The role of the private sector in climate adaptation

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Prepared for International Chamber of Commerce (ICC)

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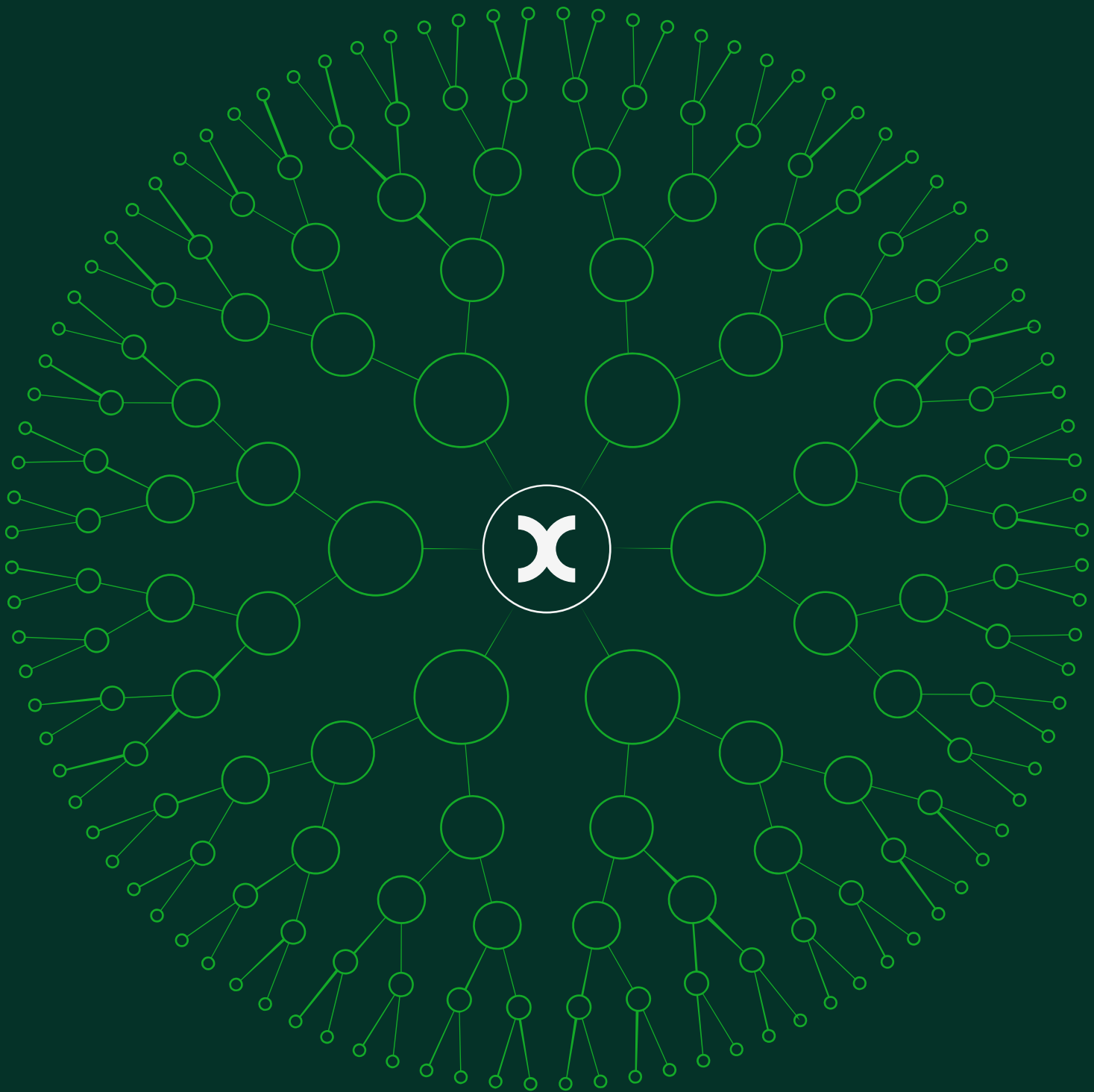

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Foreword

Philippe Varin – Chair, International Chamber of Commerce

Our report with Oxera last year showed climate change is already driving major productivity losses, costing the global economy over $2 trillion in the past decade.[1] Recent floods in the US and Europe exposed critical gaps in disaster preparedness – even in advanced economies – while developing countries face far greater vulnerability, limited resources, and a growing adaptation finance gap.

ICC commissioned this new report from Oxera for COP30 to address a critical challenge that until today remains largely absent from global debate: how to unlock urgent private capital for climate adaptation and resilience, particularly in the regions that need it most.

We know that public resources alone cannot meet the scale of the challenge. This presents a clear opportunity for the private sector to step up – working hand in hand with governments to deliver the innovation and investment needed to build adaptation and resilience at scale.

Yet private sector engagement in adaptation remains held back by serious barriers: poor access to high-quality climate risk data, inconsistent metrics to track impact, weak regulatory incentives, and a lack of the financial infrastructure needed to scale solutions like resilience bonds and climate adaptation insurance.

Overcoming these roadblocks will require targeted, coordinated action from governments, regulators, and financial institutions. This report sets out a clear path forward – practical solutions to unlock private investment, remove structural roadblocks, and turn adaptation into a viable and scalable business proposition.

With key negotiations on adaptation due to take place at COP30, now is the time to bring these ideas to the forefront and define a bold, actionable policy agenda on how to enhance climate resilience globally.

This is not only about managing risk. It is also a growth opportunity: investments in climate resilience can deliver strong returns, open new

[1] Oxera (2024), 'The economic cost of extreme weather events', 7 November

markets, and drive innovation across sectors – provided the right policy frameworks and incentives in place.

The time to act is now.

Executive summary

Climate change is no longer a future threat—it is a present-day challenge that is reshaping economies, ecosystems, and societies around the world. As the frequency and severity of climate-related events escalate, there is a growing consensus that mitigation alone is insufficient; adaptation must play a central role in securing resilience. Yet, despite increasing recognition of the need to invest in adaptation, global efforts remain fragmented and underfunded—especially in developing countries, where vulnerability is highest and financial capacity is lowest.

Recognising this critical gap, International Chamber of Commerce (ICC) commissioned Oxera to assess how the private sector's role in climate adaptation can be strengthened and scaled. The report is intended to inform ICC's advocacy as the official UNFCCC Focal Point for Business and Industry in the lead-up to COP30 in Belém, Brazil, where adaptation is expected to be a central theme, both in the negotiations, particularly around indicators to track collective progress under the Global Goal on Adaptation (GGA), and in the solutions featured through the COP30 Presidency's Action Agenda. ICC will draw on this work to engage with negotiators and governments, highlighting concrete policy steps that can unlock private investment and finance at scale.

Private sector engagement in climate adaptation is gaining recognition, but significant potential remains untapped due to structural barriers—ranging from inadequate climate risk data and lack of clear incentives, to underdeveloped financial markets and institutional capacity. As governments lay the groundwork, scaling adaptation solutions will increasingly depend on private capital and innovation across sectors like energy and transport infrastructure, agriculture, and urban planning.

To scale private sector involvement in climate adaptation, the report sets out three strategic priorities for public policy and international cooperation:

1 Strengthen climate risk information and transparency

- Governments should build and mandate access to high-quality, open climate risk data, enabling better risk assessments and adaptation planning.
- Financial regulators and international standards bodies should continue progress to standardise adaptation taxonomies and

success metrics, making adaptation outcomes measurable and investable.
- Financial regulators should mandate proportionate climate risk disclosures for both direct operations and supply chains, that catalyse informed decision-making across financial markets.

2 Establish enabling institutions and regulatory incentives

- Governments should embed private sector roles into National Adaptation Plans, including through procurement policies that reward climate-resilient infrastructure and business practices.
- Competition authorities should create regulatory sandboxes and clarify antitrust exemptions for sustainability collaborations, encouraging pro-competitive adaptation partnerships.
- Financial regulators should align financial regulation with climate risk, enabling lower capital charges for climate-resilient assets and adjusting credit scoring to reflect physical risk reductions.

3 Scale adaptation finance with innovative instruments

- Multilateral development banks and development finance institutions should work with financial and insurance actors to expand use of blended finance, resilience bonds, and insurance-linked mechanisms to de-risk and attract private capital.
- Governments and financial intermediaries should create structured vehicles for adaptation bonds, underpinned by clear metrics and repayment models tied to avoided losses or beneficiary payments.
- Governments and regulators should leverage data, expertise, and risk-modelling capabilities from insurers and reinsurers to map climate risk geographically and establish formal public–private partnerships to proactively prevent coverage retreat and drive resilience upgrades in high-risk areas.

At COP30 in Belém, ICC will draw on these recommendations to advocate for a global policy shift: one that enables the private sector to be an active partner in building a climate-resilient future. This requires targeted reforms in data, governance, and finance—supported by strong public–private collaboration.

Aligning private incentives with public resilience goals is key to closing the adaptation gap and unlocking the full potential of the private sector as a force for climate resilience worldwide.

Acknowledgements

We would like to express our sincere thanks to all those who contributed to the successful completion of this report. In particular, we are grateful to Sandra Hanni, Head of Climate Policy, and Sophie Talarico, Policy Manager Climate, from ICC for their ongoing collaboration throughout the development of this work.

This report draws on valuable insights gathered through interviews and a series of workshops designed to explore the topic with industry experts. We would especially like to acknowledge the contributions of the following stakeholders who generously shared their expertise:

- Alexander Kennedy, Managing Director, Head of Sustainable Finance Solutions, Standard Chartered
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- Jordi Gual, Board Advisor at Oxera, Professor of Economics at IESE Business School and a Research Fellow at the Centre for Economic Policy Research (CEPR)
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- Owen Bethell, Environmental Impact Lead Global Public Affairs, Nestle
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- Thomas Tayler, Head of International Sustainability Policy Advocacy, Aviva

Their input has been instrumental in shaping the findings and recommendations presented in this report.

1 Introduction

Climate change presents a growing threat to societies worldwide, manifesting in both acute weather-related events such as extreme heatwaves, droughts, storms, flooding, or wildfires, and chronic changes such as rising sea levels and sustained shifts in temperature and precipitation patterns. These risks are becoming more frequent and severe, leaving populations, infrastructure, and economies increasingly vulnerable to disruption, particularly in developing countries. As global temperatures continue to rise and some degree of climate change becomes unavoidable, there is a growing consensus that adaptation to this new climate reality is not only necessary, but urgent.[2]

> To avoid mounting losses, urgent accelerated action is required to adapt to climate change while making rapid, deep cuts in greenhouse gas emissions to limit warming so that we keep the range and scope of adaptation options as wide as possible.
>
> **International Panel on Climate Change (IPCC) Sixth Assessment Report**[3]

Climate adaptation requires a wide range of investments and interventions from both governments and the private sector to strengthen the resilience of human and natural systems to climate-related risks. Building resilience demands both anticipatory and responsive strategies across sectors—from agriculture and infrastructure to public health and urban planning. There is growing recognition of the need for greater adaptation investment and the critical role of the private sector. While international public adaptation finance to developing countries rose from US$22bn in 2021 to $28bn in 2022—the largest annual increase since the Paris Agreement—even fulfilling the Glasgow Climate Pact's pledge to double adaptation finance by 2025 would only reduce the global adaptation finance gap for developing countries—between US$208-388 billion annually—by 5%.[4] While governments across the world have played an important foundational role in driving climate adaptation—such as through both

[2] IPCC (2023), 'Sixth Assessment Report – Working Group II overarching Frequently Asked Questions and Answers', 16 June.
[3] Ibid, p. 3.
[4] United Nations Environment Programme (2024), 'Adaptation Gap Report 2024', 7 November, p. XI and p. 49 *Note 13*

direct public investment and the creation of enabling regulatory frameworks—public resources alone are insufficient to close the adaptation gap. Given the sheer scale and complexity of the challenge, systemic adaptation will require a coordinated effort that draws on the resources, innovation, and expertise of both the public and private sectors.

In this context, International Chamber of Commerce (ICC) have commissioned Oxera to explore how the private sector's role in climate adaptation can be strengthened and scaled —particularly by identifying potential enabling government policies and financial and insurance models that can attract and facilitate greater private investment in adaptation. The study is intended to support ICC in their role as the official Focal Point for Business and Industry within the United Nations Framework Convention for Climate Change (UNFCCC) in the lead-up to the COP30 Climate Summit in Belém, Brazil, in November 2025. Adaptation will be a central priority for the Brazilian COP30 Presidency, which will seek meaningful progress in negotiations on global indicators to track adaptation efforts, as well as practical solutions from the international community in this area.

ICC will use the findings of this study to shape its advocacy messages ahead of COP30 in Belém, where it will call on governments and business leaders to take targeted action that can unlock the level of private sector involvement needed to meet the climate adaptation challenge. Recognising that climate adaptation is a complex and wide-ranging challenge—requiring coordinated action across international and domestic levels, and between public and private actors—the report sets out a set of priority recommendations targeted primarily to governments and regulators designed to inform international dialogue and support the development of practical, scalable solutions. Although adaptation needs are global, contexts and capacities for action vary significantly across countries and industries. Accordingly, these recommendations are as specific and practical as possible but remain deliberately high level to help shape priorities. Further detailed work will be necessary in policy design and implementation to tailor adaptation strategies effectively to specific national and sectoral circumstances.

The report draws on a comprehensive review of the literature, synthesising existing evidence on the barriers and enablers of private sector investment in adaptation. This is complemented by insights gathered through interviews and workshops with a broad range of stakeholders—including multinational companies that are adapting their operations and supply chains, and financial institutions such as banks and insurers that are investing in or financing climate resilience.

Together, these inputs help identify where private sector action is most needed and how it can be most effectively enabled to inform our recommendations. The report also features selected case studies highlighting climate adaptation actions and enabling interventions by the private sector around the world. As part of its recently launched *Climate Opportunity* campaign, ICC will be gathering further success stories and experiences from businesses exploring climate adaptation as a business opportunity.[5]

The report is structured as follows.

- **Section 2** outlines the global landscape for climate adaptation and the respective roles of the public and private sectors. It then focuses on the private sector's role in greater depth for the remainder of the report.
- **Section 3** sets out the key barriers to private sector adaptation, organised by thematic area.
- **Section 4** presents a framework, the policy options to unlock private investment in adaptation and priority recommendations.
- **Section 5** provides conclusions.

[5] ICC, 'Global insights: what if we saw the climate challenge differently', accessed 9 July 2025.

2 Landscape of climate adaptation

There is a growing and urgent need for greater action on climate adaptation, as the impacts of climate change are already being felt across communities and economies, which need to become more resilient to the impacts of climate change.

Box 2.1 Understanding adaptation, resilience, and mitigation

The IPCC defines adaptation, resilience, and mitigation as follows.

Adaptation refers to ex-ante adjustments in ecological, social or economic systems in response to actual or expected climatic stimuli and their effects. It refers to changes in processes, practices and structures to moderate potential damages or to benefit from opportunities associated with climate change.

Resilience is the ex post capacity of social, economic, and environmental systems to cope with hazardous events or disturbances, while maintaining their essential functions, structures, and identity.

Both adaptation and resilience concepts are central to enabling societies to manage the escalating risks posed by climate change and are used interchangeably in this report.

Mitigation is human intervention to reduce emissions or enhance the sinks of greenhouse gases.

Source: IPCC (2023), 'Synthesis Report of the Sixth Assessment Report: Annex I', pp. 120 and 126.

As the impacts of climate change intensify, adaptation will be an essential pillar in the global response. Complementary to mitigation, which aims to reduce emissions and limit future climate change, adaptation is about adjusting to the reality of a changing climate—managing both current and anticipated risks. From rising sea levels and

heatwaves to more frequent storms and droughts, these challenges are no longer hypothetical; they are already reshaping lives, economies, and ecosystems around the world. In this context, climate adaptation plays a vital role in building resilience—especially as some degree of climate change is now unavoidable. This section sets out:

- the role and importance of climate adaptation;
- the state of climate adaptation in terms of planning, implementation and financing; and
- the role of the private sector in climate adaptation.

These are explored in turn.

2.1 Role and importance of climate adaptation

As temperature thresholds set to limit global warming are increasingly exceeded, adaptation becomes not only necessary but also more costly.[6] Higher levels of warming and emissions leads to more frequent and severe climate-related incidents, creating a greater need for adaptive measures to reduce loss and damage.[7]

A global study carried out by Oxera for ICC quantifies a subset of the economic costs of climate-related extreme weather events.[8]

The study, analysing nearly 4,000 events across six continents from 2014 to 2023, estimates economic losses to be US$2trn in 2023 prices. It reports that around 1.6 billion people were directly affected during this period. In just 2022 and 2023 alone, extreme weather events caused US$451bn in damage to physical assets and human capital, a 19% increase compared to the annual average from the preceding eight years. The findings highlight that, without stronger climate action, the economic toll of such events will persist and is likely to grow.

Much international focus has been on financing adaptation in developing economies, due to the combination of their high exposure to extreme weather events and more limited financial resources. Germanwatch's 2025 Climate Risk Index shows that, over the long term, extreme weather events' impacts particularly affect Global South

[6] The Paris Climate Agreement sets the global goal of limiting the rise in average temperature to well below two degrees Celsius above pre-industrial levels, while pursuing efforts to limit it to 1.5 degrees Celsius. Source: UNFCCC (2015), 'Paris Agreement', December, Article 2 1.(a)
[7] Tol, R.S.J. (2005), 'Adaptation and mitigation: trade-offs in substance and methods', *Environmental Science & Policy*, December, **8**:6, pp. 572–578.
[8] Oxera (2024), 'The economic cost of extreme weather events', 7 November

countries.[9] Floods in Pakistan during 2022 inundated one-third of the country, leading to estimated economic damages and loss of over US$30bn.[10] In 2023, tropical cyclone Freddy affected 1.18 million people and caused US$1.5bn in damages in Mozambique.[11] Combining measures of both vulnerability and readiness, the Notre Dame Global Adaptation Initiative finds that all of the 60 least-prepared countries for climate change are within the low income development group.[12] Historical quantification of the absolute economic costs of extreme weather in low- and middle-income countries is constrained by significant data gaps and by the comparatively low market value of their physical assets. Accordingly, while recorded monetary losses are largest in high-income economies, the most severe social and human consequences are likely borne by developing countries.[13]

However, recent events in Europe, North America and other high-income regions demonstrate that developed countries are also vulnerable. In 2024, Europe experienced both extreme flooding and wildfires, including floods in Valencia that caused over €10bn in damage.[14] In 2022, Europe experienced the worst drought in 500 years, affecting more than two-thirds of EU countries, while disrupting agricultural production and hydroelectric power generation.[15] The European Climate Risk Assessment (EUCRA) warns that, without stronger adaptation measures, hundreds of thousands of deaths from heatwaves could occur each year, and economic losses from coastal flooding alone could surpass €1trn per year.[16] In North America, wildfires around Los Angeles in January 2025 have caused estimated economic losses between US$250 to $275bn, surpassing the damage estimates for the entire 2020 wildfire

[9] Among the ten countries most affected by extreme climate events between 1993–2022, there are three small island developing states/least developed countries, and five lower middle-income countries.
[10] Note that 'damage and loss constitute the effects of the crisis […] Damage is defined as direct costs of destroyed or damaged physical assets. It is valued in monetary terms with costs estimated based on replacing or repairing physical assets and infrastructure, considering the replacement price prevailing before the crisis. Loss is defined as changes in economic flows resulting from the disaster and valued in monetary terms,' World Bank (2022), 'Pakistan Floods 2022: Post-Disaster Needs Assessment', October, p. 14.
[11] World Bank (2025), 'Project paper on a proposed contingent emergency response project (CERP) to the republic of Mozambique', 23 January, p. 1
[12] The research calculates a preparedness index, known as ND-Gain, by assessing the difference between climate vulnerability and climate readiness. Vulnerability measures the exposure, sensitivity, and adaptive capacity of an economy to climate hazards. Readiness considers a country's ability to leverage investments to adaptation actions. Source: Chen, C., Noble, I., Hellmann, J., Coffee, J., Murillo, M. and Chawla, N. (2022) 'University of Notre Dame Global Adaptation Index', University of Notre Dame.
[13] Oxera (2024), 'The economic cost of extreme weather events', 7 November
[14] Aguado, J. (2024),' Economic impact of floods in Spain could rise to over 10 bln euros', Reuters, 5 November, accessed 5 May 2025.
[15] European Commission (2022),'Droughts in Europe: Current Situation the worst in 500 years,' accessed 17 April 2024.
[16] European Environment Agency (2024), 'European Climate Risk Assessment,' January, p. 11

season.[17] The Central Texas floods of July 2025 resulted in estimated economic losses of US $18–22 billion, and are considered among the most severe inland flooding events in the United States in nearly fifty years, both in terms of human impact and financial cost.[18]

Investments in climate adaptation are important to enhance the resilience of societies, economies, and ecosystems. They help safeguard development gains, protect lives and livelihoods, and maintain economic and social stability. Yet despite growing recognition of its importance, adaptation continues to receive a smaller share of climate finance than mitigation. While this report does not attempt to prescribe an ideal balance between adaptation and mitigation, it acknowledges the indispensable role of both. Despite the increasing recognition of its importance, funding flows for adaptation remain insufficient, limiting the capacity of nations and businesses to prepare for and respond to climate-related hazards.[19]

Adaptation can be understood through multiple lenses, each offering varied opportunities for investment and policy engagement. The UN Office for Disaster Risk Reduction (UNDRR) Guide for Adaptation and Resilience Finance identifies seven thematic areas that present investible pathways for adaptation:[20]

- **Agrifood systems**—Enhancing the resilience of agriculture and food supply chains is critical, given their sensitivity to temperature shifts, water availability, and extreme weather events.
- **Infrastructure**—Investing in the resilience of transport networks, energy systems, and the built environment ensures that essential services continue to function under climate stress.
- **Nature and biodiversity**—Protecting and restoring ecosystems contributes to natural resilience, offering co-benefits such as carbon sequestration and flood mitigation.
- **Industry and commerce**—Industrial processes, supply chains, financial systems, and commercial operations must adapt to withstand physical climate risks and ensure long-term sustainability.
- **Cities**—Urban areas face heightened exposure to heatwaves, flooding, and infrastructure strain; adaptation strategies at the municipal level are therefore vital.

[17] Danielle, M. (2025), 'AccuWeather estimates more than $250 billion in damages and economic loss from LA Wildfires', Accuweather, 13 January, accessed 5 June 2025.
[18] Accuweather (2025), 'Independence Day flash flood tragedy in Texas causes an estimated $18 billion to $22 billion in total damage and economic loss', 7 July, accessed 18 July 2025
[19] United Nations Environment Programme (2024), 'Adaptation Gap Report 2024', 7 November.
[20] United Nations Office for Disaster Risk Reduction, Standard Chartered, KPMG (2024),'Guide for Adaptation and Resilience Finance', April, p. 15

- **Health**—Public health systems must prepare for climate-related risks, including increased incidence of heat stress, vector-borne diseases, and air pollution.
- **Societies**—Strengthening social resilience, governance, and equity is key to ensuring that adaptation efforts are inclusive, locally appropriate, and sustainable.

Given the uncertainty around the timing and scale of future climate impacts, adaptation alone cannot eliminate all risks. As a result, the role of insurance remains critical in managing residual risks and providing financial protection for both businesses and the public.

Together these findings point to the importance for immediate, coordinated, and adequately financed adaptation strategies. Given the increasing frequency and severity of climate-related impacts, adaptation is becoming an increasingly important area of focus for policy development and investment planning, as discussed in the next subsection.

2.2 The state of climate adaptation planning, implementation and financing

Over the past two decades, there has been steady progress in the development of national climate adaptation plans and strategies.

171 countries—representing approximately 87% of nations—have established at least one adaptation planning instrument, such as a national policy, strategy, or action plan.[21]

These instruments are intended to support efforts to reduce vulnerability and enhance resilience to the impacts of climate change.

Within the EU, adaptation policy and coordination continue to evolve. While many Member States have developed national adaptation strategies, the lack of binding requirements for measurable targets limits consistency and comparability across countries. A 2023 European Commission report acknowledges progress but stresses the need for stronger implementation.[22]

Building on the 2024 EUCRA, the European Commission issued the EU Communication on Managing Climate Risks, which highlights the need for improved coordination across governance levels. A central focus of the strategy is the Climate-ADAPT platform, which facilitates knowledge

[21] United Nations Environment Programme (2024), 'Adaptation Gap Report 2024', 7 November, p. 12.
[22] European Commission (2023), 'Report on the Implementation of the EU strategy on adaptation to climate change,' Commission Staff Working Document, 24 October.

sharing across Member States.[23] However, the scale and pace of implementation remain under scrutiny, with growing recognition that adaptation efforts must accelerate to match the scale of the climate threat. It emphasises the role of localised data and calls for integrating adaptation into existing policy frameworks—particularly in sectors like infrastructure and land use planning. Despite the availability of platforms like Climate-ADAPT, activity remains uneven, and some Member States still face challenges translating plans into action.

The variability in progress towards adaptation planning can also be seen elsewhere across Asia and Africa. For example, as of March 2025, out of nine Asian markets analysed,[24] only Thailand has submitted a National Adaptation Plan to the UNFCCC.[25] Only four out of the nine markets have developed physical climate risk platforms,[26] and three of the largest Asian economies—China, Japan, and Korea—do not have mandatory corporate disclosure of climate-related risks.[27] Multinational companies headquartered in these markets may nonetheless undertake voluntary sustainability reporting, or reporting against international standards for their subsidiaries.

Similarly, across Africa, only seven countries have finalised and submitted their National Adaptation Plans in East and Southern Africa.[28] A recent analysis of these plans determined that only 40% of those National Adaptation Plans submitted provided consistent links between climate risk assessment, planning, implementation, and tracking, while no document provided fully robust indicators to operationalise tracking.[29] While the development of adaptation plans is heterogeneous,

[23] European Commission (2021),'Forging a climate-resilient Europe – the new EU Strategy on Adaptation to Climate Change,' Communication from the Commission to the European Parliament, 24 February
[24] This included China, Hong Kong SAR, India, Indonesia, Japan, Korea, Malaysia, Singapore, and Thailand.
[25] Asia Investor Group on Climate Change (2025), 'Financing Asia's National Adaptation Plans', March p. 18.
[26] Hong Kong SAR, Indonesia, Japan, and Korea. Source: Asia Investor Group on Climate Change (2025), 'Financing Asia's National Adaptation Plans', March p. 23.
[27] Asia Investor Group on Climate Change (2025), 'Financing Asia's National Adaptation Plans', March, p. 24.
[28] These countries are Ethiopia, Kenya, Mozambique, South Africa, South Sudan, Zambia, and Zimbabwe. Source: UNFCCC (2025), 'Prioritizing National Adaptation Plans in East and Southern Africa', 22 January.
[29] Nowak, A.C., Njuguna, L., Ramirez-Villegas, J., Reidsma, P., Crumpler, K. and Rosenstock, T.S. (2024), 'Opportunities to strengthen Africa's efforts to track national-level climate adaptation', *Nature Climate Change*, **14**, pp. 876–882.

there is progress being made and scope to leverage the existing good practices from countries with more sophisticated adaptation plans.[30]

While the expansion of adaptation planning represents a positive development, the implementation progress has been mixed.[31] Many countries continue to face challenges in translating adaptation plans into concrete actions. In light of increasing climate-related risks, there is ongoing discussion around the need to strengthen the scale and scope of adaptation measures.

On 23 July 2025, the International Court of Justice gave a landmark advisory opinion on the obligations of States in respect of climate change.[32] While it is too early to understand the full impacts of the judgement, it could bring increased focus and activity from nations on both their mitigation and adaptation efforts.

Adaptation finance is a key issue because climate impacts are escalating, and investing in adaptation today can significantly reduce future losses. However, governments and companies, especially in developing economies, often lack the upfront capital needed for these long-term investments, making external finance essential for bridging the gap.

There is currently a large and persistent gap between the estimated global adaptation finance needs and actual financial flows.

The estimated annual funding gap for adaptation in developing countries is between US$203bn and US$388bn (using 2022 prices).[33] The financing requirements in high-income countries are less well documented. For example, only 16% of high-income countries have submitted adaptation finance needs to the United Nations Environment

[30] African countries with the highest scoring adaptation plans in coverage (comprehensive coverage of elements including define climate hazards and vulnerable systems), consistency (between planning, implementation, monitoring, evaluation, and learning), and robustness (satisfies SMART+ criteria (specific, measurable, assigned data sources, relevant, time-bound, and having clear targets) include Madagascar, Burkina Faso, South Africa, and Cameroon. Source: Nowak, A.C., Njuguna, L., Ramirez-Villegas, J., Reidsma, P., Crumpler, K. and Rosenstock, T.S. (2024), 'Opportunities to strengthen Africa's efforts to track national-level climate adaptation', *Nature Climate Change*, **14**, pp. 876–882, analysis p. 3

[31] United Nations Environment Programme (2024), 'Adaptation Gap Report 2024', 7 November, p. 12 pp. 26-39

[32] International Court of Justice (2025), 'Obligations of states in respect of climate change', Advisory opinion, 23 July.

[33] United Nations Environment Programme (2024), 'Adaptation Gap Report 2024', 7 November, p. 12 p. 49 *Note 13*

Programme (UNEP), making it difficult to fully assess the global funding landscape.[34]

Despite progress on international climate financing, adaptation flows continue to lag mitigation flows. Estimates from the Climate Policy Initiative's *Global Landscape of Climate Finance*, which tracks both private and public adaptation flows in developed and developing economies, found that between 2018 and 2022, total mitigation financing grew by 20% each year to reach US$1.3trn in 2022.[35] Over the same time period, adaptation financing grew at a similar rate of 21% per year; however, because it started from a much lower level, it is only US$76bn as of 2022.[36] While the private sector has now come to take a predominant role in financing 54% of overall mitigation flows, the public sector, including national governments and multilateral institutions, has provided the majority of adaptation finance flows (92%).[37]

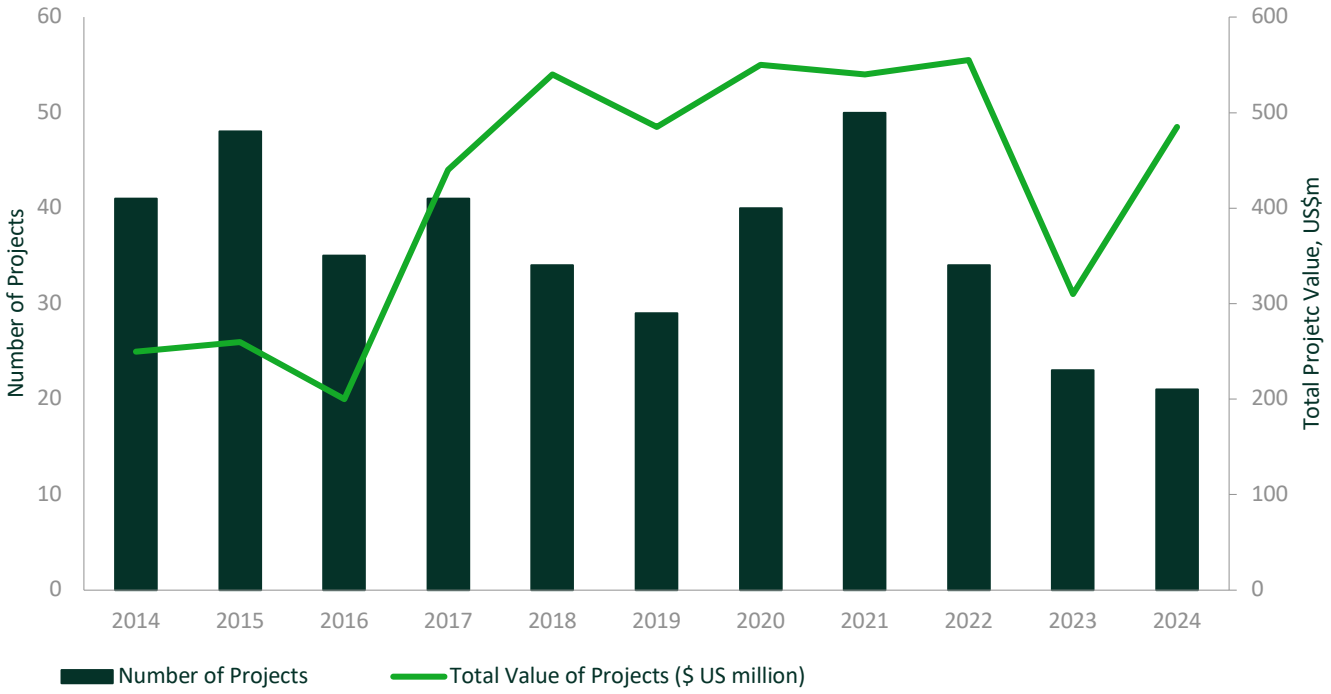
This adaptation funding gap is particularly acute in developing countries. Only 28% of the US$115.9bn in climate-related finance mobilised by developed countries for developing countries in 2022 was directed toward adaptation, with the remainder focused on mitigation (60%) or cross-cutting adaptation and mitigation outcomes (12%).[38] Although the COP29 summit resulted in a landmark agreement to raise US$1.3trn in climate finance,[39] it did not specify the proportion that would be earmarked for adaptation. While mitigation finance is of vital importance, it is also apparent that as key mitigation targets become less likely to be reached, the importance of there being sufficient finance for climate adaptation will increase.[40]

The track record of achieving public sector adaptation finance goals more recently, between 2022 and 2024, has been mixed; the Adaptation Fund received only US$133m of its US$300m target at COP29.[41] Over the

[34] International Monetary Fund (2024), 'Unlocking Adaptation Finance in Emerging Market and Developing Economies,' IMF Staff Climate Notes, November, p. 8.
[35] Climate Policy Initiative (2024), 'Global Landscape of Climate Finance', October, p.3
[36] Climate Policy Initiative (2024), 'Global Landscape of Climate Finance', October, p.4
[37] Climate Policy Initiative (2024), 'Global Landscape of Climate Finance', October, p. 3-4. Public funding includes funding from national governments, national development finance institute (DFIs), multilateral DFIs, bilateral DFIs, multilateral climate funds, state-owned financial institutions, and State-owned enterprises. Furthermore, information on climate adaptation finance from public domestic budgets and the private sector remains opaque, so these figures could underestimate the total flow of adaptation financing whilst overestimating the role of the public sector in providing this adaptation finance.
[38] OECD (2024), 'Climate Finance Provided and Mobilised by Developed Countries in 2013-2022' p. 9
[39] UNFCC (2024), 'COP29 UN Climate Conference Agrees to Triple Finance to Developing Countries, Protecting Lives and Livelihoods', accessed 17 April 2024
[40] Frankhauser, S. (2017), 'Adaptation to Climate Change', *Annual Review of Climate Economics*, **9**, pp. 209-230
[41] De Pietro, L. (2025), 'Adaptation Fund's Inclusion in Key COP29 Decisions Raises Promise for 2025 and Beyond for Vulnerable Countries', *Adaptation Fund*, accessed 4 February 2025

long run, the number of grant-financed projects conducted under the multilateral climate funds that support the implementation of the Paris Agreement—the Adaptation Fund, Green Climate Fund (GCF), and Global Environment Facility (GEF)—is also decreasing. A peak of 50 projects were started in 2021, yet only 23 were started in 2023. While the average size of each project has increased over time, their total value has levelled off at just under US$500m per year.[42] This is captured in Figure 2.1 below.

Figure 2.1 Grant-based adaptation projects under the Paris Agreement Climate Funds



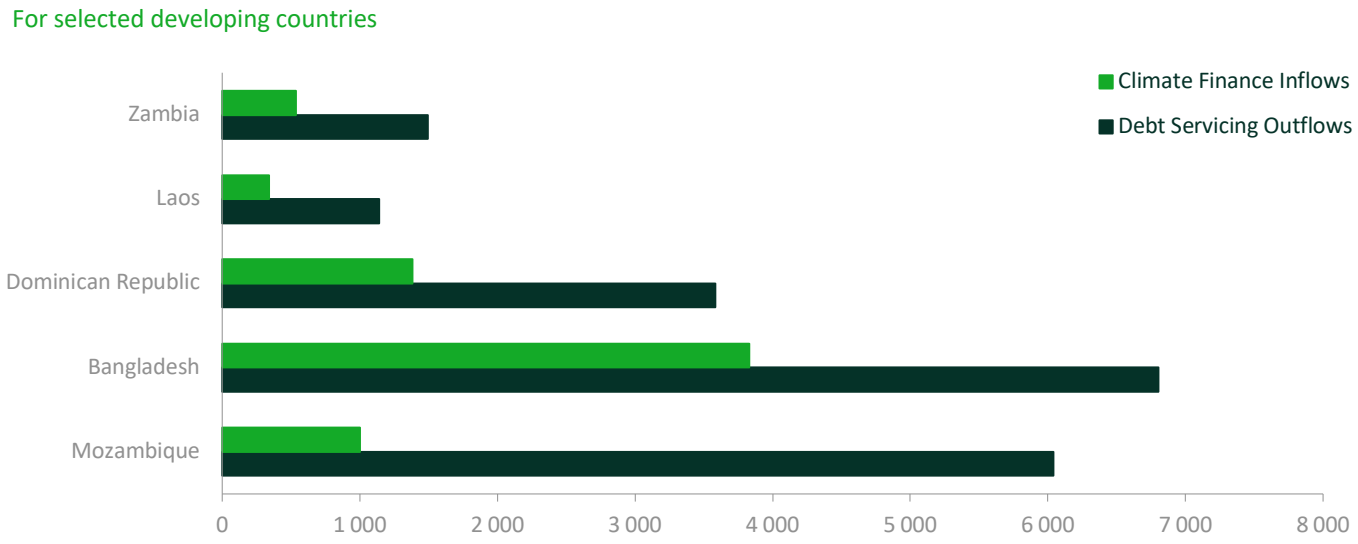
Source: Oxera analysis, based on United Nations Environment Programme (2024), 'Adaptation Gap Report 2024', 7 November.

Further, the majority of public finance flows have been in the form of debt, rather than grants, increasing debt-burdens for developing countries and reducing long-term fiscal headspace to finance adaptation projects.[43] Indeed, in 2022 interest payments on foreign debt of small island developing states (SIDs) and less economically developed countries (LEDCs) amounted to US$59bn, more than twice

[42] United Nations Environment Programme (2024), 'Adaptation Gap Report 2024', 7 November, p. 27
[43] United Nations Environment Programme (2024), 'Adaptation Gap Report 2024', 7 November, p. XIV

the US$28bn they received in climate finance.[44] This is shown in Figure 2.2 below.

Figure 2.2 Climate inflow and debt-servicing payments for developing countries



Source: Oxera analysis, based on International Institute for Environment and Development (2024), 'World's least developed countries spend twice as much as they receive in climate finance', 16 October.

Addressing the challenges of climate adaptation requires significant effort from and collaboration among all stakeholders. Governments and regulators have a crucial role in setting policy, providing public infrastructure, and ensuring resilience at a national and local level but—given the scale and complexity of climate risks—creating enabling conditions for greater action and involvement from the private sector is also critical.

2.3 Bridging the gap—the role of the private sector in climate adaptation

Meeting the growing challenge of climate change will require a significant scaling up of adaptation measures, underpinned by a more strategic and coordinated approach to investment. As climate risks intensify and become more complex, adaptation responses will need to be accelerated. In particular, mobilising private capital is essential to

[44] International Institute for Environment and Development (2024),'World's least developed countries spend twice as much as they receive in climate finance', 16 October.

accelerate adaptation efforts; however, the private sector also plays a key role in enabling adaptation more holistically, as this subsection will explore.

Historically, the public sector has led the development and implementation of climate adaptation strategies, since many, but not all, adaptation projects are what economists call 'public goods'. Because public goods, such as street lighting, are available for everyone to use, private firms typically lack the incentive to provide them which results in what's called a 'market failure'. As such, government intervention is often necessary, not only to ensure their provision, but also to establish the right incentives that encourage their effective delivery. Many climate adaptation measures—such as flood defence, early warning systems or climate-resilient infrastructure—exhibit these same characteristics, and public sector involvement is essential for their delivery, because the market will not provide them itself. National and local governments have played a central role in establishing regulatory frameworks, developing national adaptation plans, and funding essential climate adaptation. Examples of public sector projects include the Delta Programme in the Netherlands—an infrastructure project designed to manage flood risk and secure the supply of fresh water.[45] Among developing economies, Bangladesh's Coastal Embankment Improvement Project also aims to protect the country from tidal flooding and frequent storm surges.[46]

However, the resources and capabilities of the public sector alone will not be sufficient to address the full range of adaptation needs, particularly in sectors where private actors are central to service delivery, investment, or innovation. There is thus an increasing recognition of the important role that the private sector can play in supporting climate adaptation. Private entities are directly exposed to physical climate risks through their operations, assets, supply chains, and customer bases, and therefore have a strong interest in managing and reducing these risks.

Data from the 2024 S&P Global Corporate Sustainability Assessment shows that approximately 35% of companies have disclosed an adaptation plan.[47] However, sectoral variability is significant. Industries with a high reliance of physical infrastructure have been more proactive in submitting adaptation plans: utilities lead at 58%, with real estate following at 42%.[48] Communication services (28%) and healthcare (25%), sectors which have historically faced less exposure to climate

[45] Delta Commissioner, Ministry of Information and Water Management, Ministry of Agriculture, Fisheries, Food Security and Nature, and Ministry of Housing and Spatial Planning (2024),'Delta Programme 2025 | Towards a new balance in the living environment: room to live with water – Outlines,' September

[46] World Bank Independent Evaluation Group (2024), 'Implementation Completion Report for Coastal Embankment Improvement Project (P128276)',.

[47] Hall, L., Macfarland, M. and Munday, P. (2025), 'Climate costs are rising, but few companies have an adaptation plan', S&P Global Ratings, 4 March, accessed 5 June 2025.

[48] Hall, L., Macfarland, M. and Munday, P. (2025), 'Climate costs are rising, but few companies have an adaptation plan', S&P Global Ratings, 4 March, accessed 5 June 2025.

risk, lag behind, despite the risk that vulnerability rises over time, absent adaptation.[49] In addition, the private sector can contribute to adaptation of both private and publicly owned assets through financing, technology development, risk assessment, and service delivery. In this way they are both 'beneficiaries' and 'enablers' of climate adaptation.

It is estimated that approximately one third of the global adaptation finance gap lies in sectors that are typically financed or operated by private entities.[50] These include commercial agriculture, water supply, and critical infrastructure such as transport and energy networks. Mobilising private finance in these areas will be key to addressing existing shortfalls and ensuring that adaptation measures are scaled appropriately. The respective roles of the public and private sectors in climate adaptation can be understood in terms of both who enables adaptation—via financing, information-sharing, or incentivising investment—and the type of asset being adapted, whether publicly or privately owned. This distinction provides a useful framework for analysing the potential for and barriers to private sector involvement in adaptation. This is summarised in Table 2.1 below, with an example of a typical activity involved in each component.

[49] For example, 'Hospitals in major coastal cities may need to adapt to rising sea levels and more severe storms. Internet and cloud computing firms that rely on infrastructure such as server facilities must contend with heat waves that can interrupt operations and raise cooling costs'. Source: Hall, L., Macfarland, M. and Munday, P. (2025), 'Climate costs are rising, but few companies have an adaptation plan', S&P Global Ratings, 4 March, accessed 5 June 2025.
[50] United Nations Environment Programme (2024), 'Adaptation Gap Report 2024', 7 November, pp. 12, 55-56

Table 2.1 The role of the private and public sector in climate adaptation

		Type of asset being adapted	
		Public	Private
Who enables adaptation	Public	Governments fund projects delivered by public agencies	Governments host open-source data platforms to inform private companies of climate risks
	Public-Private Partnerships	Governments collaborate with insurers to create clear cost–benefit metrics for prioritising resilient public infrastructure projects	Blended financing between private and public investors to finance private adaptation investments
	Private	Private financial institutions invest in public adaptation projects via financial instruments such as resilience bonds	Private company invests in adaptation to increase the resilience of its assets

Source: Oxera.

The primary focus of this report will be on those green areas where the private firms plays a direct role either in enabling adaptation for governments or the private sector, or collaborating with the government to adapt their own assets. These represent the clearest opportunities for private-sector-led climate resilience, as well as the most pressing need for improved enabling conditions.

Insurers will play an increasingly important role in climate adaptation. The rising frequency and severity of extreme climate events, combined with the growing value of assets, will contribute to an increase in expected payouts.

In response, underwriters are incorporating climate-adjusted risk models into premium calculations. While parametric insurance products, which provide rapid payouts when predefined thresholds are met, can be applied in a variety of contexts, they are also being explored as tools to support climate resilience by encouraging policyholders to invest in protective measures that lower future risks. This can provide policyholders including municipal governments with critical post-disaster liquidity to respond swiftly and rebuild infrastructure, enhancing

ex-post resilience. [51] In doing so, the sector not only helps communities recover faster but also creates incentives to channel private capital toward adaptation solutions at scale. Three important aspects of the role of the insurance industry are summarised in **Box 2.2** below.

[51] Parametric insurance is a type of insurance that covers the probability (or likelihood) of a loss-causing event happening (like an earthquake) instead of indemnifying the actual loss incurred from the event. Source: Swiss Re (2023), 'What is parametric insurance', 7 July, accessed 5 June 2025.

Box 2.2 The role of the insurance industry

Offering adaptation-related insurance products

Insurance helps manage climate risks post-event. Products such as parametric insurance trigger payouts based on specific climate indicators. Insurers can also encourage private adaptation and management of climate risks ex-ante by offering lower premiums to clients who invest in adaptation measures that reduce future risk.

Supporting adaptation through data and research

Insurers can provide tools and analyses that help public and private actors identify cost-effective adaptation strategies tailored to their specific risks.

Investing in adaptation projects

While insurers, as regulated institutions, need to generate appropriate returns on their investments—separate from their underwriting activities—they can also support climate adaptation from a corporate social responsibility (CSR) perspective. This could include investing in resilience-focused projects, either directly or through instruments such as green bonds. Such investments can not only contribute to wider societal resilience but may also help reduce future insurance claims by enhancing the resilience of customers and communities.

Source: Oxera.

Having explored in this section the role and importance of climate adaptation; the current state of adaptation planning, implementation, and financing; and the role of the private sector in supporting climate resilience, the following sections assess the key barriers that currently limit private sector adaptation—and explore potential solutions to unlock greater private investment and action.

3 Barriers to climate adaptation

This section outlines the key barriers that hinder climate adaptation efforts, specifically those undertaken or financed by the private sector. We organise these barriers into three broad thematic areas:

- information barriers;
- institutional barriers; and
- financial barriers.

While these categories are not mutually exclusive—many barriers intersect and reinforce one another—this taxonomy offers a useful framework for analysis.

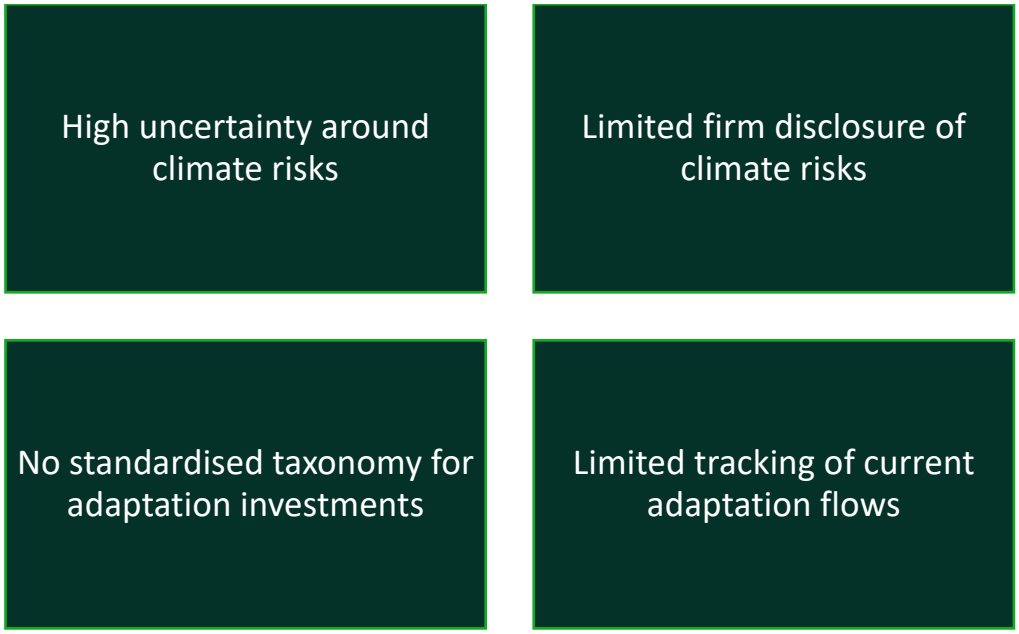
Overcoming barriers to climate adaptation means recognising that, while some obstacles to adaptation may arise independently, many overlap and reinforce one another. **Information barriers**—such as unreliable climate data or unclear definitions of effective adaptation—can make it challenging for both private and public actors to gauge how their climate exposure will change over time and to understand the true value of adaptation. These uncertainties can coincide with **institutional barriers**: weak policy signals, regulatory ambiguity and poor coordination across sectors and institutions can undermine the private sector's ability to plan or invest at scale. As a result, **financial barriers** often persist—risks remain unquantified, capital is scarce and financial instruments undeveloped. Although these financial obstacles are often the most visible, they can frequently reflect deeper information and institutional shortcomings. We now explore each set of barriers in more detail in turn.

3.1 Information barriers

Effective adaptation finance faces interlocking information barriers. While there is inherent scientific uncertainty over when, where and how climate hazards will occur, perceptions of even greater uncertainty—often driven by limited access to available data—can impact investment priorities. Disclosure of firms' physical-risk exposures remains inconsistent, hampering the collective understanding of risks and incentives required to guide capital. Ultimately, adaptation lacks a shared taxonomy and metrics to compare the costs and benefits of resilience projects, which can limit the scalability of financial products. There is significant progress being made under the UNFCCC to develop global adaptation indicators for tracking progress toward the Global

Goal on Adaptation.[52] However, **multinational financial firms have suggested to Oxera** that awareness of this work remains limited outside the UNFCCC community and standards have not been translated into a practical taxonomy that informs financial-product design and market decision-making.[53]

Figure 3.1 Information barriers



Source: Oxera.

High uncertainty around the nature and extent of climate risks: The frequency and severity of climate change and climate-related severe weather events are highly uncertain. While there are increasing efforts to categorise past prevalence of weather events,[54] projecting these into the future is highly uncertain due to climactic tipping points.[55] This

[52] See, for example, documents referenced in UNFCCC (2025), 'Global goal on adaptation', accessed 4 June 2025.
[53] Oxera Workshop on 'The role of the private sector in climate adaptation', Virtual, May 2025.
[54] For example, Climate Data 111+, a comprehensive database of hazard frequencies by geographical areas that can be used by a broad array of stakeholders for 'risk assessment, adaptation planning, policy development, and resilient infrastructure design.' Source: Freeman, A., Ranger, N., Bernhofen, M., Szczepanski, M., Lowe, J., Holmes, I., Bremner, C. and Harwood, T. (2024), 'Climate Data 111+: Synthesis of Hazard Data Sources for Physical Climate Risk Assessment and Adaptation, Version 1', Environmental Change Institute, University of Oxford, June.
[55] Tipping points refer to environmental thresholds that, when breached, create destabilising positive feedback loops that dramatically alter the frequency and/or severity of extreme events. This means that simply extrapolating the frequency of past weather events into the future likely underestimates true future frequency. See McKay, D. et al. (2022), 'Exceeding 1.5°C global warming could trigger multiple climate tipping points', *Science,* **377**:6611.

uncertainty makes it difficult to identify which types of assets face the highest risks, and what the most pressing priorities for adaptation should therefore be. Furthermore, human decision-makers tend to anchor on average or 'most likely' climate projections—such as mean warming estimates—while underweighting low-probability, high-impact 'tail risk' outcomes. As climate distributions shift, extremes that were once 'tail' events (e.g. one-in-100-year floods) become more likely and frequent, yet investments rely on outdated averages, creating insufficient resilience to the new risk frequency.[56] Nevertheless, while the precise nature of risk is uncertain, the overall level of risk is clearly increasing—making the case for greater investment in adaptation more pressing. The challenge lies, therefore, not in whether to make the investment, but how to prioritise and allocate resources effectively. A **multinational engineering consultancy told Oxera**, that in most cases, significant investment is often only being made after an extreme weather event, when the costs are far higher than those of prevention.[57]

Limited disclosure of climate-related risks: Despite large degrees of fundamental uncertainty regarding climate risk and exposure, firms are making increasing investments in understanding the risks of their own assets. However, the limited availability and standardisation of climate risk disclosures restricts the broader sharing and use of this information. This is important since, as a **credit ratings agency told Oxera**, companies in jurisdictions with more strict disclosure requirements tend to have more developed adaptation plans.[58]

Climate-related disclosures—where they are required and enforced—tend to focus primarily on mitigation, such as the reporting of greenhouse gas emissions. Increasingly, research is exploring the ways in which financial institutions' portfolios are exposed to climate risk. For example, analysis by the European Central Bank (ECB) and European System Risk Board (ESRB) finds that more than 50% of the total loan exposure to European firms in the mining, water supply, and wholesale sectors is affected by extreme flood risk.[59] Several multilateral initiatives are supporting the development of more comprehensive climate risk disclosure frameworks, including the International Sustainability Standards Board (ISSB), which builds on the work of the Task Force on Climate-related Financial Disclosures (TCFD). The ISSB's *Progress on*

[56] Institute and Faculty of Actuaries and University of Exeter (2024), 'Climate Scorpion—the sting is in the tail', March.
[57] Oxera Workshop on 'The role of the private sector in climate adaptation', Virtual, May 2025.
[58] Oxera Workshop on 'The role of the private sector in climate adaptation', Virtual, May 2025.
[59] European Central Bank and European Systemic Risk Board (2023), 'Towards macroprudential frameworks for managing climate risk', December, p. 4.

Corporate Climate-related Disclosures—2024 Report found that while 82% of sampled companies disclosed information aligned with at least one TCFD recommendation, only 11% reported on the resilience of their strategies under different climate scenarios—making it the most frequently omitted disclosure category for both 2022 and 2023.[60] This highlights a continued gap in forward-looking risk assessments, particularly in relation to physical climate risks.

Lack of standardised taxonomy for measuring and benchmarking the outcomes of adaptation investments: Unlike carbon mitigation, which has clear, quantifiable metrics (such as tons of CO2 reduced), adaptation lacks universally accepted frameworks for risk assessment and measuring success. The inherently complex and context-specific nature of natural hazard risks has to date precluded the adoption of a single accepted measure of adaptation benefits. This variability also makes it challenging to compare the comparative cost-to-benefit ratios of investments in different geographies and sectors. This can culminate in mitigation crowding out resilience and adaptation as investment themes. The absence of consistent metrics also hampers investors' ability to evaluate, compare, or verify the impact of adaptation initiatives, creating barriers to structuring scalable financial products such as adaptation bonds, funds, or blended finance vehicles.

A variety of multinational financial firms emphasised to Oxera that while some taxonomies being developed (including the UNFCCC's) were promising, they are not yet sufficiently mature or adopted to guide meaningful financial decision-making.[61]

Limited tracking and measurement of current adaptation flows: While effective data exists for public finance, there is difficulty in tracking the flows of private adaptation finance, making it more difficult to identify the sectors and geographies that are most underfunded.[62]

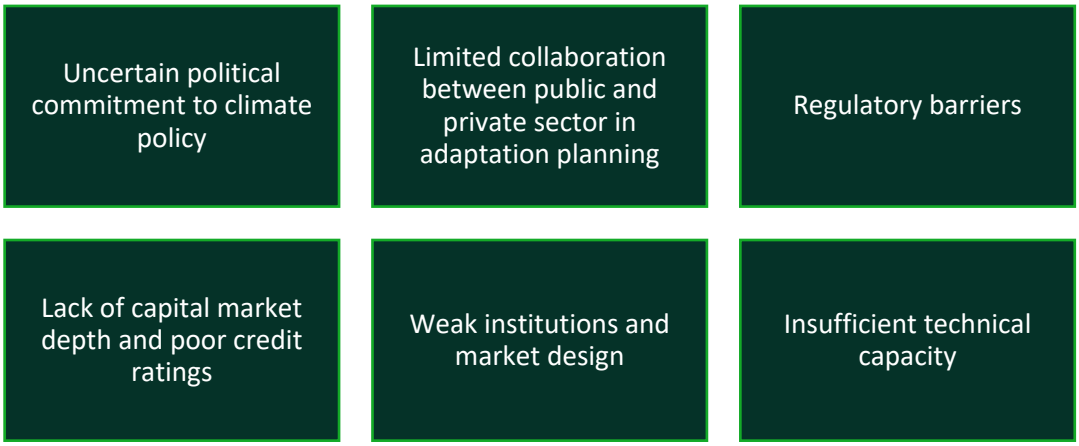
3.2 Institutional, policy and governance barriers

Effective climate adaptation requires robust institutional frameworks, clear policy direction, and well-resourced governance structures. Yet, many of the critical mechanisms needed to support adaptation—such as regulatory certainty, government capacity, and access to capital

[60] International Financial Reporting Standards (2024), 'Progress on Corporate Climate-related Disclosures', November, p. 11.
[61] Specifically, workshop participants expressed a positive sentiment towards adaptation standards being produced by the International Organisation for Standardisation. However, they also indicated that these standards were not well known by banks and asset managers. Oxera Workshop on 'The role of the private sector in climate adaptation', Virtual, May 2025.
[62] Climate Policy Initiative (2024), 'Global Landscape of Climate Finance', October.

markets—remain underdeveloped or inconsistent across regions. These systemic weaknesses undermine both public and private efforts to scale adaptation and increase the perceived and actual risks associated with investment. This section sets out the key institutional, policy, and governance barriers that constrain adaptation action, which are summarised in Figure 3.2 below.

Figure 3.2 Institutional barriers



Source: Oxera.

Uncertain political commitment to climate policy: Political commitment, underpinned by national legislation and independent national authorities, can provide long-term policy certainty, which reduces the risk of sudden policy reversals that can deter long-term investment. Effective adaptation often requires significant public investment; large projects—such as those aimed at preventing drought impacts—typically involve upfront costs, rest on narrow political majorities, are sometimes contentious, and relate to risks that are both highly uncertain and heavily discounted by voters. The importance of public finance for de-risking private adaptation leaves firms liable to financial losses and risk increases if national governments withdraw support from adaptation projects. Recently, the European Union has revised the timing and scope for its sustainability reporting rules, in a manner that the media

perceives to 'materially reduce' investors' access to information and undermines ambitious climate goals.[63]

Limited collaboration between public and private sector in adaptation planning: Analysis of National Adaptation Plans also reveals that most governments are yet to fully articulate the role of the private sector in addressing adaptation from the inception of these strategies.[64] As a result, governments are not fully harnessing the capacity and expertise of the private sector. For example, a **multinational construction and development company has told Oxera** that governments need to better utilise the private sector's expertise in designing resilient infrastructure, while **a multinational insurer**, emphasised its comparative advantage in risk analysis, citing a greater number of actuaries and risk modellers.[65]

Regulatory barriers: In many cases national regulators, particularly in infrastructure and utility sectors, are still determining how to manage novel adaptation projects, which can create uncertainty and delays to approval processes that in turn increases costs and slows adaptation.[66] Industries operating under rigid or long-standing regulations can face regulatory barriers with the lack of precedent delaying the approval of certain project components. Furthermore, building codes and land-use policies can often work against climate-resilient development, by encouraging development in high-risk areas, or failing to mandate sufficient levels of resilience.[67] Collaboration among firms—sharing data or pooling resources—may be necessary for large-scale climate adaptation across supply chains. However companies may perceive that there is a risk of antitrust scrutiny including investigations from competition authorities when cooperating with competitors on climate adaptation initiatives.

Lack of capital market depth and poor credit ratings: According to analysis carried out by the IMF in 2023, approximately 40% of emerging markets and 92% of developing economies lack investment-grade sovereign credit ratings.[68] This excludes them from pools of capital provided by institutional investors, as various banking and insurance regulations discourage or prohibit regulated entities from holding non-

[63] Jessop, S., Abnett, K. and Furness, V. (2025),'EU green finance row-back sets climate investment challenge', Reuters, 27 February, accessed 11 April 2025.
[64] World Economic Forum, Stockholm Environment Institute, and PwC (2023), 'Taking Stock of Business Efforts to Adapt to Climate Change', December.
[65] Oxera Workshop on 'The role of the private sector in climate adaptation', Virtual, May 2025.
[66] Frontier Economics and Paul Watkiss Associates (2022), 'Barriers to financing adaptation actions in the UK,' 27 July, pp. 25–26.
[67] Marsh McLennan (2024), 'Building a Climate Resilient Future: Five priorities for the global insurance industry,' p. 8.
[68] IMF (2023), 'Global Financial Stability Report, October 2023 – Online Annex 3', p. 8.

investment grade investments. Emerging Markets and Developing Economies (EMDEs) also tend to have underdeveloped capital markets, restricting long-term financing. Credit ratings agencies do not yet have a framework for recognising national adaptation investments with higher sovereign ratings, disincentivising governments from prioritising these projects.[69] Given the substantial investment need for adaptation and the finance gap, this ultimately means that many countries do not have access to the capital they need. However, efforts are underway to advance this area through enhanced scenario analyses, physical risk modelling and climate disclosure assessments—laying the groundwork for more robust integration of adaptation into sovereign credit evaluations.

Weak institutions and market design: Poor sovereign credit ratings in emerging markets are partially attributable to the absence of effective institutions. These institutions include independent central banks, independent judiciaries, strong anti-corruption oversight bodies, and transparent and rules-based fiscal authorities.[70] The absence of these institutions will lead to increases in perceived country-risk, constraining financing for both the public and private sectors. **A multinational financial firm highlighted to Oxera** that political risk is an important factor preventing financiers from allocating capital to adaptation opportunities in the developing world.[71]

Insufficient technical capacity: Many firms across both developing and developed economies cite difficulties in accessing the skills and partnerships necessary to execute adaptation projects. In an evaluation of adaptation projects completed by the Adaptation Fund, GCF and GEF, the most commonly cited causes of unsatisfactory outcomes included design and planning failures, inefficient implementation (due to technical complexities), and coordination and capacity issues (e.g. the project scope placed unrealistic demands on local resources).[72] Even among firms in developed countries, a **multinational design consultancy has highlighted to Oxera** that while companies are increasingly examining the risk profile of their assets, implementing effective risk adaptation measures is less developed.[73] Insufficient technical capacity heightens project completion risk, disincentivising financing.

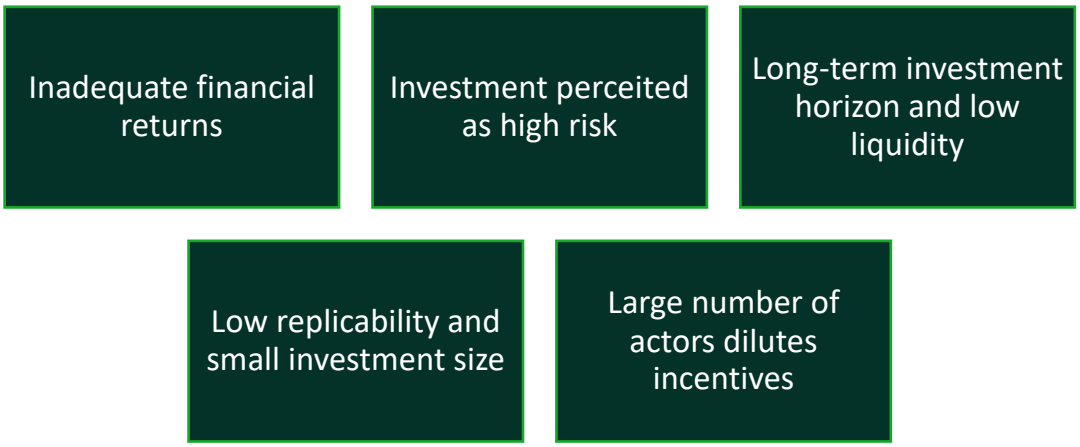
[69] Bernhofen, M., Burke, M., Puranasamriddhi, A., Ranger, R., and Shrimali, G. (2024), 'The Impact of Physical Climate Risks and Adaptation on Sovereign Credit Ratings', November.
[70] S&P Global Ratings (2017),'Ratings: Sovereign Rating Methodology', 18 December.
[71] Oxera Workshop on 'The role of the private sector in climate adaptation', Virtual, May 2025.
[72] United Nations Environment Programme (2024), 'Adaptation Gap Report 2024', 7 November, p. 27, pp. 30–31.
[73] Oxera Workshop on 'The role of the private sector in climate adaptation', Virtual, May 2025.

3.3 Financial barriers

Barriers to private sector capital flowing into climate adaptation stem from several market failures. First, imperfections in capital markets — such as high perceived risk, limited collateral, or insufficient access to affordable finance—can deter firms from investing in adaptation. Second, many companies underestimate or misunderstand their exposure to climate risks due to limited data, technical capacity, or short-term planning horizons. Finally, even when risks are known, the benefits of adaptation investments often accrue over long periods, which may not align with corporate decision-making cycles or investor expectations.

Financial considerations, both those emerging from or independent of information and institutional barriers, are among the most frequently cited obstacles to effective adaptation, with some of the key elements within this set out in Figure 3.3 below.

Figure 3.3 Financial barriers



Source: Oxera.

Adaptation investments have inadequate financial returns: Many climate adaptation projects, particularly those with public good characteristics such as early-warning systems or coastal flood defences, do not generate consistent or direct revenue streams. Their social value lies on protecting communities and businesses from climate damages. As private investors seeking a return on investment cannot account for the full value of impacts, they are unlikely to be provided at

sufficient scale by the market alone. Furthermore, the private value of adaptation investments lies in avoiding future costs, rather than generating new revenue streams. However, this makes them unattractive to external sources of financing, as they do not produce predictable cash flows needed to repay loans to issue equity against. Indeed, a **multinational insurer explained to Oxera** that the main barrier to securing financing for adaptation is the difficulty in monetising and securitising the avoided losses of adaptation investments.[74]

Adaptation investments are frequently perceived as high risk: They often involve novel technologies or are implemented in unfamiliar regulatory or geographical contexts. Political and policy uncertainty adds a further layer of risk, particularly when the continuation of supportive policies is in doubt.[75] In some emerging markets, investors fear the potential for regulatory shifts or underfunded maintenance regimes that could lead to asset stranding. These factors drive up required risk premiums—an unattractive feature particularly when considered in the context of potential low-return investment landscapes. High risk forces banks to hold more capital against the relevant exposure, disincentivising financing.

Adaptation projects also tend to have long-term time horizons and limited liquidity: This is particularly true for infrastructure and agriculture, where capital may be tied up for decades. In the context of the current international financial regulations of Basel III and Solvency II, which penalise illiquid holdings, these features pose a barrier to investor participation.[76] Under Basel III, banks face strict capital requirements that make long-term, illiquid investments less attractive due to the higher risk weights and liquidity coverage requirements. Solvency II, which applies to insurers, places a significant emphasis on matching liabilities with assets and imposes capital charges for investments that lack predictable cash flows.[77] While insurers can be major investors in infrastructure, the absence of predictable cash flows in many novel adaptation projects can limit the ability to commit at scale.

Adaptation projects are bespoke and locally-specific: Projects can be small in scale and tailored to highly localised climate risks and environmental conditions, making standardisation and replication

[74] Oxera Workshop on 'The role of the private sector in climate adaptation', Virtual, May 2025.
[75] IMF (2023), 'Financial sector policies to unlock private climate finance in emerging market and developing economies', October.
[76] TheCityUK and Imperial College Business School (2019), 'Financing Low Carbon Infrastructure', November, p. 19.
[77] McKinsey (2016), 'Financing change: how to mobilise private sector financing for sustainable infrastructure', January.

difficult. This lack of replicability reduces the efficiency gains typically associated with scaling up investment, making it harder to attract institutional investors seeking standardised and scalable opportunities.[78] **A multinational electric utility company told Oxera** that, even within their own firm, it is difficult to assess and quantify the financial risks across all of their sites to produce international alignment.[79]

Adaptation projects require significant collaboration: Adaptation finance frequently requires a multitude of stakeholders, including governments, multilateral development banks, and local implementers. While blending public and private capital can help de-risk investments and crowd in funding, the resulting complexity can delay project timelines and dilute incentives.[80] **Multinational corporations across agricultural, construction, and retail sectors have emphasised to Oxera** that effective adaptation requires coordinated action along the entire value chain and close collaboration between businesses and government to ensure the necessary support and implementation.[81]

[78] International Monetary Fund (2024), 'Unlocking Adaptation Finance in Emerging Market and Developing Economies,' IMF Staff Climate Notes, November.
[79] Oxera Workshop on 'The role of the private sector in climate adaptation', Virtual, May 2025.
[80] International Coalition for Sustainable Infrastructure (2025), 'Engineering Climate Adaptation: A Cross-Sector Approach to Scaling Up Adaptation Finance,' March.
[81] Oxera Workshop on 'The role of the private sector in climate adaptation', Virtual, May 2025.

4 A policy framework for unlocking the private sector's role in climate adaptation

Given the vast scale of investment required for effective climate adaptation, significantly more action is needed to unlock private sector capital. The financial demands of adaptation far exceed what public budgets can meet—particularly in the context of strained fiscal positions and the parallel challenge of achieving climate mitigation targets. Mobilising private investment is therefore critical. There is also an essential role for governments to support and encourage the private sector to invest in the resilience of privately owned infrastructure and supply chains.

As outlined in section 3, private investment is currently constrained by a combination of informational, institutional, and financial barriers. These barriers are often interrelated and must be addressed through coordinated, multilateral policy action. This section outlines proposed solutions and policy recommendations aimed at overcoming the identified barriers to climate adaptation. Recognising the complexity and breadth of the challenge—which demands coordinated action across international and domestic levels and collaboration between diverse stakeholders—these reforms should be designed and implemented as integrated, sequenced policy packages that progressively enhance the investment landscape. Key focus areas include strengthening data and disclosure frameworks, aligning institutional mandates and regulatory incentives, and developing risk-sharing mechanisms alongside innovative financial instruments.

While climate adaptation is a global imperative, the contexts and capacities for action differ widely across countries and sectors. Accordingly, the recommendations are crafted to be both practical and strategically high-level, serving to guide priority setting. Further detailed work will be essential to tailor policy design and implementation effectively to specific national and sectoral circumstances.

4.1 Solution architecture

Effective climate adaptation relies on addressing barriers that currently limit private sector investment. In particular, informational and institutional barriers represent fundamental constraints that need to be addressed before capital can flow efficiently and adaptation solutions can scale. Market actors—whether financial institutions, insurers, investors, or infrastructure developers—rely on accurate, standardised information about physical climate risks, and they operate within

regulatory and institutional environments that either enable or inhibit investment. Without these preconditions in place, financial markets may misprice climate risk, allocate capital inefficiently given a lack of accurate information about risks, and result in inadequate levels of adaptation investment, leaving critical adaptation needs unmet.

This section adopts a sequenced framework for climate adaptation policy, reflecting the reality that solving financial constraints requires improvements in both the quality of risk-related information and the robustness of supporting institutions.

First, this section examines how informational barriers—such as fragmented data systems, inconsistent risk disclosures, and lack of common metrics—can be overcome through coordinated efforts to build climate risk data platforms and standardised adaptation taxonomies.

Second, this section addresses policy and institutional barriers, including misalignment between public and private adaptation plans, regulatory disincentives, and constraints that disproportionately affect developing countries.

Finally, it highlights best-practice financial instruments and innovations—blended finance, resilience bonds, and insurance solutions—that can be leveraged to scale up adaptation efforts. This structured approach is consistent with good market functioning as well as aligns with recent thinking in adaptation finance that stresses the importance of sequencing reforms to unlock private capital.

4.2 Overcoming informational barriers: seeing the risks clearly

Overcoming informational barriers—such as limited understanding of climate risk, insufficient risk disclosures, and inconsistent adaptation taxonomies—is crucial to effective adaptation because accurate, standardised data enables stakeholders to assess vulnerabilities, prioritise investments, and identify the most effective interventions. This subsection examines strategies to improve data availability, enhance transparency, and align classification systems to inform decision-making and mobilise private sector engagement in adaptation.

Build open climate risk data and knowledge platforms

Governments can play a pivotal role in enabling climate adaptation by facilitating access and availability to high quality granular climate risk data. Such data helps communities and businesses to identify localised climate risks and develop context-appropriate adaptation strategies. Open access to risk analytics and geospatial data can reduce investors'

due diligence costs and foster a common understanding of climate threats—helping to prioritise adaptation investment.

While an expanding range of detailed climate data already exists, to be fully effective, data needs to be made accessible, transparent, and standardised by governments.[82] Governments can facilitate public access to privately held data through **open-by-default statutory frameworks** that include provisions for compensated access. For example, the EU Data Act 2024 empowers public bodies to request privately held data when responding to climate driven emergencies.[83] It is important to include provision for compensation to firms that collect, curate and maintain data—to ensure there is sufficient incentives for high-quality data gathering. Data of particular value includes high-resolution satellite imagery from geospatial data providers, which can identify precise delineation of floodplains, coastal erosion zones, and wild-fire prone areas.[84] Also valuable is information collected by insurers. This includes regionally aggregated historical claims data—which show the areas that have historically been exposed to climate risks—as well as underwriting and exposure portfolios—which show the number and value of insured sums for 'high risk' zones—to better spatially target resilience investments.[85]

While other jurisdictions should look to adopt similar climate data frameworks to the EU, they may also seek to go further—recognising that timely access to data is essential not only for responding to climate emergencies, but for building resilience in advance of them. A practical next-step would be to add preparedness provisions to data sharing legislation that lets authorities obtain climate-critical datasets—including high-resolution hazard maps, early warning systems, and flood models—before events occur and where early access can measurably reduce climate risk (see **Box 4.1** for an example of resilience built through open data).

[82] For example, over 100 data sources on climate hazards have been compiled into the Resilient Planet Data Hub, outlined in Resilient Planet Finance Lab (2024), 'Annual Report', p. 19.
[83] European Commission (2025), 'Data Act Explained ', 29 January
[84] Cantillon, E., Collignon, B., Denis, G. and Thys, G. (2023), 'Mobilizing private sector data for climate action', Data for Change, April.
[85] OECD (2023), 'Enhancing the insurance sector's contribution to climate adaptation', OECD Business and Finance Policy Papers, OECD Publishing, Paris.

Box 4.1 Open data sources—Oasis Hub

Oasis Hub is a non-profit platform that provides open access to standardised climate and catastrophe risk data. It hosts tools like the **Oasis Loss Modelling Framework** for building catastrophe models and the **Climate Change Risk Explorer** for climate data. Guided by a consortium of global insurers, Oasis promotes open data standards. In Bangladesh and the Philippines, it helped develop local risk models—in partnership with national agencies, aiming to build long-term capacity for private insurance markets to broaden coverage.

Source: Oasis Hub (2025), 'The Global Window to Free and Commercial Environmental and Risk Data, Tools and Services', accessed 5 June 2025.

The World Meteorological Organisation's Unified Data Policy establishes a useful precedent by providing free and unrestricted access to core weather and climate system data explicitly for risk-management and preparedness.[86]

Governments can also act as **'anchor-customer'** to procure and unlock proprietary data. Programmes like NASA's Commercial Small-Sat Data Acquisition Programme and NOAA's Commercial Data use a 'buy once, open forever' model, giving vendors predictable revenue yet making the same high-resolution inputs available across the public sector, academia and the finance industry.[87] This procurement procedure is a cost-effective way of turning proprietary data into a public good without undermining suppliers who may otherwise have insufficient incentives to collect and analyse data.[88] **Insurance firms have emphasised to Oxera** that they are particularly well-placed to provide data to governments.[89]

[86] World Meteorological Organisation (2025), 'WMO Unified Data Policy Resolution (Res.1)', accessed 5 June 2025.
[87] National Aeronautical and Space Administration (2025), 'Commercial Satellite Data Acquisition Program', accessed 20 May 2025.
[88] Crowley, J. (2014), 'Open data for resilience initiative field guide', Global Facility for Disaster Reduction and Recovery.
[89] Oxera Workshop on 'The role of the private sector in climate adaptation', Virtual, May 2025. This is consistent with industry messaging 'Data can also be made available to governments and public

Finally, the public sector can have a role in standardising and hosting data in one place. Governments should explore options such as **cloud-based dissemination platforms** that enable municipalities, SMEs, insurers and financial institutions to all work from the same information without prohibitive storage costs. By hosting this data centrally and ensuring its quality and consistency, public institutions can support more effective, coordinated adaptation planning across sectors.[90]

Climate risk assessment and disclosures

Regulators can play a significant role in incentivising adaptation through assessment and disclosure requirements. Frameworks such as the TCFD and the EU Corporate Sustainability Reporting Directive (CSRD) require companies and financial institutions to assess and report their exposure to climate risks. The impact of this can be for regulators to nudge the private sector to take further adaptation action.

However, it is important to ensure that disclosure requirements remain proportionate and do not impose excessive reporting burdens on companies, in particular smaller enterprises. A balance is needed between the compliance costs for businesses and the benefits that better information can bring to public policy and market functioning. While comprehensive adaptation taxonomies are not yet clearly defined, initiatives aimed at simplifying data collection can add value.

When banks and investors are required to disclose physical risks, they will tend to incentivise portfolio companies to improve resilience, thereby indirectly mobilising adaptation efforts.

Assessment and disclosure can also support businesses to better understand the climate risks embedded within their supply chains. The interconnected nature of global value chains can obscure where climate vulnerabilities lie; while a company's own operations might be climate resilient, critical suppliers may be exposed to significant risks. This can produce both operational disruption and input cost inflation for different industries. Analysis conducted by S&P finds that even sectors with lower direct exposure to climate risks, such as airlines, may face significant value chain exposures since airlines rely on airport operators and other transportation infrastructure, which are more exposed to

utilities to better target resilience and adaptation outcomes.' Source: Marsh McLennan (2024), 'Building a Climate Resilient Future: Five priorities for the global insurance industry,' p. 1.

[90] Green Deal Data Space (2025), 'Green Deal Dataspace: Resilience and Sustainability', accessed 20 May 2025.

climate risks.[91] Without better climate risk disclosures, companies are unable to assess their exposure to indirect risks—a survey of Forbes 2000 businesses found that less than 10% of businesses are working with value chain partners to mitigate risks,[92] albeit this may change as more regulations apply in relation to supply chain due diligence, such as the EU CSRD.

Information disclosures incentivise private sector actors to adjust their behaviours in several different ways that can promote adaptation, as listed below.

- Banks and financial institutions can adjust lending terms, redirecting financing towards more resilient firms; disclosure also supports more effective stress-testing to comply with evolving regulations.
- Insurers can use disclosed risk data to price premia more effectively, and tie premium reductions to adaptation investments that reduce future risk.
- Downstream industries can better assess their risk exposures, and source from more resilient suppliers. A **multinational food and drink corporation told Oxera** that this mechanism is one way to incentivise agricultural suppliers to make adaptation investments that promote resilience.[93]
- Governments can understand which industries, regions, or infrastructure systems are most at risk, to better target public investment on the areas that matter most—especially public goods that many private companies rely on—and provide support or subsidies to upstream industries that play a central role in supply chains.

SMEs in particular face a number of barriers in sustainability reporting and disclosure, including limited resources, lack of expertise, and complexity of data collection.[94] Creating a regime that is proportionate for SMEs will both reduce their costs and increase compliance likelihood. General recommendations for disclosure requirements include establishing a tiered reporting framework that requires only basic, qualitative disclosures from micro and small enterprises (determined by employee headcount and/or revenues), while reserving more detailed

[91] Munday, P. & Thomson, T. (2025), 'Ripple Effect: How Value Chains Compound Sector Exposure to Physical Climate Risk,' S&P Global Ratings, 13 March.
[92] Stockholm Environmental Institute in collaboration with PwC (2023), 'Taking stock of business efforts to adapt to climate change', December.
[93] Oxera Workshop on 'The role of the private sector in climate adaptation', Virtual, May 2025.
[94] ICC, Sage (2024) 'Unlocking sustainable finance for SMEs', 16 November and OECD (2025), 'Fostering convergence in SME sustainability reporting', 12 February.

disclosures for larger or higher-risk SMEs.[95] Regulators can also provide sector-specific templates to indicate the core metrics that need to be gathered. Finally, the public sector can offer targeted capacity-building support—including public grants to cover initial reporting costs and workshops through local SME associations—to develop in-house reporting skills.

While some regulators will want to consider new disclosure requirements on climate risk, there is also scope for lighter touch regulatory signalling within existing regulations. A **UK based financial firm told Oxera** that a 'dear CEOs' letter from the Bank of England to financial institutions was an effective catalyst for prioritising adaptation within financial plans, following the results of the TCFD reporting. [96]

Standardisation of differing adaptation taxonomies

Standardising adaptation taxonomies could help to catalyse the development of adaptation as an asset class. Given that adaptation investments do not often come with the clear revenue models or benchmarks that investors are used to, the development of shared definitions and ways to measure outcomes is important. Without this, it can be challenging to tell whether a project—like a seawall, a water-saving irrigation system, or climate-proofed infrastructure—is reducing risk in a meaningful way, or how it compares to other options.

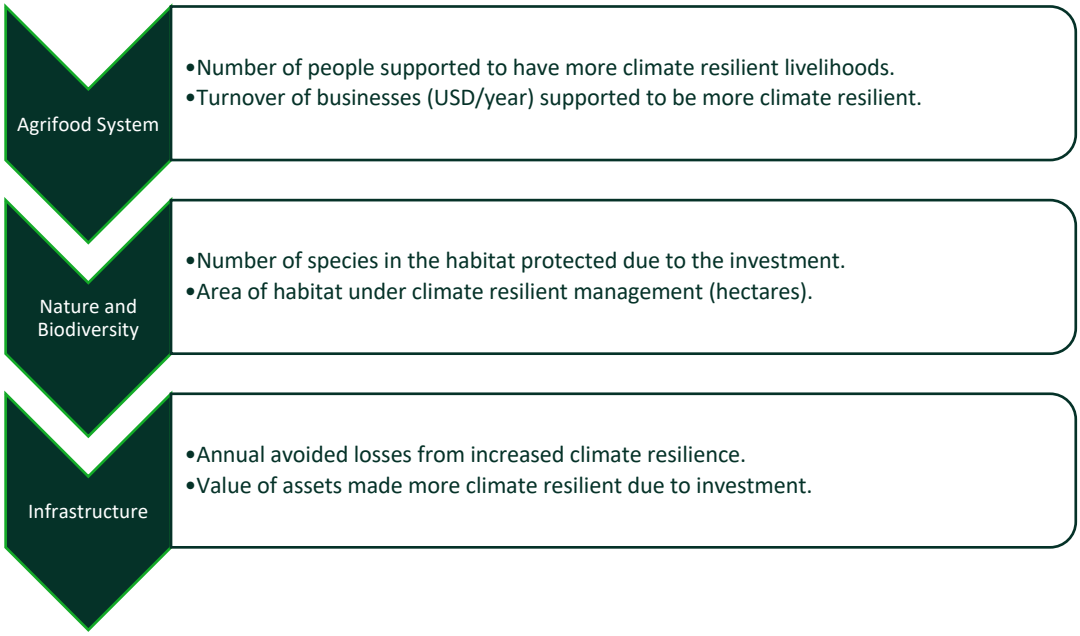
A well-defined taxonomy makes it easier for investors to understand what counts as a credible adaptation investment, track its performance, and fit it into ESG or sustainable finance strategies. In short, it helps turn the broad idea of 'resilience' into something concrete and investable, making it far more likely that institutional capital will flow toward the kinds of projects that strengthen communities and supply chains against climate shocks.

Multiple stakeholders, including the Climate Bond Initiative (2024), Standard Chartered Bank (in collaboration with the UNDRR), and the Adaptation and Resilience Investors Collaborative (2024), are developing taxonomies to determine the materiality of investments that contribute to climate change, and quantify the outcome of these

[95] For example, the OECD's Voluntary Reporting Standard for SMEs (VSME) Basic Module is a simplified, entry-level reporting framework designed specifically for micro and small enterprises with fewer than 50 employees. The European Commission is expected to issue the VSME as a recommendation during 2025. Source: OECD (2025), 'Fostering convergence in SME sustainability reporting', 12 February; European Financial Reporting Advisory Group (2025), 'VSME in Action: Empowering SMEs for a Sustainable Future', 7 April.
[96] Oxera Workshop on 'The role of the private sector in climate adaptation', Virtual, May 2025.

investments for benchmarking purposes.[97] Some examples are captured in Figure 4.1 below.

Figure 4.1 Examples of climate adaptation metrics, by sector



Source: Oxera analysis, based on Adaptation and Resilience Investors Collaborative (2024), 'Adaptation and Resilience Impact: A measurement framework for Investors' April.

Representatives from both insurance and banking have emphasised to Oxera that the most effective metric is ultimately monetary, and adaptation projects must be expressed on the basis of the monetary value of future losses avoided.[98] Average annual losses (AAL) is a well understood metric in the insurance sector, while quantifying the monetary payoff of adaptation investments can be used to show the high return on investment such projects yield.

[97] Indeed, as many as 24 adaptation taxonomies have been developed in the last five years alone. See Martin, R.S., Ranger, N., and England, K. (2024) 'The (in)coherence of adaptation taxonomies', working paper, 24 June.
[98] Oxera Workshop on 'The role of the private sector in climate adaptation', Virtual, May 2025.

Recommendations for overcoming information barriers

Increase data accessibility and centralisation

- Governments should increase data accessibility through mandating open-by-default statutory frameworks or acting as 'anchor customers' in private procurement.
- When mandating open data, governments must ensure that data collection is sufficiently compensated to maintain incentives for high quality.
- The public sector should invest in public cloud-based dissemination platforms to host consistent, policy-grade data in one place.

Enhance requirements for climate risk disclosure

- Regulators should follow TCFD recommendations to enhance climate assessment and disclosure requirements of both direct and supply chain risks.
- Regulators should ensure that climate risk disclosures are proportionate to firm size and risk, while providing sector-specific templates to guide reporting.

Standardise adaptation metrics and KPIs

- Building on UNFCCC work to date, governments and financial institutions should work together to develop clear frameworks, standards, and success indicators for adaptation (akin to 'net zero' for mitigation).
- This collaboration should extend to creating harmonised reporting tools to enable comparability and confidence in investment returns.

Source: Oxera.

4.3 Overcoming institutional barriers: building the rules for resilience

Successfully involving the private sector in climate adaptation depends on have the right conditions for investment in place at the national level—such as strong institutions, clear and transparent governance, and confidence that government will act consistently, fairly and predictably. This subsection explores how to strengthen these foundations to enable more effective and sustained private sector contributions to adaptation.

Integrating private adaptation into National Adaptation Plans (NAP)

Adaptation should be embedded as a core objective and strategic planning element in national and local policies. There should be clear and actionable guidance on the private sector's role in NAPs. Because public institutions lack the fiscal space, expertise, and reach to meet climate-adaptation needs alone, governments must outline how different private actors can contribute, benefit, and partner within these strategies—thereby mobilising private investment and expertise. The UK's NAP3 is a leader in this capacity because it highlights the role of government in establishing appropriate regulations, standards, incentives, and information for private adaptation.[99]

Early and sustained engagement is essential, with a strong case to be made for private sector representation on the NAPs oversight committees. This helps ensure that business perspectives are reflected in planning, financing, and implementation decisions, making adaptation actions more grounded and viable.

Further, a **multinational construction and development company emphasised to Oxera** that adaptation and resilience should become a central requirement of all public procurement processes.[100] Traditional procurement practices remain focused on short-term cost and delivery, often failing to consider future climate risks. By shifting procurement

[99] This is because the UK's NAP3 works to align 'incentives and requirements for the private sector to provide an effective policy framework for adaptation. This involves setting standards and regulations that support its climate goals and enable the flow of private investment into adaptation. For example, through the Nature Markets Framework, the government will support the development of nature markets, such as water quality or biodiversity, so that the environment, farmers, local communities and the economy all benefit from increased investment in nature and associated adaptation benefits. The chapters of NAP3 set out the existing and future plans to improve the regulatory environment to support climate adaptation. For example, the Department for Levelling Up, Housing and Communities (DLUHC) has implemented the overheating requirement introduced through the Building Regulations in June 2022 to enhance the resilience of new homes to high temperatures'. Source: Government of the United Kingdom (2023) 'Third National Adaptation Programme (NAP3)', 17 July 2023 pp. 20–21; 92–95.

[100] Oxera Workshop on 'The role of the private sector in climate adaptation', Virtual, May 2025.

criteria to value long-term resilience, governments can stimulate innovation in adaptation technologies, reduce disaster recovery costs, and safeguard development gains. Without governments recognising the importance of resilience within their procurement policies, firms face limited incentive to make costly investments that promote resilience when delivering goods and services to governments. **Box 4.2** below highlights that when governments actively support and recognise resilience in their policies—such as through partnerships and national adaptation planning—firms are more motivated to invest in long-term, climate-resilient practices.

Box 4.2 Jamaica's leadership in a collaborative NAP

Red Stripe's *Project Grow*, launched in 2013, aimed to reduce reliance on imported corn syrup by increasing the use of locally grown cassava by 40% by 2020. In partnership with the government and USAID's *Rural Economy and Ecosystems Adapting to Climate Change II* project (2015), the brewery supported over 300 farmers through training, technical assistance, and the introduction of drought-tolerant cassava varieties—directly contributing to Jamaica's NAP goals. In 2017, Red Stripe also joined the government's 'Uncut Conversations' campaign, a national outreach effort to raise awareness of climate adaptation. As a member of the Private Sector Organisation of Jamaica, its involvement helped signal the importance of aligning private initiatives with public adaptation strategies and encouraged broader business participation in the NAP process.

Source: Crawford, A. and Church, C. (2019), 'Engaging the Private Sector in National Adaptation Planning Porcesses', International Institute for Sustainable Development, p. 27.

Governments need to show leadership by signaling that they prioritise adaptation by maintaining their own commitments. A **multinational insurer and investment manager has told Oxera** that governments' failures to submit NAPs and instruments on time had led to a de-prioritisation of such efforts in its own industry.[101]

[101] Oxera Workshop on 'The role of the private sector in climate adaptation', Virtual, May 2025.

Creating a forward-looking financial regulatory regime

Rising climate risks can deter banks from financing adaptation investments, particularly for those firms most exposed to those risks—often the businesses most in need of adaptation. If climate risks materialise and are not fully mitigated, the borrower may suffer financial losses that undermine their ability to repay, increasing the risk of default. As a result, banks may need to hold more capital against their relevant exposures, reducing the amount of lending they can offer.[102]

However, if an adaptation project is likely to mitigate the negative impacts of climate change in a region where a financial institution has significant credit exposures, then financing the adaptation project can reduce the risks faced by that financial institution. A formal mechanism, similar to the Matching Adjustment used by insurers under Solvency II,[103] could be employed: an adaptation project would be formally matched (under specified criteria) with other exposures whose climate risk it can reduce such that the risk capital associated with the other exposures is lowered.

In the UK, private financial institutions are collaborating with the Bank of England and the Financial Conduct Authority through the Climate Financial Risk Forum (CFRF). As **explained to Oxera by a global bank that participates in the initiative**, the forum is gathering data on how physical risks impair collateral and cash-flows and, in doing so, is demonstrating the link between climate risk and credit risk**.** Lenders want to fund assets that are resilient to stranding risks. The forum is testing practical policies for adjusting capital requirements where banks use the Basel Standardised Approach. Specifically, the forum is considering complementary levers, including enhanced credit-scoring models that capture physical-risk mitigation, and revised regulatory risk weights that explicitly reward climate-resilient assets. This would allow risks associated with adaptation to be treated like other risks assessed

[102] In principle, banks should recognise that exposure up-front—charging a higher spread, shortening tenors or asking for extra collateral—so the *expected* loss is already priced and provisioned and risks are reflected in the level of required return. However, banks' (out-turn) return on equity would tend to be reduced when climate impacts or adaptation shortfalls turn out worse than the assumptions used for the initial pricing. In that case, loan-loss provisions may prove insufficient, and there could be write-offs to cover *unexpected* loss.

[103] Solvency II facilitates insurers to match their long-term liabilities (such as pensions annuities) with long-term assets (such as government bonds) whose cash flows and maturity match the liability. It does this by allowing them to add a premium over the risk-free interest rate to discount their liabilities, reducing the present values of these assets, improving financial solvency and reducing capital requirements.

by banks in their lending process.

The UK experience's with the CFRF is an effective precedent that could be replicated. It demonstrates the merit of regulators working with private firms to build a robust evidence base on how physical climate hazards affect credit losses and, using that insight, calibrate incentives and capital requirements to channel cheaper finance toward resilient assets. The CFRF provides banks with helpful information on a relatively new source of credit risk to help close the data gap that arises when lending contexts change materially. This reduction in uncertainty may assist banks in pricing adaptation finance, assisting market entry. This public-private dialogue illustrates how a public response to an information-driven market failure can unlock private capital for resilience while safeguarding prudential soundness.

Balancing collaboration alongside competition policy[104]

Collaboration between firms is essential in fostering system-wide adaptation across value chains. **A multinational retailer**[105] **told Oxera** that a key barrier to creating resilience across its value chain is the perceived inability to collaborate with other firms in the sector due to antitrust laws that promote competition.[106]

There are well developed frameworks across the UK, EU, and Oceania that allow for collaboration on 'sustainability' standards and technologies within competition law (see **Box 4.3** as an example).[107]

[104] ICC continues to carry out research in this area. See, for example, ICC (2022), 'When chilling contributes to warming: How competition policy acts as a barrier to climate action', November
[105] Oxera Workshop on 'The role of the private sector in climate adaptation', Virtual, May 2025.
[106] For example, Article 101 TFEU prohibits 'all agreements between undertakings, decisions by associations of undertakings and concerted practices which may affect trade between Member States and which have as their object or effect the prevention, restriction or distortion of competition within the internal market.' This could create difficulty in achieving environmental outcomes which involve 'horizontal cooperation to bind participants to a more stringent environmental standard than the established legal one i.e. environmental standardisation or sustainability agreements, b) horizontal co-operation to phase out a less environmentally-friendly type of product, c) horizontal cooperation to set joint schemes and sharing of infrastructures for an environmental goal.' Source: Centre for Climate Engagement (2021),'Competition Law and Climate Change', accessed 12 May 2025.
[107] Competition and Markets Authority (2024), 'Green Agreements Guidance', 12 October; Australian Competition and Consumer Commission (2024), 'Sustainability collaborations and Australian competition law'.

Box 4.3 Shell and TotalEnergies permitted to collaborate on CO2 storage

The Netherlands Authority for Consumers and Markets (ACM) allowed the competitors Shell and TotalEnergies to collaborate on the storage of CO2 in empty natural-gas fields in the North Sea. The ACM deemed that:

Cooperation is necessary for getting this initiative off the ground and for realising the climate benefits, the slight restriction of competition between Shell and TotalEnergies was deemed not that harmful. The benefits for customers of both companies and for society as a whole exceed the negative effects of that restriction.

Among other aspects, the project involves supplying a trunkline with a planned capacity of 22 megatons per annum (MTPA) to transport the CO2 and store it in depleted gas fields. High investment costs and high risks, alongside potential for duplication of infrastructure, meant that collaboration fulfilled the **indispensability** criteria of Article 101(3) TFEU, which is met only if the restrictions that are caused by the agreement are needed (indispensable) in order to achieve the efficiency gains generated by the green agreement.

This example shows that firms can collaborate on CO2 mitigation and capture; the same collaborative framework could be applied to adaptation investments.

Source: Netherlands Authority for Consumers and Markets (2022), 'ACM: Shell and TotalEnergies can collaborate in the storage of CO2 in empty North Sea gas fields', June; Oxera (2022), 'Ticking the boxes on a green self-assessment, and the risk of greenwashing', 31 August

However, the role of adaptation and resilience within these frameworks is not always fully articulated, leading to higher perceived barriers to collaboration for resilience.[108] These frameworks should be implemented

[108] For example, the European Commission's Guidelines on Article 101 of the TFEU Section 9 discusses sustainability agreements, with para. 517 defining sustainable objectives to include

in other jurisdictions where they are currently absent, with explicit encompassing of adaptation within sustainability, to promote the diffusion of resilient technologies and best practices. The European Commission and other like-minded competition authorities may explicitly signal, through guidance and case practice, an accommodative approach to well-founded sustainability agreements.

To guard against perceptions of anti-collusive behaviour, open forums that bring together regulators and industry participants are essential. Below, **Box 4.4** shows how this can be achieved by the Hellenic Competition Commission (HCC) within a regulatory sandbox environment. A **multinational insurer told Oxera** that such settings not only promote transparency but also enable productive collaboration between the public and private sectors. In particular, the insurer highlighted the private sector's comparative strengths in risk analysis and management—areas where public institutions may lack capacity.[109] Structured public-private dialogue, convened with appropriate oversight, can therefore unlock significant value and support more effective climate risk management.

'fostering resilient infrastructure,' but it does not cover any of the other six UNDRR themes that constitute resilience. Source: European Commission (2023), 'Guidelines on the applicability of Article 101 of the TFEU to horizontal co-operation agreements', Communication from the Commission, 21 July (This sentiment was reinforced by participants at Oxera's Workshop (Oxera Workshop on 'The role of the private sector in climate adaptation', Virtual, May 2025).

[109] Oxera Workshop on 'The role of the private sector in climate adaptation', Virtual, May 2025.

Box 4.4 Facilitating pro-competitive collaboration with the Hellenic Competition Commission's (HCC) Sustainable Development Sandbox

'Regulatory sandboxes' can offer controlled environments where innovative climate-adaptation technologies can be tested without the usual regulatory constraints.

The HCC has launched a Sustainable Development Sandbox that gives companies—especially small and medium-sized enterprises—a safe space to pilot new collaborations or business models that advance sustainability laws. Participants can submit proposed projects to the HCC for early competition-law review and may receive a no-action letter if the initiative delivers clear sustainability benefits without significantly restricting competition. This lowers legal uncertainty and regulatory risk for green investment, while allowing the authority to monitor experiments, prevent green-washing and keep Greece's transition on sound, competition-compatible footing.

Source: Oxera.

Institutional reform

Adaptation finance often faces more fundamental challenges than just mispricing or information asymmetries: in many cases, the necessary financial markets simply do not exist. This is especially true in developing countries, where the gap between climate adaptation needs and available domestic financing is particularly wide.[110] However, developing countries may face challenges such as less consistent contract enforcement, variability in the rule of law and regulatory uncertainty. These factors can affect the development of local capital markets and influence the levels of cross-border lending.[111] A strong body of empirical evidence shows that effective rule of law, political stability, and regulatory quality are essential to attracting institutional

[110] United Nations Environment Programme (2024), 'Adaptation Gap Report 2024', 7 November.
[111] Jarmuzek, M. and Lybek, T. (2018), 'Can Good Governance Lower Financial Intermediation Costs', Working Paper 18/279, International Monetary Fund, December.

capital and foreign direct investment (FDI) inflows. To address these barriers, previous ICC work has identified that governments should prioritise facilitating a robust domestic enabling environment—one that includes clear national targets with broad political support; robust investment protection laws; sound permitting and regulatory processes for major infrastructure projects; strong offtake markets for energy and resilience investments; and appropriate fiscal incentives for sustainable infrastructure.[112] By strengthening these foundational frameworks, countries can attract institutional capital and FDI, reduce financing costs, and ultimately scale up adaptation investments to meet growing climate risks.[113]

Addressing deficiencies highlighted by the Financial Action Task Force (FATF) is an important, actionable step for governments in emerging markets. Being placed on FATF's grey or black lists signals weak anti-money laundering and counter-terrorist financing frameworks, deterring institutional investors through heightened regulatory scrutiny and higher compliance costs. Conversely, removal from the list demonstrates improved financial governance, restoring confidence in global markets. This, in turn, lowers financing costs, enhances credit ratings, and expands access to international capital and foreign direct investment—including for adaptation projects.

[112] ICC (2024), 'Making the NCQD a real catalyst of private sector climate finance', November.
[113] See, for example: Alfaro, L., Kalemli-Ozcan, S. and Volosovych, V. (2008), 'Why Doesn't Capital Flow from Rich to Poor Countries? An Empirical Investigation', *Review of Economics and Statistics*, **90**:2, pp. 347–368; Busse, M. and Hefeker, C. (2007), 'Political Risk, Institutions and Foreign Direct Investment', *European Journal of Political Economy*, **23**:2, pp. 397–415; and Paul, J. and Jadhav, J. (2019) 'Institutional Determinants of foreign direct investment inflows: evidence from emerging markets', *International Journal of Emerging Markets,* **15**:2, pp. 245–261.

Recommendations for overcoming institutional barriers

Strengthen public procurement requirements

- Public procurement processes should explicitly include resilience and adaptation criteria, creating a stronger market signal for resilient infrastructure and supply chains.
- Increase awareness and competence among public authorities on how to assess and reward adaptation in public procurement bids.

Align climate and credit risks in financial regulation

- Regulators should assess how adaptation project loans affect portfolio credit risk and adjust capital requirements accordingly, such as through matching adjustments.
- Regulators should facilitate dialogue with financial institutions—through forums such as the CFRF—on the regulatory implications of emerging climate risks.

Stimulate collaboration

- NAPs should explicitly define the private sector's role and include targeted incentives and regulations to support its engagement.
- Competition authorities should give companies clearer guidance on how to structure collaborative adaptation agreements within competition-law limits, while providing 'sandbox' environments to test initiatives and minimising regulatory uncertainty.

Source: Oxera.

4.4 Scaling adaptation financing

Finally, with robust climate-risk data and institutions to channel capital established, investment will flow towards companies that are resilient or that can create resilience solutions. In addition, innovative financing tools—such as blended finance, resilience bonds, and insurance products—can be deployed to further scale up adaptation finance. These tools are analysed in this subsection.

4.4.1 Investing in adaptation enablers

The informational and institutional reforms discussed—such as climate risk disclosure, data-sharing platforms, and improvements to market institutions in emerging economies— facilitate and incentivise firms and governments to adapt their own assets. This will help create significant **demand for firms providing adaptation goods and services**. Improved growth prospects for these firms should facilitate private capital being allocated towards these adaptation enablers. **Box 4.5** below shows that this mobilisation is already underway, with dedicated private capital funds and listed equity investment strategies targeting climate adaptation. A better informational and institutional environment will catalyse these capital flows. For developing economies in particular, attracting outside equity investment is essential, as it provides much-needed finance without exacerbating already high debt-servicing burdens.

Box 4.5 Private and public equity

Mazarine Climate Adaptation Tech Fund: A venture capital fund that invests in early stage companies with innovations focussing on **adaptation to water risks** including quantity risks (e.g. sea level rise and drought) and quality risks (harmful algal blooms and saltwater intrusion).

Public equity: The Climate Resilience Investments in Solutions Principles (CRISP) framework is developed by the Global Adaptation & Resilience Investment (GARI) Working Group to identify companies that provide adaptation goods and services. Out of 827 companies identified globally, 231 were listed in EMDEs.

Source: Mazarine Climate (2025),'About us', accessed 5 May 2025; Global Adaptation and Resilience Investment Working Group (2024), 'The Unavoidable Opportunity: Investing in the Growing Market for Climate Resilience Solutions,' March, p. 4.

4.4.2 Innovative financial instruments

Alongside highlighting pre-exisiting opportunities in private and public markets, a number of innovative financing mechanisms can be deployed to further direct capital to adaptation projects.

Adaptation and resilience bonds

Redressing the imbalance between adaptation and mitigation taxonomies would facilitate the creation of targeted adaptation and resilience bonds. Out of over 48,000 bonds issued for Green, Social, and Sustainability (GSS) purposes, less than 3% were recognised as having a portion of their proceeds used for adaptation and resilience purposes.[114]

Market participants involved with sustainability-linked bonds emphasise that a significant challenge in designing these instruments with adaptation benefits as the central focus is the lack of consistent, comprehensive, and comparable key performance indicators. This difficulty arises due to varying definitions of adaptation and inherent challenges in measuring adaptation outcomes across different regions,

[114] Climate Bonds Initiative (2023), 'Sustainable Debt Global State of the Market', p. 20.

issuers, and sectors.[115] Once a standardised taxonomy for climate adaptation is adopted and robust systems for information and climate risk disclosure are in place, resilience bonds can become a particularly effective mechanism to direct private capital toward adaptation investments across both the public and private sectors. By clearly categorising adaptation projects, a taxonomy enables governments and private sector actors to systematically prioritise and structure investments according to risk and return profiles. Investors gain confidence from enhanced transparency and consistent benchmarking, facilitating their participation in resilience bonds issued by municipalities or corporates to finance defined adaptation measures.[116] The potential of this asset class is reflected by the success of the European Bank for Reconstruction and Development (EBRD) Resilience Bond issuance in 2019 (see Box 4.6 below).

The public good nature of adaptation projects mean that a large variety of actors potentially benefit from adaptation measures. This creates a number of ways in which cash-flows can be generated to repay bond investors from resilience investments, through the coordination of a state actor, to repay bond-holders. This can include the following.

- **Service-user charges**: Some adaptation assets behave like utilities, so they draw steady cash flows from end-users via tariffs or fees. London's Thames Tideway, funded by £1.83bn of green bonds, is designed to cope with heavier rainfall and sewer overflows, and is financed by Thames Water bill payers, amounting to approximately £20–25 per customer per year.[117]
- **Beneficiary/property-based charges**: Where resilience works raise—or simply preserve—local land values, governments can capture part of that uplift through special assessment districts or tax-increment financing. Sacramento's benefit-assessment districts offer a clear adaptation-finance model: properties benefitting from the Natomas and American River levee upgrades pay a dedicated annual levy on their tax bill, and that earmarked revenue services the bonds that fund the works—designed to deliver 200-year flood protection. By linking the charge to the uplift in land value from reduced flood risk, these

[115] International Monetary Fund (2024), 'Unlocking Adaptation Finance in Emerging Market and Developing Economies,' IMF Staff Climate Notes, November, p. 18.
[116] Buhr, B. (2022), 'Adaptation Bonds: Lessons from the US Municipal Bond Market to Help Close the Adaptation Financing Gap,' Imperial College Business School Centre for Climate Finance & Investment.
[117] Tideway London, 'Funding - Tideway ', accessed 20 May 2025.

benefit assessments turn avoided-damage benefits into a stable, investment-grade cash flow for resilience projects.[118]

- **Public-budget 'availability' payments**: For large protective assets with no direct user fee, public entities can commit multi-year budget payments to a private concessionaire in return for keeping the asset functional ('available'). Tokyo's green bonds finance projects such as river-wall heightening, coastal floodgates and heat-island counter-measures. Debt servicing is covered by the city-state's general account, effectively converting metropolitan tax receipts into predictable cash flows that support multi-decade adaptation investments—without requiring new user fees.[119]

In addition, there is some (albeit mixed) evidence that green bonds trade at a premium in secondary markets, signalling a robust demand for resilient companies and sovereigns.[120] By accessing potentially lower funding costs for sustainable projects, issuers contribute to the shift toward a low-carbon economy, positioning themselves more effectively to manage the risks and seize the opportunities presented by this global transition. Consequently, adaptation bonds not only increase the volume and quality of projects reaching the market but also unlock substantial institutional capital, significantly narrowing the adaptation finance gap.

[118] Sacramento Area Flood Control Agency (2025),'Assessment Districts', accessed 20 May 2025.
[119] See, for example, ISS Corporate (2023), 'Tokyo Metropolitan Government Tokyo Green Bond Impact Report', 18 December.
[120] Caramichael, J. and Rapp, A.C. (2024), 'The green corporate bond issuance premium', *Journal of Banking and Finance*, **162**:1.

Box 4.6 EBRD Resilience Bonds

The EBRD, in 2019, issued the first *climate resilience bond* (CRB). This bond raised over US$700m (it was oversubscribed by US$200m) from about 40 investors. All CRB proceeds finance EBRD's Climate Resilience Portfolio—projects that strengthen infrastructure (e.g. water, energy and transport) against climate shocks. As of late 2022, the CRB programme had raised a total of ~US$1.15bn and supported EUR 1.4bn in resilient assets.

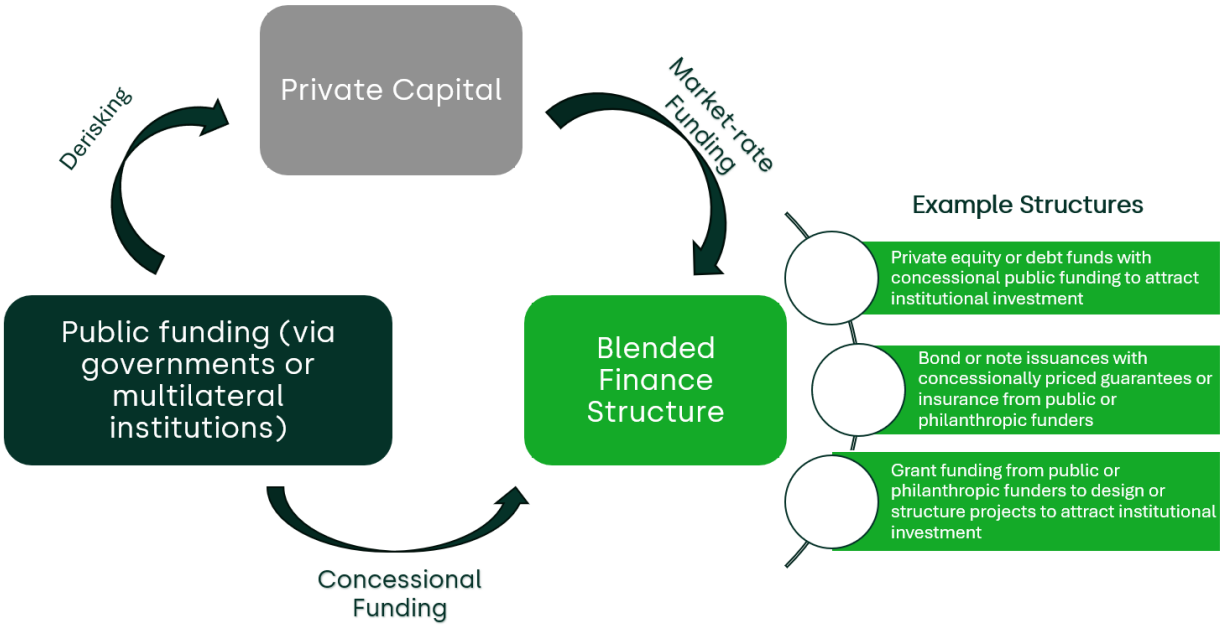
The bond issue was able to attract institutional investors (asset managers, banks, insurers, and even central banks) by labelling a new asset class. Indeed, CRB investors were diverse: about 32% asset managers, 28% banks, 9% insurance firms/pension funds, and 31% official institutions. This demonstrated demand for resilience projects. By pooling multiple projects under one bond, EBRD overcame individual project size issues.

Source: OECD (2023), 'Scaling up Adaptation Finance in Developing Countries', pp. 118–119.

Mobilising blended finance to de-risk and catalyse private investment

Given the risk-return profile of many adaptation projects, public finance has a vital role to play in bridging the investment gap. Public institutions can use concessional funds and guarantees to improve the risk-adjusted returns for private investors. For example, governments might provide grants or low-interest loans for the portions of a project that have high external benefits to society, while enabling private financiers to fund the remainder on commercial terms. A simplified model of alternative blended finance structures is presented in **Figure 4.2**.

Figure 4.2 Model of blended finance structures



Source: Convergence (2024), 'State of Blended Finance 2023 Climate Edition,' p. 15.

This blended finance approach is already proving useful in sectors such as agriculture and water, where public funds absorb initial risks (or subsidise elements with no revenue) and thereby crowd in private capital (see **Box 4.7**, below).[121]

A **multinational food company explained to Oxera** that its suppliers were unable to make resilient investments due to a lack of credit, high interest rates, or limited collateral.[122] The multinational company emphasised the importance of its role in working alongside financial institutions and public catalytic capital to provide information on where funds should be directed to increase supply chain resilience. An example of this is set out below in **Box 4.7**.

[121] Examples of successful agricultural blended finance initiatives include the Food Securities Fund and AGRI3 Fund (see Climate Policy Initiative (2024) 'Toolbox on Financing Nature-Based Solutions', pp. 46 and 58.
[122] Oxera Workshop on 'The role of the private sector in climate adaptation', Virtual, May 2025.

Box 4.7 Blended finance in agriculture

The US$600m Africa Rural Climate Adaptation Finance Mechanism (ARCAFIM) is a large-scale model of tailored finance for small- and medium-scale agrobusinesses and rural microenterprises. ARCAFIM integrates blended finance and incentivises regional private banks through a risk-sharing mechanism, with financial backing from the GCF, Nordic Development Fund, and the Government of Denmark to cover an initial portion of losses.

The programme aims to provide Climate Change Adaptation loans to approximately 260,000 small-scale producers and 500 rural microenterprises and agribusiness SMEs in East Africa. This initiative is expected to directly benefit around 336,000 households, impacting approximately 1.5 million individuals across Kenya, Uganda, Tanzania, and Rwanda.

Source: GCF (2023), 'Funding Proposal – Africa Rural Climate Adaptation Finance Mechanism (ARCAFIM) for East Africa Region', 24 November.

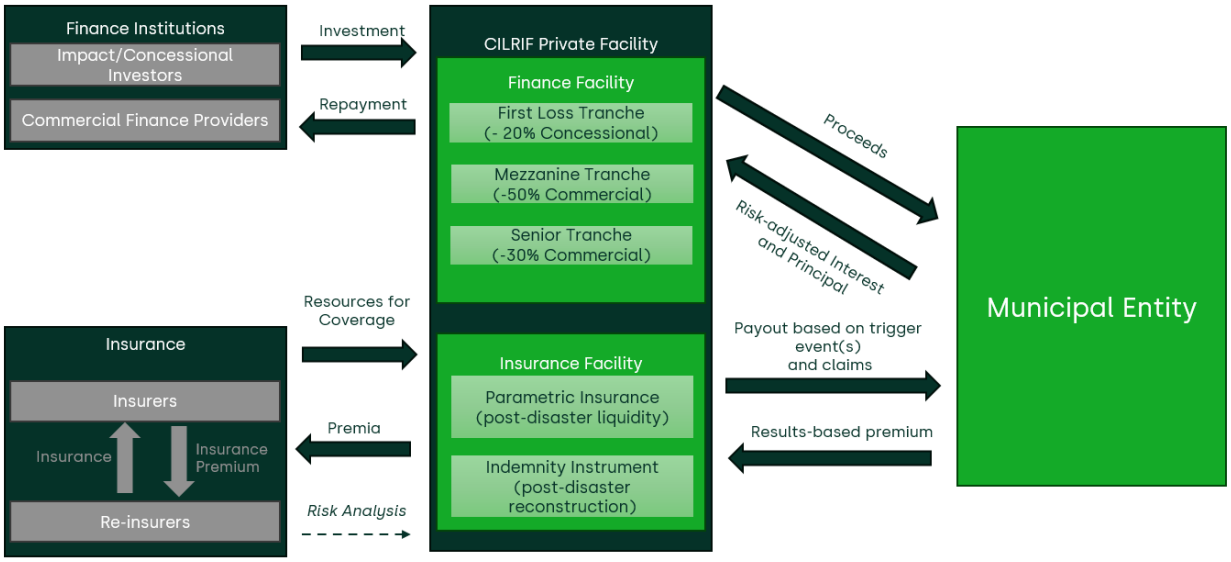
Insurance

As highlighted in subsection 2.3, insurers can provide a key role in incentivising climate adaptation ex-ante by offering reduced premia for governments, firms, and households making resilient investments. Climate Insurance Linked Resilient Infrastructure Financing (CILRIF) is a novel instrument that incentivises municipalities to invest in resilient infrastructure by offering concessional insurance premia conditional on cities' investment in climate resilience measures.[123, 124] Fully integrated into financing mechanisms, CILRIF includes an infrastructure finance facility that provides concessional and commercial capital for resilience projects. This dual-structure approach ensures that cities have both the financial protection against climate risks and the necessary funding to

[123] Climate Finance Lab (2022), 'Climate Insurance-Linked Resilient Infrastructure Financing (CILRIF)', accessed 25 July 2025.
[124] Private insurers contributing to CILRIF include AXA Climate, AXA CL, and Munich Re.

invest in resilient infrastructure.[125] The cumulative risk-reduction effects of resilience investments, insurance, and concessional capital lead to a lower risk premium demanded by commercial finance providers, creating lower financing costs. As this virtuous cycle involves several different actors, a coordination mechanism is needed; CILRIF provides one model of this mechanism.

Figure 4.3 Climate insurance linked resilient infrastructure financing facility



Source: Global Innovation Lab for Climate Finance (2022), 'Climate Insurance-Linked Resilient Infrastructure Financing' September, p. 9.
Note: This stylised presentation focuses on the financing and insurance components of CILRIF, and does not present the complementary Technical Assistance and Subsidy Facility, which enables the provision of technical support to cities in developing countries through grants, and is funded by donor capital and the UN Climate Development Fund (UNCDF).

CILRIF is targeted particularly towards cities in developing countries and SIDs, aiming to serve at least 100 cities during its first five years. By pooling risks across multiple cities and leveraging both public and private capital, CILRIF seeks to create a diversified risk portfolio that attracts investment from insurers, reinsurers, and impact investors. This approach aims to mobilise substantial private capital for climate-

[125] Global Innovation Lab for Climate Finance (2022), 'Climate Insurance-Linked Resilient Infrastructure Financing' September.

resilient infrastructure development. **Increasing resilience ex-post** by providing parametric insurance will provide municipal governments with critical post-disaster liquidity in the case of a climate event, as well as help streamline fiscal planning to free up additional resources required due to an extreme weather event.

An integrated approach to the financing and insurance of projects can be highly effective. Insurance provision can provide both the incentive for adaptation, by conditioning premia on resilience investments, and financing, by reducing the adapter's cost of capital.

A common theme **highlighted by both firms and insurers to Oxera** is the increasing trend for insurers to completely withdraw from insurance markets when exposure is significantly high and there are limited or no risk management actions in place. In the US, major insurers have been leaving the Californian property insurance market since 2021.[126] Research by the European Central Bank (ECB) and the European Insurance and Occupational Pensions Authority (EIOPA) has found that the EU has a major insurance gap, with only 25% of climate-related catastrophe losses insured across the region (and less than 5% in some countries).[127]

Solving this issue requires tackling the market failures that prevent insurance markets from working effectively. These include the following.

- **Highly correlated losses**—for example, when floods hit many properties in the same area at once, it overwhelms the basic idea of insurance, which relies on spreading risk.
- **Information gaps**—when insurers know less than customers about the risks they face, they can end up with a pool of high-risk clients (known as adverse selection), making premiums more expensive for everyone.
- **Moral hazard**—if people believe insurance will cover them regardless, they may be less likely to invest in making their property more climate-resilient.
- **Lack of public goods**—such as high-quality, shared data about local flood risks or large-scale flood defences, which are essential for insurers to accurately price and manage risk.

[126] Chubb, one of the ten largest insurance companies by 2023 Net Premia, stopped writing insurance policies in 2021. Allstate stopped writing policies in 2022. State Farm, California's largest insurer, stopped writing policies in 2023, while Armguard, Falls Lake, Travelers, and Farmers Direct Property withdrew in 2023. Source: Horne, A. (2025), 'The Los Angeles wildfires: Devastating losses with minimal insurance', Minter Ellison, 9 April.
[127] ECB and EIOPA (2023), 'Policy options to reduce the climate insurance protection gap', April, p. 2.

- **Affordability issues**—in some cases, premiums based on actual risk would be unaffordable, so prices are distorted, which weakens the signals needed to drive investment in risk reduction.
- **Lack of risk management**—insurance is a risk-sharing contract; if there is limited demonstration of risk management by the owner then insurability is challenged.

Insurers have highlighted that the Flood Re programme, developed by Oxera with the Association of British Insurers (ABI) and described in **Box 4.8** below, provides a compelling example of effective public-private partnerships and a model of best practice that other governments should seek to replicate.[128]

[128] Oxera Workshop on 'The role of the private sector in climate adaptation', Virtual, May 2025.

Box 4.8 Public-private insurance collaboration Flood Re

Flood Re was created after the pre-2016 'Statement of Principles'—which bundled flood cover into every household policy in exchange for continued public spending on defences—started to crack. Advances in risk modelling exposed the hidden cross-subsidy from low- to high-risk homes, causing premiums in the most exposed postcodes to spike or vanish and putting the UK's tradition of universal flood insurance at risk.

The solution devised by and launched in 2016 as Flood Re, tackles each structural barrier in turn. It restores affordability by allowing insurers to cede the flood component of high-risk household policies to a central pool that charges a capped, council-tax-band-linked premium well below fully risk-reflective levels. The pool's losses are financed by a transparent £180m annual levy on every domestic buildings and contents policy, re-establishing an explicit, society-wide risk-sharing mechanism while still letting the competitive market price and retain low- and medium-risk business. Because the levy and the eligibility criteria can be reset periodically, the scheme is inherently adaptive: it can tighten or loosen the cross-subsidy as climate projections evolve.

Beyond immediate affordability, Flood Re also mends information failures. Concentrating almost the entire portfolio of high-risk properties in a single reinsurer generates a rich data lake on flood incidents, mitigation measures and claims severity—all of which can feed back into national resilience planning. At the same time, insurers now have a commercial incentive to invest in better hazard modelling so they can identify and price the profitable, lower-risk tail. In short, the scheme re-establishes universal access, makes the cross-subsidy explicit and contestable, creates a learning loop that improves risk knowledge over time, and leaves open a pathway for future transition from solidarity-based support to risk-reflective pricing as defences and adaptation measures take hold.

Source: Oxera (2015), 'Why does it always rain on me? A proposed framework for flood insurance (revisited)', 23 April; Oxera (2019), 'A flood of interest: Flood Re makes its mark', 31 May

Recommendations to overcome financial barriers

Mobilise capital via 'resilience bonds' developed using harmonised taxonomies

- Financial regulators and governments should work together to endorse standardised taxonomies.
- Development banks, developmental financial institutions, and governments should look to issue 'resilience bonds' targeting adaptation outcomes. These bonds pool investment projects together to diversify risk from localised climate exposures and establish an investable pipeline.

Support financial inclusion and de-risking mechanisms

- Governments should de-risk private capital through mechanisms like guarantees, concessional capital, or blended finance, to provide affordable finance for smallholders and SMEs,
- Governments should look to develop public-private partnerships that reduce perceived risk for private capital in adaptation projects.

Clarify roles of insurance and reinsurance sectors

- Governments should use data from insurers and re-insurers to understand the geographical distribution of climate risks and drive resilience upgrades.
- Regulators should establish formal frameworks for public–private partnerships with insurers to proactively address and prevent coverage retreat in high-risk areas.

Source: Oxera

5 Conclusion

While the urgency of climate adaptation is increasingly recognised, the private sector still faces significant barriers that limit its ability to scale up investment and its contribution to adaptation. These include uncertain returns on adaptation projects, long payback periods, fragmented ownership of risk across complex value chains, and a lack of standardised data and metrics to assess, price and compare climate risks effectively. In many cases, adaptation is further hampered by limited awareness or technical capacity at the local level, making implementation inconsistent and difficult to replicate at scale.

Yet, alongside these challenges lie substantial opportunities. Climate adaptation presents a growing commercial opportunity for the private sector across multiple industries. Proactively investing in resilience can lower future costs, protect supply chains and preserve asset value. Demand is rising for resilient infrastructure and supply chain solutions—creating new markets for construction, engineering, agriculture and financial services. Financial institutions can also play a catalytic role, mobilising private capital through innovative instruments such as resilience bonds and blended finance.

Unlocking these opportunities will depend on creating the right enabling conditions—through clearer frameworks, public-private collaboration, financial innovation, and a more consistent valuation of adaptation benefits across sectors.

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