of climate and nature-related hazards. In the past two decades, climate and nature shocks have displaced more than 20 million people each year, erased at least $525 billion from emerging markets, and driven business losses, with the EU Agriculture sector losing $28 billion annually (equivalent to 6% of EU crop and livestock production) through value chain disruptions, productivity declines, and asset damage.[30] Some countries now spend more on emergency response than on health or education. A single storm has wiped out a year's GDP in more than one instance. The disruptions are escalating — and will intensify now that the world has surpassed the scientific threshold of 1.5 °C warming. But our evidence base shows that countries can most likely reduce the economic impacts of climate and nature shocks. Such investments are urgent to build a safer future.

Investing to prevent long-term decline and build resilience against slow-moving climate and nature risks is essential. Climate and nature impacts are not merely causing disruptions; they are steadily eroding the capital that sustains development — physical, natural, human and social.

Each shock undermines health and security, weakens critical infrastructure, and drives up costs and volatility. In EMDEs, climate change could cut GDP by 3–8% by 2030 and nature loss by up tp 10%, with climate impacts alone rising up to 12–20% of GDP by 2050.[31] Public spending could drop by up to 40% in the most exposed economies, forcing governments to choose between rebuilding and investing in development priorities.[32] But as the sector evidence base makes clear, investments that protect against these slow-burning risks can deliver profound long-term dividends — stabilizing economies, protecting lives, and strengthening the foundations for future growth.

Such investments must take a global, systemic view. Climate and nature risks ripple through global systems, compounding macroeconomic and business volatility across countries. Famously, drought in Russia in 2010 slashed wheat exports, contributing to food price spikes that helped spark the Arab Spring.[33] An estimated 20–30 million people faced hunger as a direct consequence of Russia's 2022 invasion of Ukraine, as the war between the world's largest and sixth-largest wheat exporters caused prices to surge across Africa and the Middle East.[34] At the time of writing, heat domes affect major agricultural regions in North America and Europe simultaneously.

30 *Oxfam (2019) Forced from Home: Climate-fuelled displacement; V20 (April 2024) 'V20 Views on the NCQG on CF on post-2025'; European Investment Bank (2025). Insurance and Risk Management Tools for Agriculture in the EU. This report shows that the EU agriculture sector loses more than $28 billion per year as a result of adverse weather, equivalent to 6% of annual EU crop and livestock production; V20. (2022). Climate Vulnerable Economies Loss Report. Available at: https://www.v-20.org/resources/publications/climate-vulnerable-economies-loss-report.*

31 *NGFS. (2024). NGFS Climate Scenarios for central banks and supervisors - Phase V. Available at: https://www.ngfs.net/en/publications-and-statistics/publications/ngfs-climate-scenarios-central-banks-and-supervisors-phase-v. Pessimistic scenario: "Current Policies" scenario in which only current policies are maintained, without any additional climate measures. Under this scenario, global temperatures are projected to rise by ~1.5°C in the 2030s, ~2°C in 2050 and ~3°C by 2100. Optimistic scenario: "Below 2°C" scenario in which a transition consistent with limiting global warming to below 2°C occurs, i.e. climate policies are introduced early and become gradually more stringent, achieving net zero emissions before 2070.*

32 *Calcaterra, M., A. Consiglio, V. Martorana, M. Tavoni and S.A. Zenios (2025). 'Sovereigns on thinning ice: debt sustainability, climate impacts and adaptation', Working Paper 06/2025, Bruegel*

33 *Bloomberg (2022). The Global Safety Net Against Hunger Is Frailer Than You Think*

34 *iPES Food (2024). The global food crisis in the age of catastrophe*

In 2023 and 2024, severe drought conditions in the Panama Canal – exacerbated by El Niño and likely intensified by climate change – reduced daily ship transits by one-third, driving up freight costs and delaying shipments worldwide.[35] The COVID-19 pandemic offered a stark reminder of how quickly systemic shocks can cascade across borders. So countries and multinational companies must take a systemic investment lens to resilience investments, as earlier diversification approaches may no longer work.

Some macroeconomic models treat resilience investment as consumption — but this is misguided. These investments protect capital and enable growth, stability, and competitiveness. Leaders who act early – with foresight and solidarity – can turn vulnerability into advantage. By building resilient infrastructure, upgrading public services, protecting watersheds and coastlines, and strengthening social protection systems, they reduce exposure and expand opportunity. There is still a clear need to cut greenhouse emissions – there are limits to the temperature shifts we can adapt to – but building strength and stability now requires the capacity to adapt, recover and thrive. Ultimately, resilience is about capital protection and value creation: it helps families stay healthy and secure, enables countries to protect development gains and fiscal space, and allows businesses to keep operating and innovating in a volatile world.

This is not a story of blind optimism, but of realism to sustain growth and reduce value at risk. Investments in resilience can significantly improve economic outcomes compared with business as usual, but they cannot eliminate the risks from climate change and nature loss. The goal is not to eliminate losses entirely, but to flatten the curve of damage and preserve the core capital stocks that development depends on. By investing in resilience, leaders can navigate towards greater stability and lay the foundation for future prosperity in a rapidly changing world. Thus, they can avoid the risk of vicious cycles of volatility and decline to deliver on national and strategic priorities.

Economic and financial decision-makers have a critical role to play in translating resilience from principle to practice. With the right strategies, they can turn rising risks into real returns — for people, economies, and businesses. The question is not whether to act, but how. The next sections lay out where and how investment is needed, the returns these investments generate, and the tools available to make them happen. From ministries of finance and central banks to insurers, investors, regulators, and philanthropies, the opportunity is now to embed resilience into the heart of economic planning, capital markets, and business strategy — and to seize the full potential of this resilience agenda.

35 *Carbon Brief (2024). 'Drought behind Panama Canal's 2023 shipping disruption 'unlikely' without El Nino*

BOX 1

Integrated climate and nature hazard framework*

Communities, companies, and countries face two types of hazards that cover virtually every sector of an economy:

- **Chronic hazards** — gradual, slow-onset hazards like temperature increases, ecosystem degradation, water stress, and biodiversity loss, which will – if left unaddressed – gradually undermine livelihoods and prosperity over time; and
- **Acute hazards** —sudden, short-term hazards like droughts, wildfires, floods, and storms, that results from immediate physical events or shocks. These can be economically devastating unless communities, companies, and countries invest in resilience to reduce their immediate impacts and accelerate recovery.

In addition to distinct chronic and acute hazards, climate change and nature loss present distinct and compounding challenges. Until recently, most resilience strategies framed risk primarily through the lens of climate change. Nature loss — though urgent — was seen as an environmental or biodiversity issue, not a driver of economic or financial disruption.

That separation no longer holds. Climate and nature hazards are deeply interlinked and mutually reinforcing. Climate change accelerates ecosystem collapse through heat, drought, and shifting rainfall. Nature loss amplifies climate impacts by degrading the very systems — forests, wetlands, reefs — that regulate water, buffer floods, and store carbon.

In the recent paper, *Making the Case for Climate and Nature Resilience Investments: The Need to Revise Growth and Debt Sustainability Frameworks,* the Bridgetown Initiative (2025), presents an integrated climate–nature hazard framework, building on and responding to existing frameworks including UNEP (2024)'s Climate Risk Landscape Report 2024; UNFCC (2023)'s National Adaptation Plans Progress Publication and others. This demonstrates that the vast majority of hazards are driven by the combined effects of climate change and nature loss.

* *Bridgetown Initiative (2025). Making the case for climate and nature resilience investments: the need to revise growth and debt sustainability frameworks.*

	Hazard		Climate[1]	Nature[2]
Chronic	Land	· Soil erosion and soil health decline	✓	✓
		· Land pollution	✓	✓
		· Decline of provisioning services (terrestrial ecosystems)		✓
		· Loss of pollination services		✓
		· Land use change	✓	✓
		· Residual loss of terrestrial biodiversity, habitat and species	✓	✓
	Ocean	· Sea use change	✓	✓
		· Coastal erosion	✓	✓
		· Sea level rise	✓	
		· Decline of provisioning services (marine ecosystems)	✓	✓
		· Ocean acidification	✓	
		· Residual loss of marine biodiversity, habitat and species	✓	✓
	Freshwater	· Reduced flood mitigation	✓	✓
		· Water stress	✓	✓
		· Water pollution and saline intrusion	✓	✓
		· Reduced regulation of water quantity and quality	✓	✓
	Atmosphere	· Temperature increase and variability	✓	
		· Changing wind patterns	✓	
		· Heat stress	✓✓	✓✓
		· Changing precipitation (patterns and types)	✓	✓
		· Air pollution	✓	✓
		· Disrupted regulation of climate, weather and air quality	✓	✓
		· Reduced storm mitigation		

	Hazard		Climate[1]	Nature[2]
Acute	Land	· Residual acute terrestrial nature degradation[3]		✓
		· Mass movement (incl. landslide, avalanche)	✓	✓
		· Snow, glacier and icesheet thawing	✓	
		· Wildfires	✓	✓
		· Droughts	✓	✓
	Ocean	· Residual acute marine nature degradation[3]		✓
	Freshwater	· Floods	✓	✓
	Atmosphere	· Heatwave	✓	✓
		· Cold wave (frost)	✓	✓
		· Storms (incl. tornados, cyclone, hurricanes, typhoons)	✓	✓
		· Heavy precipitation (rain, hail, snow, ice)	✓	✓

1 Driven by climate change
2 Driven by nature loss
3 Man-made or natural acute and sudden ecosystem degradation causing ecosystem services decline

Climate and nature hazards translate into physical risks and economic costs for economic and financial decision-makers.[36] The scale of risk depends not only on the hazard itself, but also on the level of exposure and vulnerability—with exposure referring to the presence of people, assets, infrastructure, and services that could be harmed, and vulnerability to the susceptibility of those systems (whether households, firms, or countries) to be adversely affected.

BOX 2

EMDEs in Focus - Shared Risks, Varied Realities

Climate and nature risks are local — shaped by geography, livelihoods, and institutional capacity. This report often refers to Emerging Markets and Developing Economies (EMDEs). While no two contexts are alike, what unites EMDEs is exposure to high risk – with many dependent on sectors like agriculture, fisheries and tourism – and limited fiscal space to respond. These economies face deeper setbacks and slower recoveries. The overall pattern is stark: compared to high income countries, EMDEs face more than ten times more economic damage (as a share of GDP), recover four times more slowly, and suffer deeper human development impacts due to higher exposure and lower fiscal capacity.[1] Businesses must navigate value chain instability, sometimes fragile infrastructure, and thin financial buffers.

Least developed countries and small island developing states are the worst affected. Sub-Saharan Africa and South Asia are home to the largest numbers of people at high climate risk – nearly 42% of Sub-Saharan Africa's population is highly vulnerable, and 87% of South Asia's population is exposed to climate-related hazards with significant vulnerability.[2]

1 Emerging markets and developing economies (EMDEs) are disproportionately affected by climate-related disasters. Over the past two decades, EMDEs have incurred over $525 billion in direct losses from extreme weather events alone — representing about 20% of their collective GDP, compared to less than 1% for high-income countries (World Bank, 2022; IMF, 2023). Recovery from these shocks is also slower: according to IMF research, countries with lower adaptive capacity can take up to four times longer to return to pre-shock economic trajectories than high-income peers (IMF, Climate Change and Long-Term Growth, 2023; Hallegatte et al., World Bank, 2016)
2 World Bank Group (2023) Counting People Exposed to, Vulnerable to, or at High Risk From Climate Shocks

36 *This report focuses on direct and indirect economic costs of physical climate and nature risks. It does not consider transition risks, that is the risks of direct and indirect loss and damage during the transition to a low-carbon and nature-positive economy.*

2 Resilience is an Investment Agenda

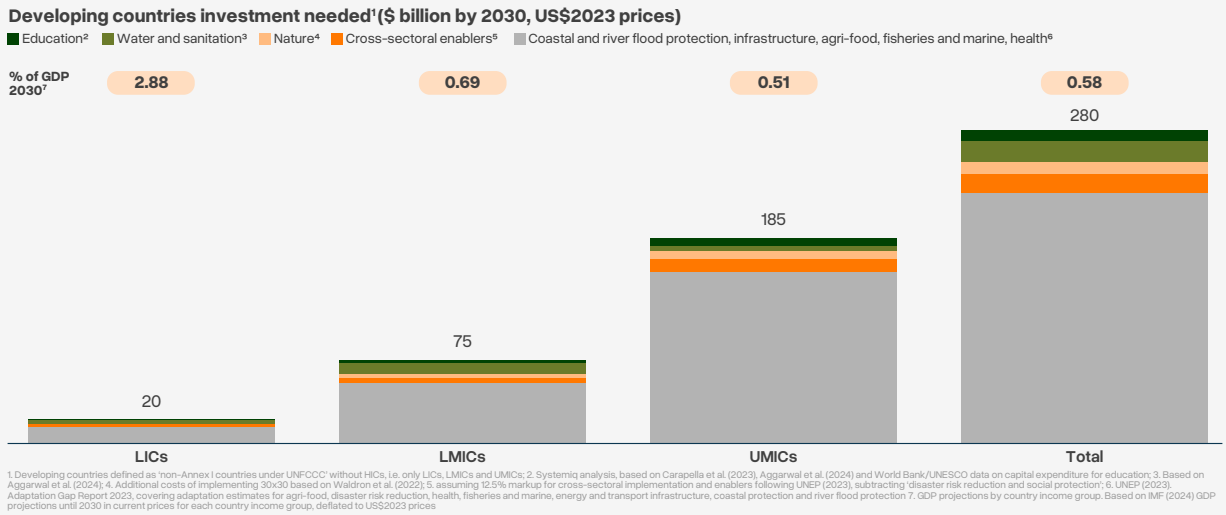
Investments in resilience are increasingly well understood with high returns that protect capital, drive growth, and build stability.

As the World Resources Institute highlights, resilience offers a "triple dividend": it avoids losses, unlocks economic gains, and generates social and environmental benefits.[37] Resilience investments – in health, infrastructure, and nature – are inherently productive.[38] They deliver core services, improve quality of life, and expand opportunity, even in the absence of shocks. Businesses, banks and investors are starting to see resilience as an investment and financing theme.[39] For example, restoring mangroves not only protects coastlines from storms, but also boosts fisheries, supports tourism, and filters water year-round. Low-carbon technologies offer particularly strong returns. As well as slowing climate change — without which there is no long-term resilience — solutions like renewable energy, electric vehicles, and reforestation improve health, stimulate economic growth, strengthen the balance of payments, and reduce inflationary pressure for fossil-fuel-importing countries.

A successful transition must be both low-carbon and shock-proof.

These returns are not theoretical — and they are not confined to isolated success stories. Recent estimates suggest that scaling investment in resilience to around $[280] billion – or 0.58% GDP – per year in EMDEs by 2030, could deliver strong returns for increased strength, stability and competitiveness.[40] See Exhibit 1. This includes practical interventions – from farmers using drought-resistant seeds to neighbourhoods retrofitting schools and clinics. The benefits are not abstract. They are the tangible returns on resilience — visible not only in aggregate figures, but in different ways across the people, economies, and businesses that resilience helps protect and empower.

Exhibit 1: Resilience Investment Need in EMDEs



1. Developing countries defined as 'non-Annex I countries under UNFCCC' without HICs, i.e. only LICs, LMICs and UMICs; 2. Systemiq analysis, based on Carapella et al. (2023), Aggarwal et al. (2024) and World Bank/UNESCO data on capital expenditure for education; 3. Based on Aggarwal et al. (2024); 4. Additional costs of implementing 30x30 based on Waldron et al. (2022); 5. assuming 12.5% markup for cross-sectoral implementation and enablers following UNEP (2023), subtracting 'disaster risk reduction and social protection'; 6. UNEP (2023). Adaptation Gap Report 2023, covering adaptation estimates for agri-food, disaster risk reduction, health, fisheries and marine, energy and transport infrastructure, coastal protection and river flood protection 7. GDP projections by country income group. Based on IMF (2024) GDP projections until 2030 in current prices for each country income group, deflated to US$2023 prices

37 *WRI (2025). Strengthening the Investment Case for Climate Adaptation: A Triple Dividend Approach*
38 *There are a growing number of resilience 'taxonomies' that illustrate what is meant by resilience interventions for public and private actors, including CPI (2024). Adaptation Tracking Taxonomy, the Tailwind Taxonomy for Adaptation and Resilience activities and others.*
39 *WBCSD (2024). The Business Leaders' Guide to Adaptation and Resilience; WEF (2023) Accelerating Business Action on Climate Change Adaptation; Standard Chartered, KPMG, UNDRR (2024) Guide for Adaptation and Resilience Finance*
40 *Bridgetown Analysis (2025). assesses the investments needs for resilience in developing markets by 2030, based on UNEP (2023) Adaptation Gap Report; IMF (2024). Accounting for Climate Risks in Costing the SDGs; Waldron et al. (2022). The Costs of Global Protected Area Expansion. All estimates will be updated by COP30 to 2035 investment need estimates, together with UNEP, IHLEG, IMF and other organizations.*

3 The Returns on Resilience for People, Economies and Businesses

The returns on resilience are multi-dimensional — and context-specific.

For people, resilience reduces vulnerability and improves wellbeing. For governments, resilience investments strengthen growth, fiscal stability, and sovereignty. For businesses, they safeguard value-chains, enhance competitiveness and unlock market opportunities. And for the financial system, they reduce systemic risk and stabilise returns. While the indicators vary — from avoided deaths to jobs created, from GDP gains to credit security — they all reflect tangible, measurable value.

To reflect this, we assess resilience through a shared lens: first, how it mitigates risks, and second, how it unlocks returns. This framing captures both sides of the resilience equation — the costs avoided and the value created — and shows how investing in resilience delivers meaningful benefits across the economy.

For people: development is resilience, and resilience is development.

Resilience investments are human development investments. They reduce exposure to shocks, improve wellbeing, and create the conditions for people to thrive — by protecting health, food security, education, and livelihoods.

Mitigating risks

Without development, households and communities are unable to withstand disruptions and bounce back from shocks. A 10% increase in GDP per capita reduces wellbeing losses from natural disasters by 2.4% and cuts the number falling into extreme poverty by 5%.[41] At the same time, development without resilience is fragile. A new port can be severely damaged by rising sea levels before it has delivered trade revenues; a newly constructed school in a flood-prone area may be inundated before it provides lasting education benefits.

i. Extreme weather is disrupting critical services and livelihoods; in 2024, at least 242 million students in 85 countries experienced disruptions to their education due to extreme weather events like heatwaves, cyclones and floods.[42] These shocks don't just damage schools – they erode long-term prospects.

ii. Climate and nature impacts exacerbate inequalities. Vulnerable groups are often the most exposed to risks and the worst equipped to manage them. Climate-related income losses are up to 70% greater for the poorest 40% of populations.[43] 100 million people in developing countries could fall below the poverty line by 2030 due to climate impacts.[44] Women are particularly exposed to climate and nature impacts, in part because they are more likely than men to have nature-based livelihoods. In Cameroon, women's employment could fall by over 10% when climate policies are not gender sensitive by 2050, due to the impacts of climate change.[45] With every increase in temperature, the prospects of escaping poverty are reduced and inequality solidified.

41 *World Bank (2024). Rising to the challenge. Success stories and strategies for achieving climate adaptation and resilience; Balasubramanian et al. (2023). Does economic growth reduce multidimensional poverty? Evidence from low- and middle-income countries;*
42 *UNICEF (2024). Learning Interrupted: Global Snapshot of Climate Hazards and School Disruption. New York: United Nations Children's Fund*
43 *World Bank (2024). Rising to the challenge: Advancing adaptation and resilience in a changing climate. World Bank*
44 *Global Commission on Adaptation (2019). Adapt Now: A Global Call for Leadership on Climate Resilience. Rotterdam and Washington, DC: Global Center on Adaptation.*
45 *The World Bank (2024). People in a Changing Climate: From Vulnerability to Action*

Unlocking returns for health & livelihoods

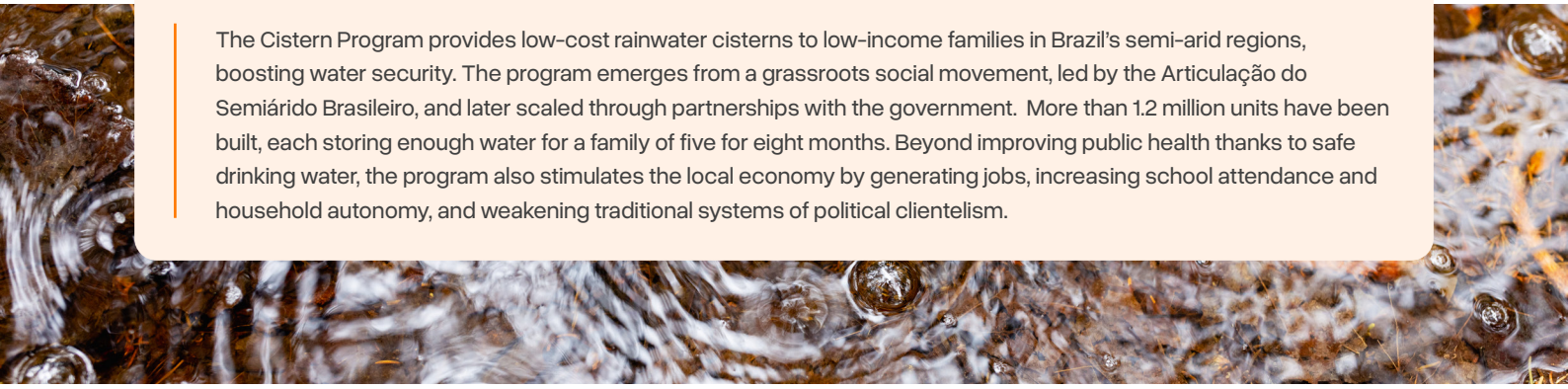
Investing in resilience can mitigate threats to human health and livelihoods. According to a synthesis of analysis conducted for this report, resilient health systems could help to avoid more than [1] million additional deaths per year by 2030, rising to more than [2] million by 2050.[47]

On top of lives saved, these investments strengthen social fabric, improve productivity, and allow communities to break out of cycles of vulnerability and deprivation.

CASE STUDY

Cisterns Deliver Development Returns in Brazil

The Cistern Program provides low-cost rainwater cisterns to low-income families in Brazil's semi-arid regions, boosting water security. The program emerges from a grassroots social movement, led by the Articulação do Semiárido Brasileiro, and later scaled through partnerships with the government. More than 1.2 million units have been built, each storing enough water for a family of five for eight months. Beyond improving public health thanks to safe drinking water, the program also stimulates the local economy by generating jobs, increasing school attendance and household autonomy, and weakening traditional systems of political clientelism.



For national economies: resilience drives inclusive growth and secures stability.

Resilience investments are not consumptive expenditure – they are productive, high multiplier investments that protect long-term value, creating the conditions for investment, national prosperity and jobs. By acting to protect people, advance national prosperity and security in the face of clear risks, a resilient investment agenda enables governments to deliver on their mandate to citizens and maintain popular support. This is achieved by protecting not just financial capital, but also by unlocking positive returns in physical, natural, human and social capital.

Mitigating risks

Resilience reduces risk not only at the macroeconomic level, but also for households, businesses, and local institutions. Without action, climate and nature risks will erode physical, natural, human and social capital.

i. **Human capital:** Loss of life caused by 1.5°C warming could drive labour productivity loss of 2-3% by 2030, equivalent to 80 million full-time jobs and $2.4 trillion in lost GDP[48] – rising significantly with 3°C warming to 18% in low-exposure sectors and 25% in high-exposure sectors.

ii. **Natural capital:** Land-use change, habitat loss, overexploitation and pollution are destroying and eroding natural capital.

Climate change accelerates degradation by intensifying droughts, altering ecosystems, and driving species collapse. This undermines the function of ecosystem services and resources that underpin all sectors of the economy: water, soil and forests, pollination, water purification, and carbon sequestration. Agriculture, manufacturing and water-intensive industries are particularly exposed. For example, in the agriculture sector soil degradation reduces crop yields by up to 50%.[49]

46 Systemiq synthesis 2025. See Technical Annex 4 for further information.
47 Systemic synthesis. See Annex for further detail.
48 International Labour Organization (2019). Working on a warmer planet: The Impact of Heat Stress on Labour Productivity and Decent Work
49 FAO. (2019). Soil erosion: the greatest challenge for sustainable soil management. Global Symposium on Soil Erosion – Key Messages. Food and Agriculture Organization of the United Nations.

iii. **Physical capital:** Climate and nature shocks are destroying or shortening the lifespan of infrastructure, reducing the ability of machinery and production systems to support productive processes and increasing maintenance costs. $275 billion in infrastructure-related losses have been incurred globally over the past five years, with a growing share in middle-income countries where asset exposure is rising faster than resilience investment; only 45% of these losses were insured.[50] This is set to escalate dramatically: climate hazards are projected to cause $560–610 billion in fixed asset losses annually by 2035.[51]

iv. **Social capital:** By destroying foundational assets, disrupting lives and increasing resource scarcity, climate and nature shocks can weaken traditional and informal support systems, reduce social cohesion and erode trust between individuals, households, communities and institutions.[52]

v. **Rising debt and volatility:** For climate vulnerable and low-income countries, as climate risks increase, debt balloons and fiscal buffers erode, deteriorating sovereign creditworthiness.

Creditors and rating agencies see rising debt and reduced capacity to repay. In turn, the cost of capital for climate vulnerable countries increases. Countries with higher climate vulnerability face an average increase of 1.17% in sovereign borrowing costs.[53] This is compounded by an amplified perception of sovereign risk; just a one unit increase in climate vulnerability increases sovereign credit spreads for two-year debt by up to 23% for high-risk countries.[54] In the 50 most climate-vulnerable countries, external debt payments are projected to average at least 15.5% of government revenue in 2024. This is the highest level since records began in 1990.[55] Investment in long-term development—including adaptation and resilience—is squeezed out, without which, future shocks are more damaging. Low-income and vulnerable countries are locked into a cycle of costly recovery, weakened growth and mounting risk.

Unlocking returns

i. **Growth:** Scaling adaptation interventions could secure GDP gains of up to 15% by 2050 versus current policies according to World Bank country-specific research, with the highest gains in SIDS.[56]

ii. **Jobs:** Research is underway to indicate the job-generating potential of investing in resilience.[57] In the meantime, there are indications that resilience interventions have high job multipliers due to a combination of significant investment in labour-intensive sectors like construction and agriculture, particularly labour-intensive activities like regenerative agriculture.

For example, an African Water Facility €86 million ($6.78 million) climate-resilient WASH project in Mali created 850 short-term construction jobs (50% for women) and 100 permanent roles in operations and maintenance.[58] This results in a job multiplier of 140 jobs per million $. African countries involved in the Great Green Wall initiative have projected very strong jobs multipliers – with target jobs per $1 million invested ranging from 665 in Nigeria to 1,375 in Burkina Faso – while improving communities affected by drought and soil erosion.[59]

50 *Swiss Re Institute (2023). In 5 charts: continued high losses from natural catastrophes in 2022.*
51 *World Economic Forum. (2024). Business on the Edge: Building Industry Resilience to Climate Hazards*
52 *SIPRI (2022). The Social Side of Climate Change Adaptation: Reducing Conflict Risk*
53 *Buhr, B., Volz, U., Donovan, C., Kling, G., Lo, Y., Murinde, V., & Pullin, N. (2018). Climate Change and the Cost of Capital in Developing Countries: Assessing the Impact of Climate Risks on Sovereign Borrowing Costs. London: Imperial College London, SOAS University of London, UN Environment.*
54 *Gonzalez et al. (2025). Asymmetric sovereign risk: implications for climate change preparation*
55 *Debt Justice (2024). Debt payments in climate-vulnerable countries: 2024 projections. Debt Justice, May 2024.*
56 *World Bank (2024). People in a changing climate: from vulnerability to action. Insights from World Bank Group Country Climate and Development Reports covering 72 economies. . This report compares the economic benefits of implementing selected adaptation interventions from CCDRs in certain low, low-middle and upper-middle-income on real GDP compared to their 2050 baseline.*
57 *Analysis is on-going to inform a Flagship report on Jobs and Skills for the New Economy, to be launched in November 2025 at COP30. This initiative is funded by GIZ, the Ares Foundation and NDC-P, and prepared by the Word Resources Institute and Systemiq, and with contribution with several other partners including EDC-P, ADB, WBCSD, and LinkedIn*
58 *African Water Facility & African Development Bank (2022). Climate-Change and COVID-19 Resilient Drinking Water Supply and Sanitation Support Project in the Kayes Region and Kati Circle*
59 *UNCCD (2020). The Great Green Wall: Implementation Status and Way Ahead to 2030*

iii. **Stability:** Resilient economies are less exposed to volatility, stabilising balance sheets and preventing fiscal slippage. A 10-point improvement in a country's Notre Dame Global Adaptation Initiative (ND-GAIN) score is linked to a 37.5 basis point reduction in sovereign bond spreads. Combined with well-designed fiscal policies, economies can free up fiscal space to respond to future shocks and/ or invest in development, empowering countries to meet their essential needs and drive long-term growth.

iv. **Strength and Sovereignty:** Protecting and expanding critical domestic assets (such as freshwater, forests, coastlines) bolsters sovereignty and security by enhancing an economy's position in international trade systems and reducing the risk that climate and nature shocks spillover into conflict and population instability. For example, Singapore's water resilience strategy has enabled it to meet 40% of its water needs independently, safeguarding from supply shocks and securing essential resources. Resilience investments are strategic investments in state capacity and sovereignty.

CASE STUDY

Resilient Development: Emerging Models, Real Returns

Many countries are already adapting, particularly the most vulnerable, though not always through a "climate" or "adaptation" lens. Instead, resilience often emerges through efforts in food security, supply chain management, or disaster preparedness. While there are no perfect examples of resilience and many struggle with contradictory policies, these examples provide evidence that investing in resilience delivers strong returns for drive growth, stability and competitiveness.

While global institutions are only beginning to respond, many emerging and developing economies have long treated resilience as a development necessity. **Barbados** has embedded natural disaster clauses in its sovereign debt restructuring;[60] **Bangladesh** has developed one of the world's most extensive community-based early warning systems;[61] and **Vietnam** is integrating climate risk into its public investment planning.[62] These countries are not waiting to be told that resilience is development — they are showing what it looks like in practice. Their leadership must be recognised as central to the global agenda, not peripheral to it.

Major economies are also demonstrating how strategic foresight can yield real returns. Singapore has consistently invested heavily in resilience to protect and enhance its position as a global logistics and innovation hub, strengthening its geostrategic position. This approach has included investments in coastal defences; urban cooling strategies, such as increased green cover to protect against extreme heat; and integrated water management systems to manage both extreme rainfall and prolonged dry weather. Costa Rica's shift from deforestation to a thriving conservation-based economy shows how protecting natural capital can enhance a country's productive base and deliver development gains. Brazil is beginning to stake out a leadership role in the bioeconomy — using its extraordinary biodiversity and natural capital base to develop new industries in low-carbon food systems, pharmaceuticals, and regenerative agriculture.

60 *Government of Barbados (2022). Debt restructuring included natural disaster clauses, providing fiscal space in the event of climate shocks. See IMF (2022), Barbados: Staff Report for the 2022 Article IV Consultation.*
61 *International Federation of Red Cross and Red Crescent Societies (2021). Bangladesh Early Warning Systems: Good Practice Country Case Study.*
62 *UNDP (2021). Climate Public Expenditure and Investment Review (CPEIR) in Vietnam.*

For businesses: resilience is competitiveness

Resilience investments are a strategic advantage for a large and growing share of the private sector. They protect value chains, reduce downtime, stabilise operations, and enable companies to outperform competitors in a changing risk environment.

Mitigating risks

Climate change and nature shocks destabilise value-chains and pose fundamental threats to company operations, assets and profitability. Without adaptation, the world's largest companies (S&P Global 1200) are projected to face $885 billion in total annual costs from physical climate risk in the 2030s, and $1.2 trillion in the 2050s.[63] This includes asset losses of up to $560–610 billion per year by 2035, with estimated knock-on effects of 6.6–7.3% declines in company earnings, and up to 24% in highly exposed sectors like telecommunications and utilities.[64]

Acute shocks that damage infrastructure increase capital expenditure (for repair and replacement) and cause productivity standstills, interrupted operations and workforce displacement, reducing output. In 2024, reductions in West African cocoa yields due to heavy rainfall and severe droughts caused cocoa prices to surge 300% compared to 2023.[65] Chronic stresses such as heat stress diminish labour output. Growing macroeconomic instability resulting from these stresses dampens demand and increases uncertainty and financial risk.

Unlocking returns

i. **Value creation:** Greater resilience safeguards value chains, stabilises operations, and opens new revenue streams. A number of corporations report that the case for adaptation investment is stronger than for mitigation, as it addresses near-term, direct impacts and threats to revenues. McCain Foods, a multinational food company, saw potato yields in New Zealand increase by 25% after adopting regenerative practices to reverse stagnating yields and build long-term resilience.[66] A $4 million investment in adaptation enabled AstraZeneca to avoid potential manufacturing interruption of up to eight weeks, worth $2.5 billion in potential output, at a manufacturing plant in Sweden.[67] Ratings agencies are starting to recognise and reward the value of resilience. In March 2025, Moody's upgraded PG&E Corporation and its Pacific Gas & Electric Subsidiary, citing the firm's "continued improvement in mitigating wildfire risk" among other factors.[68]

ii. **Market opportunity:** The demand for resilience solutions is expanding rapidly. BCG and Temasek estimate that global demand for adaptation and resilience solutions will reach $500 billion to $1.3 trillion by 2030.[69] Businesses leading in these solutions — from climate-resilient infrastructure to heat-adapted materials and water efficiency — are already opening new markets and strengthening their competitive edge.

63 *S&P Global Sustainable1 (2025, March 10). For the World's Largest Companies, Climate Physical Risks Have a $1.2 Trillion Annual Price tag by the 2050s.*
64 *Ibid*
65 *Reuters. "Cocoa prices rocket to record highs due to supply woes." Reuters, 26 March 2024.*
66 *SAI Platform (October 2024). "A Global Framework for Regenerative Agriculture" case study: "Average potato yields have increased by 25% compared to the 2000–2023 averages"*
67 *WBCSD (2024). The Business Leaders' Guide to Climate Adaptation and Resilience*
68 *Utility Dive (2025). 'Moody's upgrades PG&E on reduced credit risks from wildfires. Available at: https://www.utilitydive.com/news/moodys-upgrades-pge-pacific-gas-credit-wildfire/743811/*
69 *BCG & Temasek (2025). The Private Equity Opportunity in Climate Adaptation and Resilience*

Across these sectors, interdependence remains a fact – and can be an asset. Interdependence is a structural reality of the 21st century economy. The globalisation of trade, finance and value-chains has heightened exposure to systemic risks.

Failure to recognise the transfer of risks in a globalised economy has caused this vulnerability to be inadequately managed historically. Equally, Oxford research estimates that global supply chain disruptions cost the economy around US $1.9 trillion in 2021. In the UK, shipping costs rose more than 400% in less than a year as COVID-19-related labour shortages and surging demand caused bottlenecks at ports across Europe and Asia.[70] Yet at the same time, interdependence offers a form of insurance: distributing production, capital and innovation across geographies reduces the likelihood that a single shock causes existential collapse.

Delaying action wastes money: the cost of inaction is far greater than investing in resilience now. Climate and nature shocks have already cost the 68 economies in the V20 $525 billion over the last 20 years.* The world's largest private health companies could lose $31 billion annually by 2050 due to climate change and nature loss, with extreme heat representing 70% of the total.[71] Impacts cascade across borders, affecting inflation, value chains, debt, and trade. By contrast, making infrastructure more resilient in low- and middle-income countries—across power, transport, and water and sanitation—would raise total infrastructure investment needs by just 3%.[72]

70 *Oxford Martin School, University of Oxford (2023). Food System Disruption: Global Risks and UK Resilience. Estimates based on 2021 shipping data and macroeconomic modelling. See also: UK Department for Environment, Food & Rural Affairs, UK Food Security Report 2022.*

71 *S&P Global Sustainable1. (2025, March 10). For the world's largest companies, climate physical risks have a $1.2 trillion annual price tag by the 2050s.*

72 *World Bank (2019). Lifelines: The Resilient Infrastructure Opportunity*

* *V20 (April 2024) 'V20 Views on the NCQG on CF on post-2025*

3 Financing resilience

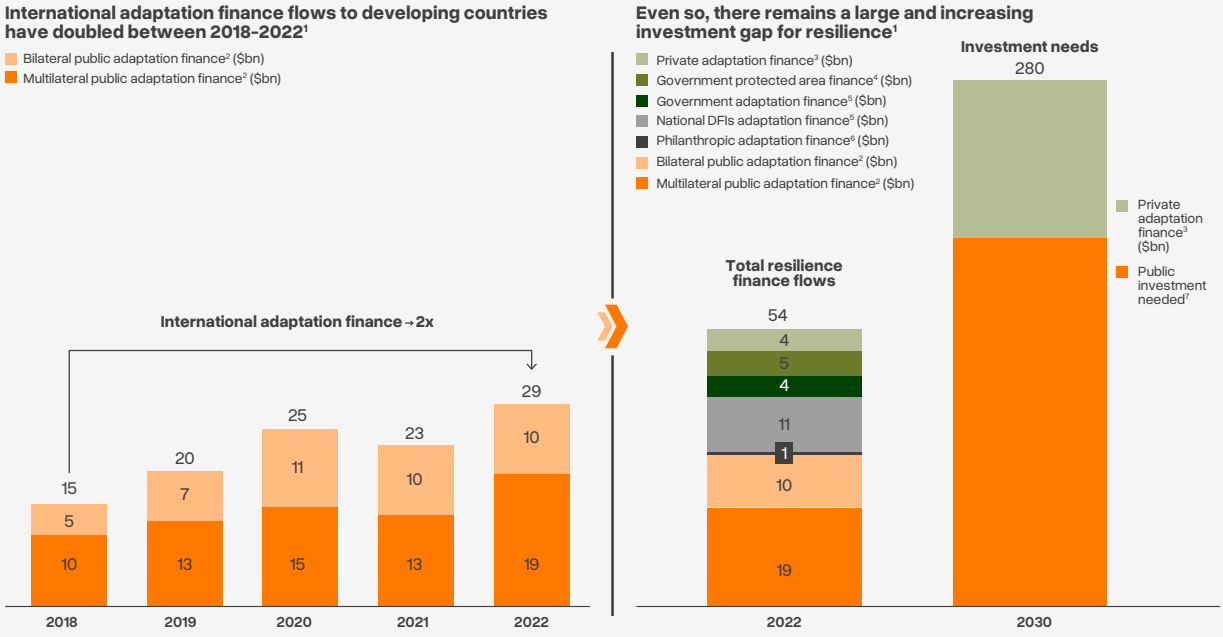
Finance is the thread that runs through each of these stories: whether enabling families to recover, governments to invest, or businesses to adapt, the financial system determines what gets built, what gets protected, and who is left exposed.

Yet today, most financial models fail to recognise the true value of resilience. The breadth and depth of climate and nature risks – and their erosion of economic and business foundations - already constitute a systemic financial threat. Yet, currently our systems are not set up to reflect this. For every $1 spent on climate-resilient infrastructure, $87 is spent on infrastructure that ignores resilience entirely. This is not only inefficient—it signals a major market failure. The problem is not simply a lack of finance — it is the misallocation of finance.

Risk-adjusted models underweight investments that reduce exposure, preserve value, and stabilise returns. As a result, resilience remains chronically undervalued and underfunded — despite its growing strategic relevance.

Resilience finance is a $[280] billion per year economic lifeline that hardly anyone is using.[73] Currently, $[54] billion flows into investments in climate resilience each year — just one-fifth of what's needed.

Exhibit 2: The Resilience Finance Gap Is Large and Set To Grow



1. Developing countries defined as 'non-Annex I countries under UNFCCC' without HICs, i.e. only LICs, LMICs and UMICs. All estimates are in US$2023 prices; 2. Bilateral and multilateral funding based on UNEP (2024)'s adoption of OECD data; 3. Based on CPI (2024) global number, trimmed down to developing countries; 4. Based on public spending on terrestrial and marine protected areas in developing countries in 2022, author's assumptions based on data from Waldron et al. (2022); 5. Government and DFI funding based on CPI (2024). National DFI numbers based on 2023 as calculations for 2022 were inflated based on assumptions for the China Development Bank, that were corrected in 2023; 6. Based on ClimateWorks (2023) estimates; 7. Public/private split of 70/30% based on intervention-specific methodology that is demonstrated in later slide

Sources: Systemiq Synthesis

73 *Systemiq synthesis 2025. See Technical Annex 4 for further information.*

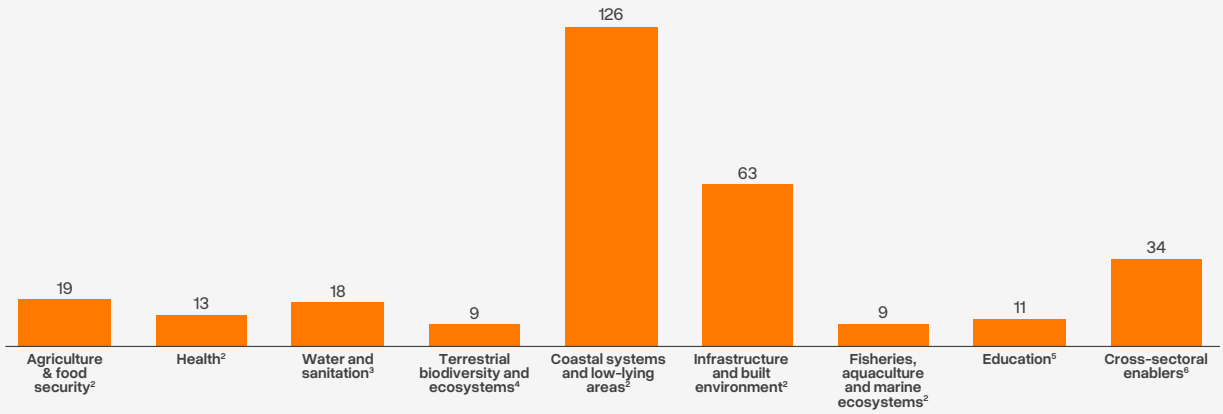
A suite of interventions across sectors, including agriculture, health, infrastructure and water, can help to build resilience.

For example, in the health sector, this includes interventions to treat climate and nature-related health issues (such as disease detection, vaccines and heat alert schemes) and interventions to build the resilience of the health system itself (such as resilient health buildings and equipment). Exhibit 3 below outlines the investment needs split across sectors and priority interventions for the health sector. Ahead of COP30, we will build out the list of health interventions and other sectors, to indicate where finance should be directed.

Among sectoral interventions, new analysis by the Boston Consulting Group (BCG) highlights 15 solution areas across food, water, health, infrastructure and communities that can deliver transformative impacts, particularly in developing countries. Solutions range from measures that enhance food security through resilient production practices, securing adequate water supply, protecting health and strengthening health systems, fortifying infrastructure, and strengthening preparedness.

Exhibit 3: Resilience Investment Needs across Sectors[74]

Investments needed in Non-Annex 1 countries[1] ($ billion by 2030, US$2023 prices)



1. This includes also 24 'high-income countries' according to the World Bank classifications, as sector totals for all non Annex I countries were only available from UNEP (2023); 2) UNEP (2023). Adaptation Gap Report 2023, covering adaptation estimates for agri-food, disaster risk reduction, health, fisheries and marine, agriculture, infrastructure, river floods; 3.Based on IMF (2024). Accounting for climate risks in costing the Sustainable Development Goals ; 4) Additional costs of implementing 30x30 based on Waldron et al. (2022); 5) Systemiq analysis, based on Carapella et al. (2023), IMF (2024) and World Bank/UNESCO data on capital expenditure for education; 6. Assuming 12.5% markup for cross-sectoral enablers and program implementation following UNEP (2023) and incorporating 'disaster risk reduction and social protection.

Infrastructure | Targeted interventions | Enablers | Insurance

	Type Of Intervention	Interventions[1]
Health		· Disease detection, surveillance and control systems
		· Vaccines, medical products and technology for climate-sensitive diseases
		· Heat mitigation and heat-alert schemes
		· Health sector response to respiratory health issues
		· Health sector response to malnutrition and exposure to hazards
		· Targeted measures to improve mental and psychosocial health
		· Emergency health services
		· Climate and nature-health information, surveillance and early warning systems
		· Health workforce training
		· Resilient health infrastructure (including buildings, equipment, IT)
		· Resilient healthcare supply chains

1. Out of scope: response to (i) water stress; (ii) malnutrition; (iii) interventionsmitigating direct exposure to hazards (e.g. floods, storms) that are outside of the health sector, such as coastal protection.

74 *UNEP's 2023 Adaptation Gap Report estimates sectoral adaptation investment needs across all 155 non-Annex I countries. This group includes 24 high-income countries, so the sector-level totals here reflect the full non-Annex I cohort. As a result, the aggregate adaptation investment need here reaches $300 billion by 2030.*

Public finance will need to do the heavy lifting with careful targeting for greatest impact. Of the $[280] billion needed per year, $[196] billion could come from public sources.[75] This is based on estimates of the potential split between public and private financing from UNEP and the Independent High Level Expert Group, which range from 65 – 80% public versus 20 – 35% private.[76]

The private sector plays a critical role in resilience investment. An estimated $[84] billion can come from private investment based on a 30% split, especially in commercially viable sectors like infrastructure, agri-food, and water. Resilience investments offer investors and financiers credit security, a growing investment theme, and a frontier for new financial products.

For lenders and investors, resilience investments can protect collateral value, stabilise loan performance and preserve the investability of assets. A US study of homes built to wind-resilient codes found 50% lower mortgage-delinquency rates after hurricanes compared to pre-code homes.[77]

As demand for resilience grows, resilient solutions providers are becoming an investment theme. BCG identifies six high-potential sub-sectors for private market investors, each with multi-billion dollar markets and double-digit growth rates, including climate intelligence, flood-defence solutions and climate-adapted agricultural inputs.[78]

As for public markets, MSCI, the Global Adaptation and Resilience Investment Working Group (GARI) and the Lightsmith Group have identified an 800-company listed investable universe that spans industrials to pharmaceuticals and tech, 28% of which are listed in EMDEs.[79]

The insurance sector has the mandate and opportunity to contribute more. Insurance is a powerful but underused lever to close the climate finance gap in vulnerable countries and increase resilience investments. It has a unique role not only as providers of risk transfer solutions but also as long-term investors (holding a third of the world's AUM, approximately $40 trillion), and as experts in risk insights. Insurance has the potential to unlock $100–200 billion in climate finance annually for EMDEs, by de-risking resilient infrastructure, expanding the lending capacity of financial institutions and enabling blended finance structures.[80] A recent example, is the Insurance Development Forum's Infrastructure Resilience Development Fund (IRDF), which uses a credit enhancement structure to match insurers' investment requirements to mobilise capital from the sector.[80]

To build long-term resilience, economic and financial decision-makers can take individual action to account for climate and nature risks — and to embed the benefits of resilience investments into strategic and operational decision-making.

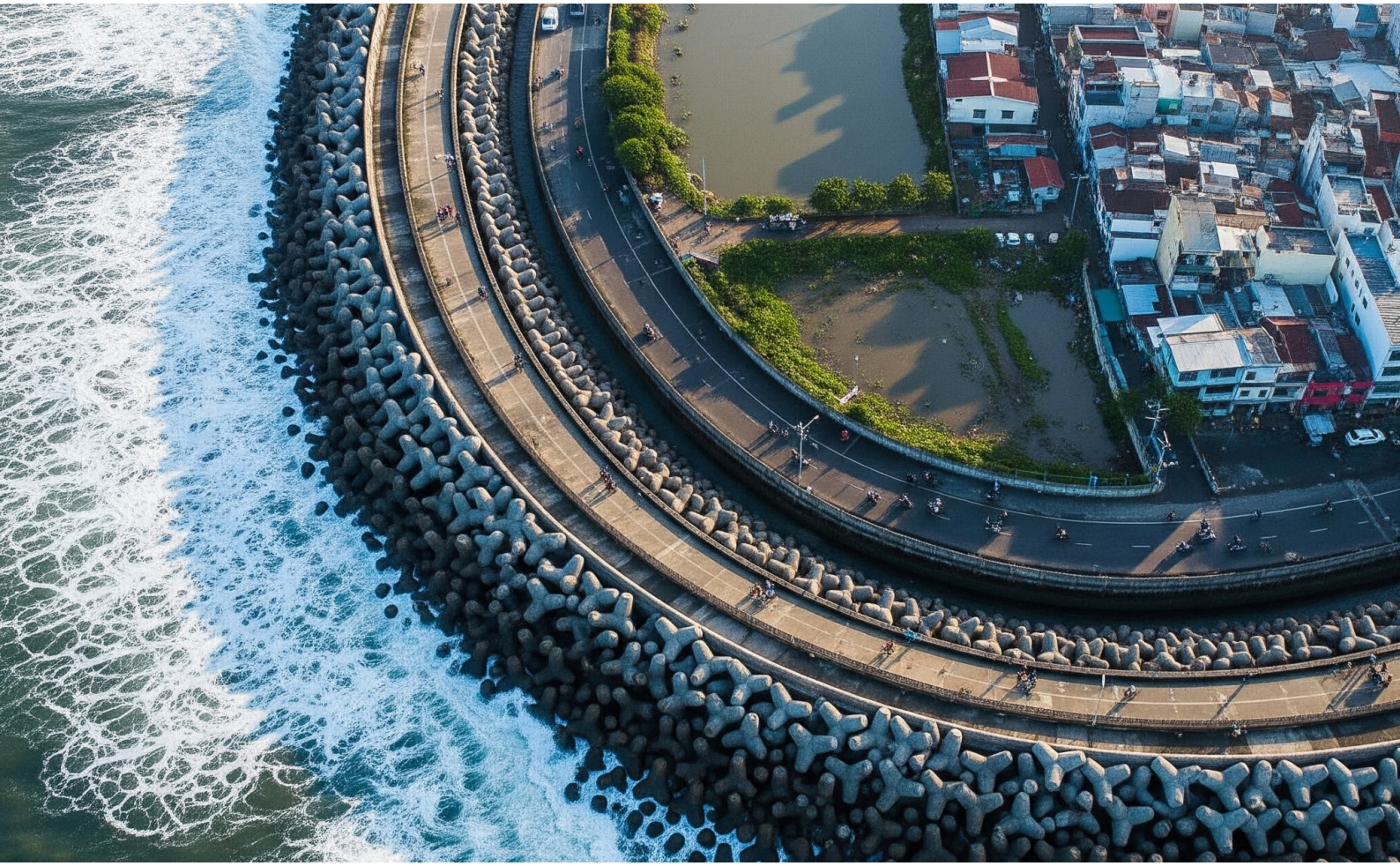
75 *Systemiq synthesis 2025. See Technical Annex 4 for further information.*
76 *UNEP's Adaptation Gap Report (2023). identifies around one-third of adaptation finance as typically sourced from the private sector. IHLEG (2024), in both Raising Ambition and Accelerating Delivery of Climate Finance and The State of Delivery: Progress Report of the Global Climate Finance Agenda, estimates that 60–65% of total climate and nature finance can be publicly financed, with 35–40% possibly coming from private sources.*
77 *Insurance Institute for Business & Home Safety and CoreLogic (2023). Joint Study*
78 *BCG, Temasek, Ecosperity (2025). The Private Equity Opportunity in Climate Adaptation and Resilience*
79 *Global Adaptation and Resilience Investment Working Group (GARI), MSCI Sustainability Institute, The Lightsmith Group, Bezos Earth Fund, and ClimateWorks Foundation. The Unavoidable Opportunity: Investing in the Growing Market for Climate Resilience Solutions. March 2024.*
80 *Insurance Development Forum (IDF), Bridgetown Initiative (2025). From Risk to Resilience: How Insurance Can Mobilise Disaster Finance and Climate Investment in Vulnerable Economies.*

There are growing examples of policymakers, central bankers, business leaders, investors and development finance actors driving action in these areas. Yet there is an urgent opportunity to scale action. A recent survey of 59 Ministries of Finance by the Coalition of Finance Ministries found that, while 90% of respondents across country income groups identify climate-related physical shocks as threats to GDP, public finances and debt sustainability, only one in three view climate action as part of their core mandate.[81] In the private sector, only 5% of businesses assess impact and less than 1% understand their dependencies on nature.[82]

By integrating climate and nature risks into national planning, regulatory frameworks and investment strategies, countries can better protect long-term prosperity and catalyse growth.

Reforms such as those to financial regulation, land-use and planning laws and infrastructure codes can create the conditions for investors and financiers to act differently – directing capital toward future-proof, resilient assets. States and provinces, as well as cities and smaller communities in rural and urban areas, play a vital role in deploying these measures on the ground. Annex 2 provides an overview of priority actions across stakeholder groups.[83]

However, scaling action requires more than isolated effort. COP30 offers an opportunity to kick-start efforts to tackle systemic barriers that constrain progress, through coordinated, cross-sectoral initiatives that align incentives, unlock investment, and embed resilience across the international financial architecture.



81 *Coalition of Finance Ministers for Climate Action (2025). A Global Survey of Ministries of Finance: The pressing policy questions Ministries of Finance face in driving green and resilient transitions and their use of analytical tools to address them. Report for the HP4 initiative 'Economic Analysis for Green and Resilient Transitions'*

82 *World Benchmarking Alliance Nature Benchmark (2024).*

83 *Reports informing recommendations include: WBCSD, 2024. Business Leaders Guide to Climate Adaptation and Resilience; WEF, 2023. Accelerating Business Action on Climate Change Adaptation; Tailwind Climate, 2024; GARI, BCG and USAID, 2023, From Risk to Reward; Systemiq, 2024. Integrating Climate Adaptation and Natural Capital into Macroeconomic Frameworks and Debt Sustainability; NGFS, 2024. Synthesis report on the greening of the financial system; Insurance Development Forum and Bridgetown Initiative, 2025. From Risk to Resilience (forthcoming).*

4 A Breakthrough Agenda to COP30

With its unprecedented focus on adaptation and resilience, COP30 presents a unique opportunity to scale interventions that drive growth and development.

The Fourth Letter from the Presidency outlined the axes of the Action Agenda, to put into practice what has been collectively agreed. This provides a critical channel to advance the resilience investment agenda. There is an opportunity to use the COP30 moment to bring together partners across sectors and deliver initiatives that meet three prioritisation criteria. (1) The initiative must have systemic global impact, with particular relevance for countries and populations that are vulnerable to climate change and nature loss. (2) It must be scalable and capable of attracting private capital. (3) It must be actionable, with a clear pathway to delivery and impact.

Based on stakeholder consultation, a suite of breakthrough actions with political and technical momentum is materialising. These are outlined below. Exhibit 4 maps the Breakthrough Actions in terms of where returns are greatest for people, economies, business and the finance system, and how they align with the COP30 Action Agenda thematic axes. We are continuing to engage with individuals and organisations to crowd-source additional ideas and identify where momentum is strongest. We welcome feedback and suggestions around this initial list. See Annex 3 for full descriptions of each idea.

Policy, governance and planning

- **A global initiative to integrate climate and nature resilience investments into macro-fiscal frameworks and growth projections:** by COP30, this initiative will host practical tools and shared methodologies, grounded in country-led experience, and will drive coordinated engagement with key institutions – including the IMF and World Bank – to inform and influence the ongoing review of the Low-Income Country Debt Sustainability Framework (LIC-DSF).
- **'Resilience for Growth' Country Platforms:** at COP30, a global network of EMDE finance ministries, planning commissions and national institutions is launched to support peer learning, shape a shared solutions hub, and guide the development of on-demand tools and technical assistance.
- **Spatial planning for climate and nature resilience:** at COP30, a global support network is launched that equips countries to develop national spatial plans for climate, nature and sustainable development; integrating resilience and physical risks into national policies and strategies (for example nationally determined contributions (NDCs), national biodiversity strategies and action plans (NBSAPs), and national development plans).

84 *The High-Level Panel on Closing the Crisis Protection Gap – a group of 20 leaders from across sectors and geographies – called for an increase in pre-arranged finance from 2% to 20% as part of the Crisis Protection 2.0: Future-Proofing Our World report, released January 2025.*

Finance and risk instruments

- **Mandate pre-arranged finance for disaster responses:** at COP30, a global commitment is made that by 2030 at least 20% of international crisis financing should be pre-arranged, and to align funders, multilateral development banks (MDBs) and development finance institutions (DFIs), and support countries in integrating pre-arranged finance into their fiscal and disaster response strategies. This builds on calls made by the High-Level Panel on Closing the Crisis Protection Gap.[84]
- **Protection gap scores for resilience:** a global commitment to develop and apply protection gap scores is launched at COP30.
- **Put nature on the balance sheet:** by COP30, leading companies across sectors and geographies recognize natural capital in financial accounts and profit and loss statements.
- **The Investors Resilience Challenge:** DFI members of the Adaptation and Resilience Investors Collaborative (ARIC), supported by a secretariat housed within UNEP Finance Initiative are aligning on a common framework for increasing standardisation across origination and mobilisation of private capital for adaptation and resilience investments.

Measurements, Standards and Data Infrastructure

- **Physical risk data:** a new coalition of tech companies, scientific institutions, and philanthropies will be launched at COP30 and work together to make high-resolution, auditable, and decision-ready physical risk data available for public use. This includes building common standards, aligning scientific models with risk frameworks, and developing open protocols for spatial and sector-specific risk insights. These efforts must include interoperable, open-access data systems that enable governments, businesses, and communities to anticipate risk and design targeted interventions.
- **Integrated Resilience Typology:** by COP30, research institutions, finance initiatives and standards bodies have worked together to integrate taxonomies for investments in resilience and adaptation to produce a synthesised public-private resilience taxonomy.
- **AI-driven resilient city strategies:** global program is launched at COP30 to equip cities with AI-tools and training to develop integrated responses to build resilience and programming on how to use the tools, supported by multi-donor structure.

Sector-specific breakthroughs

- **Sustainable regeneration planning for agriculture:** at COP30, partners announce plans to scale 'Agricultural Regeneration Plans' and pilots developed by Fondazione CMCC - Centro Euro-Mediterraneo sui Cambiamenti Climatici and partners, that support sustainable regeneration planning for agriculture, promoting sustainable practices and climate-resilient crops.

Exhibit 4: Mapping the Breakthrough Actions – Returns and Alignment with Action Agenda

Breakthrough Actions	Who captures the returns?				Alignment with Action Agenda Axes					
	People	Economies	Business	Financial System	Energy, Industry, Transport	Forests, Oceans, Biodiversity	Agriculture & Food Systems	Resilience for Cities, Infrastruc -ture, Water	Human & Social Develop -ment	Enablers and accelerators – Finance, Technology, Capacity Building
Integrating climate and nature resilience investments into growth projections, the debt sustainability analysis (DSA) and macro-fiscal frameworks										
'Resilience for Growth' Country Platforms										
Spatial planning for climate and nature resilience										
Mandate pre-arranged finance for disaster response										
Protection gap scores for resilience										
Put nature on the balance sheet										
The Investors Resilience Challenge										
Accessible Physical Risk Data										
Integrated Resilience Typology										
Artificial Intelligence (AI) -driven resilient city strategies										
Sustainable regeneration planning for agriculture										