Network for Greening the Financial System

Technical document

Integrating adaptation and resilience into transition plans

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NGFS

Central Banks and Supervisors
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The NGFS has been invited to lead the development of an input paper on adaptation and transition plans, which could inform the G20 Sustainable Finance Working Group's 2025 work on scaling up adaptation finance for a just climate transition. Building on its previous work, such as the NGFS Transition Plan Package (2024) and the Conceptual Note on Adaptation (2024), the NGFS has collaborated with leading international institutions including the International Transition Plan Network, the Sustainable Insurance Forum, and CDP.

Incorporating adaptation considerations into transition plans is essential. NGFS work shows that physical risks of climate change are intensifying and pose significant threats to the global economy and financial stability. Even in a net-zero emissions scenario by 2050,[1] these risks could reduce global GDP by 8.5%, with chronic physical risks driving most of the economic loss. The complex, non-linear, and systemic nature of these risks challenges traditional risk assessment frameworks and requires tailored approaches for effective risk management.

While mitigation remains indispensable to limit future damages, integrating adaptation into climate transition plans is also crucial, given their interconnectedness. Adaptation efforts help reduce vulnerability, strengthen resilience, and unlock economic opportunities. Yet, the practical integration of adaptation into transition planning is complex – requiring new metrics and targets – and is currently still not widely adopted.

This note offers a practical and flexible framework to embed adaptation across five pillars of transition planning: governance, foundations, implementation strategy, engagement strategy, and metrics and targets. It also proposes guidance for developing adaptation targets and metrics – tailored to institutions' varying capacities, readiness and contexts. Making adaptation a core component of transition plans can support the alignment of capital flows with the needs of climate resilience and enable institutions to manage physical risks more effectively.

The NGFS calls on policymakers, supervisors, financial and non-financial institutions, and academics to accelerate their efforts to embed adaptation within transition plans, alongside mitigation actions. Through collective action, supported by enabling policies, we can foster a resilient financial system and advance the transition to a sustainable future.

1 NGFS (2024), Long-term climate scenarios – Phase V.

Executive Summary

The impact of physical risks from climate change is substantial, and is expected to intensify even in a scenario with emissions reduced to net zero by 2050. Under this scenario, global Gross Domestic Product (GDP) could be 8.5% lower due to climate change, with most of that loss (7.3 percentage points) attributed to chronic physical risks (Network for Greening the Financial System, 2024a). Risk will be transmitted to institutions through multiple micro and macroeconomic channels. Traditional risk assessment approaches and related models are often unable to capture the forward-looking, non-linear nature of climate risks. They typically fail to account for tipping points, feedback loops, and compound risks that can amplify damages across systems and sectors in unpredictable and cascading ways. As these risks continue to rise, they are increasing capital costs, reshaping insurance markets, and threatening asset values across sectors, with growing adverse implications for monetary and financial stability.

While climate mitigation[2] remains essential to limiting future economic damages, climate adaptation[3] measures can play an essential role in reducing physical risks and also providing opportunities for investments. There are limits to adaptation as climate change progresses and its impacts worsen, but many of these measures could provide immediate resilience benefits along with economic value. This would include reducing long-term losses (for example for the manufacturing sector, by improving the resilience of production sites to climate hazards) or creating new revenue opportunities (for example in the agricultural sector, by diversifying crops and developing more resistant seeds). However, the deployment of adaptation finance remains far below what is needed, particularly in some Emerging Markets and Developing Economies (EMDEs), which face heightened vulnerability, limited fiscal resources and access to financial markets for adaptation, and lower institutional capacity. Climate adaptation investments are not yet occurring at scale, with recorded finance flows in the tens of billions of dollars versus estimated needs in the hundreds of billions of dollars (Organisation for Economic Cooperation and Development, 2024a). Private sector engagement is constrained by data gaps, market inefficiencies and a lack of incentives. Addressing these gaps requires tools and approaches that improve the assessment of physical risks and responses, strengthen the information base and provide appropriate incentives to mobilise private resources.

Transition plans can serve as a tool to facilitate a strategic approach to the assessment and management of physical risks. A transition plan sets out an institution's strategic response to risks and opportunities arising from the system-wide impacts of climate change and the transition to a low-emission economy (NGFS, 2024b). For financial institutions, transition plans help evaluate exposures and support strategic alignment with climate goals. Non-financial institutions' transition plans provide essential forward-looking information for financial institutions to assess counterparty risk and inform capital allocation. By enhancing transparency of physical risk exposures and adaptation needs, transition plans can help mobilise finance toward resilience-building activities – both by informing internal investment decisions and by signalling opportunities to external investors. Strengthening the availability, credibility, and consistency of these plans can improve the financial sector's ability, and the overall economy's capacity, to align capital allocation and risk management with adaptation needs.

Transition plans should evolve from mitigation-centric tools into more comprehensive frameworks that integrate adaptation actions aligned with broader institutional and systemic resilience objectives. To date, transition plans have primarily focused on reducing greenhouse gas (GHG) emissions: around 43% of non-financial institutions and 58% of financial institutions have considered physical risks in their climate risk assessments (CDP,[4] 2023), though the systematic integration of adaptation actions into these plans remains

2, 3 Climate adaptation refers to adjustments in ecological, social, or economic systems in response to actual or expected climatic change and its effects, aimed at reducing vulnerability and building resilience (United Nations Framework Convention on Climate Change). Climate mitigation refers to actions that reduce the rate of climate change by limiting greenhouse gas (GHG) emissions or enhancing carbon sinks (Intergovernmental Panel on Climate Change, 2022).

4 For more information on CDP, please refer to: https://www.cdp.net/en.

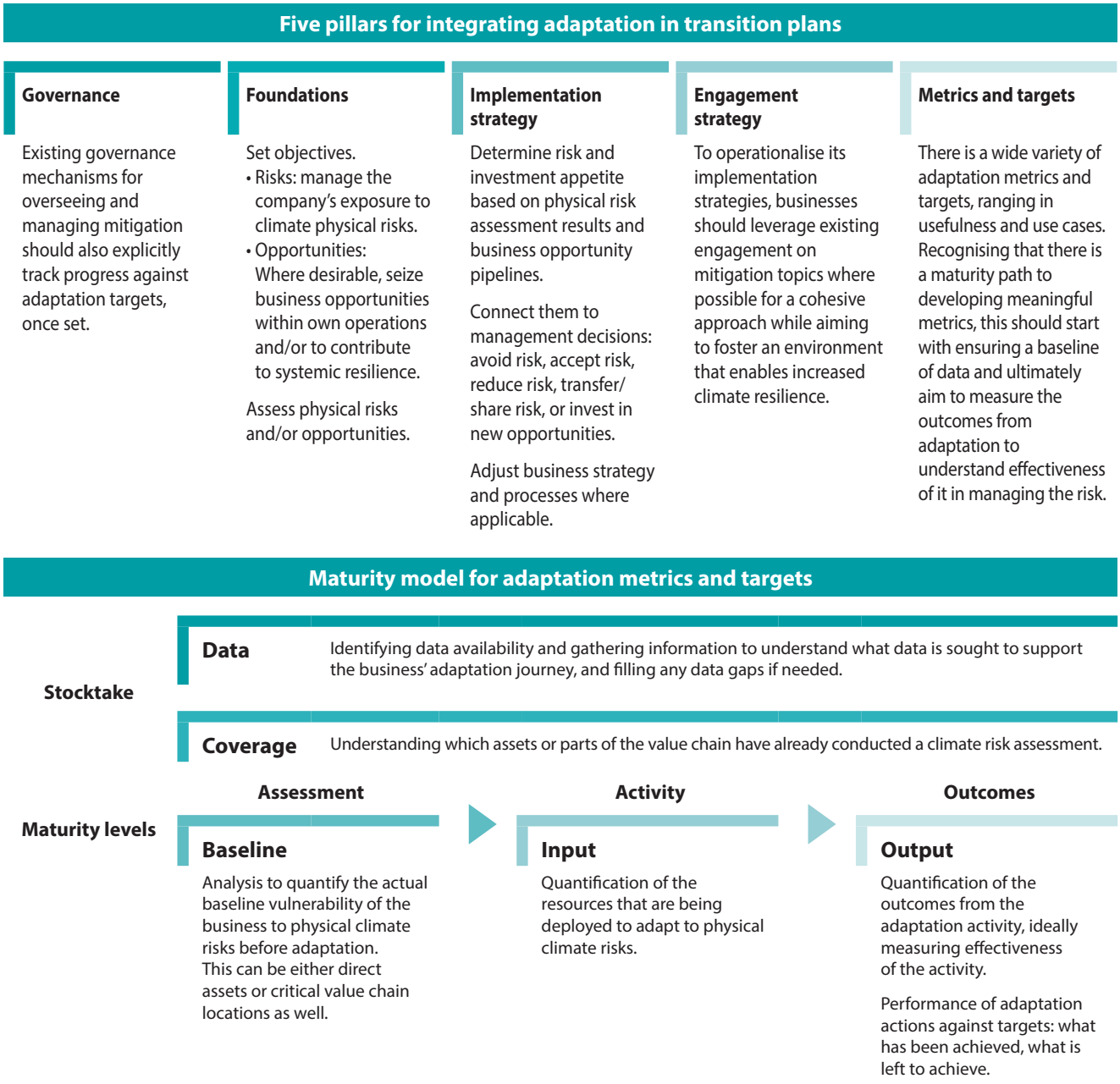
limited. Given the materiality of physical risks, particularly in some EMDEs, adaptation should become a more central element of risk management and strategic planning.

Adaptation is already recognised as an integral component of transition planning by the Network for Greening the Financial System (NGFS), the G20 and others, but its integration has been limited in practice, with the lack of relevant metrics and targets being a key constraint. This paper sets out a practical approach for embedding adaptation and resilience into transition plans. It primarily focuses on financial institutions (in line with NGFS members' mandates) but also considers non-financial institutions given their interdependencies with the financial sector, and given that many of the approaches to transition planning described in this paper are also applicable to non-financial institutions. This paper adapts the five building blocks of existing transition plan frameworks – governance, foundations, implementation strategy, engagement strategy, and metrics and targets – to assist in incorporating adaptation and resilience considerations. This approach aims to maximise the complementarity between mitigation and adaptation objectives. It is designed to support institutions at varying levels of readiness and capacity.

- **Governance:** Effective governance structures are essential to oversee the integration of adaptation objectives into transition planning and sustainability targets reporting, ensuring that all pillars are addressed comprehensively and iteratively. They can be common to both mitigation and adaptation.
- **Foundations:** While mitigation has the goal of net zero emissions, there is no analogous single quantified global objective for adaptation. Integrating adaptation into transition planning could instead be structured around two objectives, managing the institution's exposure and vulnerability to physical risks,[5] and, where appropriate, seizing adaptation-related business opportunities.
- **Implementation strategy:** This translates the institution's assessment of physical risks and potential adaptation opportunities into concrete risk management and investment decisions. Strategies may include avoiding risk (for example, through divestment), accepting risk, reducing risk (for example, through physical adaptation measures), transferring/sharing risk (for example through insurance or other financial products), and investing in new opportunities (for example, updated product and service offerings).
- **Engagement strategy:** Engaging with a range of external stakeholders is central to operationalising the implementation strategy. This can include the institution's value chain, industry peers, governments at all levels, central banks, supervisors, regulators, and academia.
- **Metrics and targets:** Institutions can approach metrics and targets via a maturity pathway, commencing with a stocktake to assess data availability and current coverage (for example, identifying portfolio and location relevant data to assess exposures to physical risks). They can then establish a baseline using simple input or process-level metrics, such as the amount of adaptation finance mobilised for adaptation projects, or the number of people trained in climate resilience measures. Over time, they can progress towards more advanced approaches that quantify the outcomes of adaptation activities (for example, reduction in repair costs/damage to assets due to acute climate risks) and define clear, time-bound targets aligned with broader resilience objectives.

5 This should follow the 'do no significant harm' (DNSH) principles where possible to avoid unintended negative consequences.

Figure 1 **Five pillars and a maturity pathway for metrics and targets to integrate adaptation into transition plans**



Source: Authors.

Recognising that institutions differ in capacity and context, particularly in EMDEs, the framework suggested in this paper is designed to be flexible and proportionate. It supports incremental progress, allows ambition to grow over time, and can flexibly accommodate institutions of different sizes and capabilities.

An enabling environment by public actors, and strong real economy planning by non-financial institutions, are important for unlocking the full potential of adaptation-focused transition planning. National adaptation plans (NAPs), targeted public interventions and blended finance mechanisms can

facilitate the development of investable projects and help attract private capital by sharing risk between private and public participants. Strengthening real economy planning – through the integration of climate considerations into corporate strategy, risk management and operations – helps support clearer investment pipelines and reinforce the feedback loop between corporate planning and financial flows. This in turn enhances the credibility of transition plans and supports more effective alignment between capital allocation and resilience goals. However, the absence of such structures – adaptation plans, targeted interventions or blended finance mechanisms – should not be a reason for inaction. Institutions can begin by using available data and internal capacity to identify risks and build resilience incrementally.

This paper has been prepared by the NGFS as an input to the G20 Sustainable Finance Working Group's (SFWG) priority on scaling up financing for adaptation. It aims to support this agenda by exploring how adaptation and resilience considerations can be integrated into transition plans, aligning with the mandates of central banks and financial supervisors while remaining relevant to the broader financial and real economy sectors. This input paper aims to advance initial thinking on this emerging topic and offers a foundation for further work. It calls on institutions, policymakers, and financial sector authorities to take forward this agenda. Knowledge partner contributions to this paper provide practical examples and insights from industry engagement, offering a diverse perspective on operationalising adaptation through transition planning.

1. Introduction

Companies are increasingly exposed to physical risks from climate change – financial costs are projected to reach USD 25 trillion by 2050 in a scenario where global temperature rises to 2.7 °C by the end of the century – yet only 35% have an adaptation plan (S&P Global, 2025). Although the financial sector is the second most affected sector with 15% of total projected losses, only 30% of financial institutions currently have adaptation strategies in place (S&P Global, 2025). Despite these expected rising costs, adaptation remains underfunded. In EMDEs alone, where exposure to physical risk is the highest, annual adaptation finance flows cover only one-third of the required amount through 2030, with 92% of global adaptation finance coming from public sources (Climate Policy Initiative, 2024a). These growing exposures and the persistent funding gap highlight the need for more structured approaches to help ensure adequate attention to climate risk planning and response. This paper contributes to the G20 SFWG's priority on "scaling up financing for adaptation and just transition", by integrating adaptation and resilience considerations into transition plans.[6] It focuses on transition planning as a tool to manage climate-related financial risks, with broader relevance across the financial and real economy sectors.

Transition plans can be a useful tool for managing both physical and transition climate risks associated with climate change. A transition plan defines an institution's strategic response to risks and opportunities arising from the system-wide impacts of climate change and the transition to a low-emission economy (NGFS, 2024b).[7] Transition plans are primarily strategy documents, and risk management provides an important foundation for strategy and thus, for transition planning. Physical risks from climate change, as well as transition risks from the global response to climate change, will have implications for an institution's safety and soundness. Different institutions may emphasise one category of risk over the other (for example, transition risk over physical risk) depending on their specific circumstances. However, a narrow focus on one without consideration of the other may leave institutions unprepared to manage the full range of material climate-related risks to which they are exposed and to take advantage of the opportunities that arise from the transition. For this reason, effective transition plans should approach mitigation and adaptation as complementary elements, aligning decarbonisation efforts with resilience-building measures to address the full spectrum of climate risks.

Adaptation is recognised as an important component of transition planning by the NGFS and the G20; however, its integration has been limited in practice, with the lack of relevant metrics and targets being a key constraint. The G20's High-Level Principles on "Credible, Robust, And Just Transition Plans" state in Principle 2 that "for financial institutions and corporates making investments, transition plans should consider, as appropriate (…) actions related to adaptation (SFWG, 2024)." Similarly, the NGFS emphasises that "transition plans should reflect an entity's integrated approach to reducing its emissions (climate mitigation) while simultaneously adapting to the impacts of climate change that will arise even if the goals of the Paris Agreement are met (climate adaptation) (NGFS, 2024b)." However, it notes that "in contrast to mitigation objectives, typically measured by emission metrics, there is a lack of clear and scalable metrics and targets for adaptation and broader sustainability objectives" (NGFS, 2024c).

Adaptation generally refers to proactive measures that reduce exposure and vulnerability to physical risks. The aim of adaptation is to increase resilience – understood as an institution's ability to endure and recover from climate hazard events (World Bank, 2024a; NGFS, 2024d). This may include modifying infrastructure, adjusting business strategies or adopting new policies to minimise vulnerability and to capture opportunities. Defining and measuring adaptation face challenges, as adaptation

6 According to G20 Sustainable Finance Working Group: 2025 Presidency and Co-chairs Note on Agenda Priorities. As a complement, the OECD and African Development Bank will also contribute to the priority by delivering an input paper on barriers to scaling up adaptation finance. The World Resources Institute will produce a compilation of case studies on the use of financial instruments in adaptation finance. The IAIS will deliver an input paper on insurance protection gaps and how to address them.

7 According to NGFS Stocktake on Financial Institutions' Transition Plans and their Relevance to Micro-prudential Authorities (NGFS, 2023b), a distinction can be made between transition planning as the internal process undertaken by a firm to develop a transition strategy, and transition plan as the final product, external-facing output providing transparency.

measures are not always labelled as such. For instance, adaptation and development measures are difficult to separate, particularly in low-income countries. Meanwhile, the private sector is taking action and investing in resilience in response to climate-related impacts, but these actions are not always visible or recorded as climate change is often one among many drivers (World Bank, 2024a). This partly explains why only 5% of total climate finance is considered adaptation finance, as current estimates focus mainly on investments that solely target adaptation needs or that involve incremental costs specifically attributed to adaptation (CPI, 2024a).

Considering the mandates of NGFS members, this paper focuses primarily on managing risks for financial institutions, although many of the approaches to transition planning described here are also applicable to non-financial institutions. Non-financial institutions are also covered through their interdependencies with the financial sector – financial institutions rely on information from non-financial institutions, including transition plans, to assess the climate risk on their balance sheet and align their financial exposures with broader climate objectives (NGFS, 2024e). Despite inconsistencies in reporting, data availability, and comparability, non-financial institutions' transition plans remain a major source of forward-looking climate-related information, making their development and refinement crucial for financial institutions' transition planning efforts.

A strong enabling environment is an important dependency for embedding adaptation in transition plans and mobilising broader action on adaptation. While institutions should not wait to act, subnational, national and international policy frameworks, regulatory support, and public-private collaboration mechanisms can support effective transition planning. NAPs or local adaptation plans (where applicable) serve as critical reference points guiding businesses in assessing physical risks and setting adaptation strategies to enhance resilience. Yet, as of November 2024, only 62 countries have submitted NAPs, compared to 192 countries that have submitted Nationally Determined Contributions (NDCs).[8] To make progress on adaptation considerations in transition plans, relevant actors (for example governments, policy makers, supervisors and industry) need to work together, as fostering an enabling environment is critical to promote action on adaptation.

This note provides key considerations for institutions and jurisdictions looking to integrate adaptation and resilience into transition planning and plans. Section 2 builds the case for embedding adaptation and resilience considerations into transition plans, outlining how such plans can help address the significant adaptation challenge. Section 3 proposes an approach to integrate adaptation and resilience into transition plans by outlining the main building blocks of transition planning and developing a maturity model for adaptation metrics and targets.

8 Refer to NDC Registry and NAP repositories for developing countries and developed countries: NDCs can include adaptation measures.

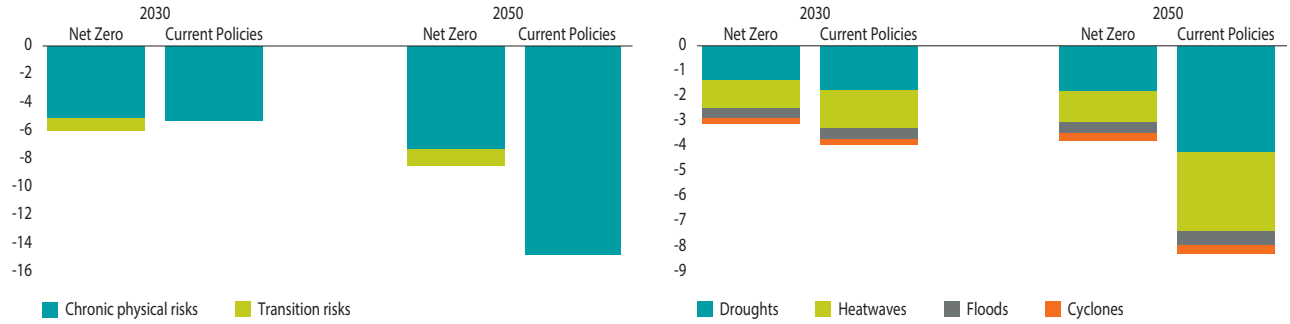
2. The case for integrating adaptation in transition plans

2.1 The adaptation challenge

The cost of physical risks is already significant and will rise further, even in a net zero emissions scenario. Between 2000 and 2019, climate change-attributed extreme weather caused annual losses of around 1% of GDP in low-income countries (Newman and Noy, 2023). Advanced economies are also exposed, with the United States making up at least two-thirds of the USD 135 billion in global estimated insured losses from natural catastrophes in 2024.[9] The NGFS long term scenarios suggest that global GDP could be 8.5% lower by 2050 in a net zero scenario (relative to a counterfactual scenario without climate change), reflecting the combined effects of transition risks and chronic physical risks. Within this, chronic physical risks alone contribute approximately 7.3% points of the GDP loss (Figure 1, left) (NGFS, 2024a). Furthermore, losses due to acute physical risks – such as droughts, heatwaves, cyclones and floods – could amount to 4% of GDP (Figure 1, right) (NGFS, 2023c).[10] These losses are substantially higher under weaker mitigation pathways, highlighting the importance of mitigation as a first line of defence: in a Current Policies scenario, global GDP could decline by nearly 15% by 2050 due to chronic physical risks, and by over 8% due to acute physical risks.[11] At the same time, the persistence of significant losses even in a net zero scenario highlights the need for adaptation to manage residual physical risks that cannot be avoided through emissions reductions alone. Without sufficient adaptation, sectors reliant on natural resources, infrastructure, and real estate will face increasing financial pressures. For example, global agricultural yields are projected to decline by up to 30% by 2050 without adaptation (Global Commission on Adaptation, 2019), and inadequate infrastructure resilience could cost major cities up to USD 194 billion in repair and rebuild costs annually by 2050.[12]

Figure 2 **Global GDP impact for chronic physical and transition risks (left panel) and acute physical risks (right panel) under different NGFS long-term scenarios**

(in % difference from baseline/year)



Note: The Current Policies scenario assumes that only currently implemented policies persist into the future, leading to higher physical risks and no additional transition risks.
Source: Left panel (NGFS, 2024a); Right panel (NGFS, 2023c). Long-term scenarios for central banks and supervisors.

9 Swiss Re Institute 2024, "Hurricanes, severe thunderstorms and floods drive insured losses above USD 100 billion for 5th consecutive year". However, this figure likely understates the full economic impact, as a significant share of climate-related damages remains uninsured – even in developed markets like the United States.

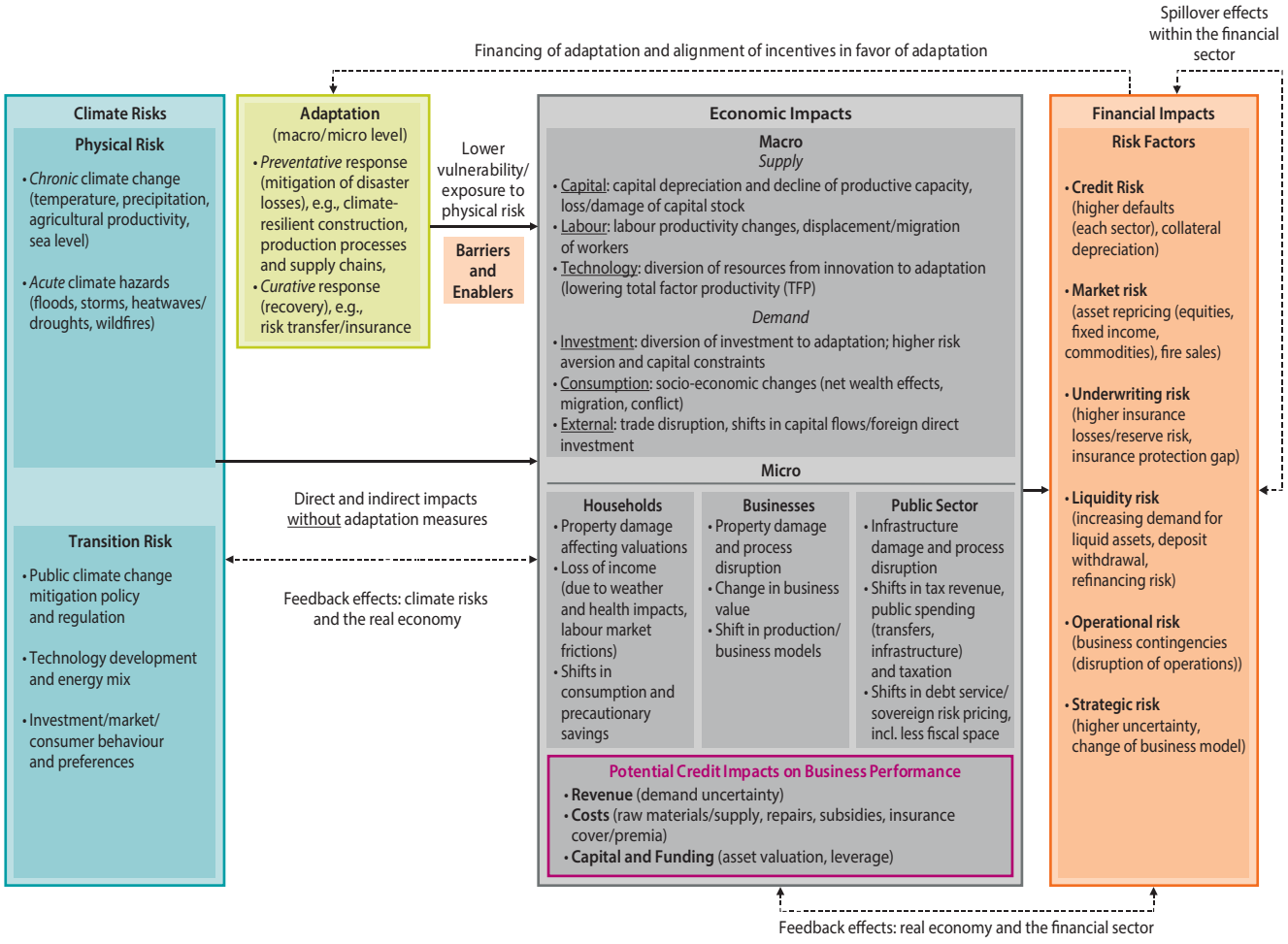
10 The GDP impacts linked to acute and chronic physical risks are not directly additive, as they are the result of different methods. These differences in method stem notably from the new damage function method developed as part of the latest version of the NGFS scenarios (Phase V), published in November 2024. For more detail on the damage function and the overlap between acute and chronic physical risks, please refer to Damage functions, NGFS scenarios and the economic commitment of climate change: an explanatory note (2024).

11 Similarly to the Net Zero scenario, the impacts of chronic and acute physical cannot be simply added given existing overlaps. For more details, please refer to footnote 8.

12 https://www.c40.org/.

Physical risks transmit to financial institutions through both micro- and macroeconomic channels (Figure 2 and Basel Committee on Banking Supervision, 2021). At the micro level, they increase credit risk by degrading collateral values and reducing borrower repayment capacity of households, corporates, and sovereigns. They also heighten market risk through the potential for sudden asset devaluations and volatility, strain liquidity *via* deposit withdrawals or credit line drawdowns during disasters and disrupt operations by damaging infrastructure and systems. At the macro level, physical risks reduce economic output by degrading labour productivity, disrupting supply chains, and contributing to inflation and resource constraints, ultimately affecting financial institutions' exposures across sectors and geographies. Financial institutions may struggle with assessing and managing physical risks due to limited transparency on counterparties' exposure and adaptation efforts, as well as an overreliance on historical data models that fail to capture the forward-looking, non-linear nature of climate risks. Climate and ecological tipping points, feedback loops, and compound risks can amplify damages across systems and sectors in unpredictable and cascading way.

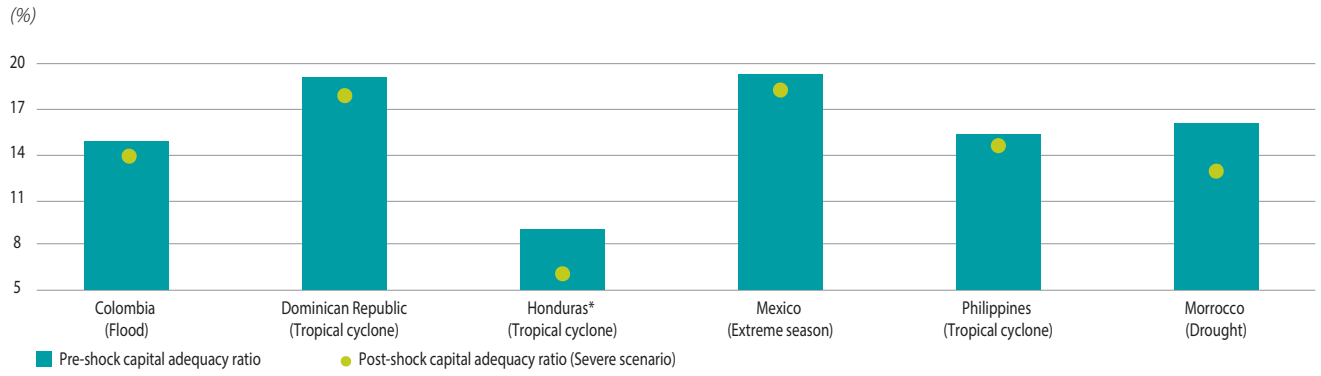
Figure 3 **Transmission channels of climate-related physical and transition risks**



Note: Indirect effects refer to the gradual change in the average severity/frequency of natural disasters.
Sources: Jobst (2025), NGFS (2024, 2021), Birry et al. (2024), Bartzokas (2022), Jobst and Pazarbasioglu (2018).

The financial consequences of physical risks are already materialising across institutions. For example, financial costs to companies could reach USD 25 trillion by 2050 under a scenario where global temperature rises by 2.7 °C by 2100 (S&P Global, 2025a). Complementing this, recent stress testing exercises of financial sectors in EMDEs highlight that, although system-wide financial stability impacts may appear contained (Figure 3), underlying vulnerabilities vary significantly across institutions (World Bank, 2024b). In Morocco, for instance, economic impacts in a variety of drought scenarios range between $4 and $7 billion, decreasing GDP by 1.8 to 3.5 percentage points, while reducing the capital adequacy ratio of banks by 1.3 to 2.2 percentage points, with the total impact potentially higher as not all transmission channels are captured in the modelling (World Bank, 2024c). Furthermore, insurance markets are already responding to rising physical risks, with some insurers significantly increasing premiums or withdrawing from high-risk markets altogether. Even banks and non-bank financial institutions without direct exposure to physical risks may face secondary pressures through their counterparties and broader market dynamics. These findings suggest that even where the economic case for adaptation is clear – for example by reducing losses across the broader economy – the financial case must be reinforced through better risk pricing, improved data, and forward-looking planning at the institutional level. These trends highlight that the financial sector faces a growing burden of direct and indirect physical risk exposures which requires proactive risk management and the integration of adaptation measures into strategic and operational planning.

Figure 4 **Climate stress test results as impact on system-wide capital adequacy ratio for physical risks**



Note: Data is based on World Bank staff calculation from publicly available climate risk assessments across six EMDEs. The graph shows the outcomes of the most severe physical risk scenario per country.
**The analysis shows the impact on banking system–wide capital adequacy ratio (CAR), except for Honduras, where it indicates CET1 ratio impacts.*
CET1 = common equity tier 1.
Source: World Bank (2024b).

Adaptation measures can help reduce exposure and vulnerability to physical risks and limit financial losses over time.[13] Preventive measures – such as developing climate-resilient infrastructure, risk-informed land-use planning, and improved building standards – have been shown to reduce the impact of physical risks and avoid repeated damage across multiple events (NGFS, 2024d). These actions can help maintain the value of physical assets, reduce the likelihood of credit losses, and limit disruptions to economic activity. For financial institutions, allocating capital toward such measures, if commercially viable, may contribute to lowering their exposure to physical risks across portfolios. Greater uptake of adaptation measures by non-financial and financial institutions to manage their own risks can also support the broader goal of maintaining price and financial stability, particularly as physical risks become more frequent and severe. Some examples of successful approaches are provided below.

13 International Association of Insurance Supervisors – World Bank (2025) also describes the importance of risk reduction measures.

Real-world examples of how institutions integrate adaptation and resilience into business strategies and processes[1]

Institutions are starting to develop adaptation measures and integrate them into internal processes to manage increasing physical risks. The real-world examples presented below relate to large and medium sized institutions, supported in some cases by public authorities. Many of these are related to the agriculture and real estate sectors, as these sectors face direct impacts from physical risks and therefore have traditionally needed to manage these risks. Although these examples do not refer directly to transition plans, they highlight the development of adaptation measures, integrating within internal processes and adaptation plans, all of which could form part of more global transition planning strategies.

Example 1 – Agriculture insurance, Zambia[2]

Agriculture plays a pivotal role in fostering Zambia's socioeconomic development and accounts for 51% of the country's labour force. Half the population also depends on the sector for their food, primarily through smallholder production. Recognising the demand for financial resilience among farmers, a Zambian agriculture company introduced weather index insurance in 2013 to help them recover from climate-related losses and improve their ability to cope with unpredictable weather patterns. The model enables small-scale farmers to voluntarily participate without requiring subsidies, as the company prefinances insurance premiums and provides other agricultural inputs in exchange for an agreement to buy the farmers' cotton at the end of the season. The proceeds from cotton sales and any insurance payouts help offset the farmer's outstanding loan with the company, with the remaining surplus paid out to the farmer. By formalising business relationships and pooling risks, this model creates a safety net for farmers while ensuring the company's steady supply of cotton. The company reports that this scheme has insured over 52,000 farmers, providing payouts to 23,000 of them after a severe drought in 2015-16. It has improved farmers' resilience and fostered trust within agricultural communities, encouraging them to increase crop yields and expand cotton planting.

Example 2 – Water efficient irrigation systems, Nigeria and India[3]

Operating in 60 countries, one of the world's largest rice, cotton, cocoa bean, and coffee-producing agribusinesses has committed to reducing and reusing wastewater in 30 percent of its upstream farms and plantations in water-stressed regions. As part of its programme in Nigeria, it has facilitated the development of drought- and heat-resistant wheat seeds to support the country's goal of achieving self-sufficiency in food production. In India, the company reports that its programme has reduced water needs by 19 percent (and GHGs by 48 percent) compared to conventional methods through drip irrigation, rainwater harvesting, cover cropping, and other sustainable agriculture methods.

Example 3 – Real estate management, Australia[4]

This Australian property trust has sought to understand, manage and disclose its physical risks, and has developed adaptation measures and adaptation plans for its key buildings. It has identified riverine flooding as one of its most significant physical risks, and in response it has made significant investments in flood prevention in riverside assets including installation of floodgates and barriers to protect key equipment, sewer and stormwater diversion works, and relocation of some essential services to higher levels in the building. The adaptation measures have helped strengthen resilience both for its tenants, customers and visitors, as well as for its own operations, with the adaptation measures reducing their estimated losses to physical risks by approximately 90 percent.

1 Examples compiled by the NGFS, based on public sources.

2 Source: NWK Agri-Services, World Bank 2024, Rising to the Challenge.

3 Source: Olam, World Bank 2024, Rising to the Challenge.

4 Source: GPT Group.

Example 4 – Real estate, Hong Kong[5]

A Hong Kong real estate investment trust experienced severe flooding damage to one of its properties due to extreme rainstorms. Following the incident, the company made a multi-million-dollar investment in flood resilience measures, such as installing flood sensors and enhancing design of drainage pipes. Recognising that these risk management measures could also lead to opportunities for reducing operational costs, the company engaged insurers in early discussions to foster collaboration and improve understanding of its initiatives in a roadshow. Additionally, the company presented quantifiable evidence of risk reduction resulting from its resilience investments. By adopting these strategies, it successfully negotiated a further reduction in insurance premiums with its insurers.

Example 5 – Asset management, France[6]

This asset management branch of an insurance group has developed a tool for assessing exposures to natural disasters and integrated this into its investment and portfolio management processes. For its property investments, the branch models various risks (heat waves, floods, forest fires, storms, etc.) using climate projections (IPCC RCP 4.5 and 8.5 scenarios). The assessment is based on the geolocation of buildings, their main occupancy and physical components. For the most at-risk buildings in the portfolio, the company issues recommendations to increase resilience (for example green roofs). The in-house catastrophe modelling tool was used to understand the average annual loss of their investments. Of the €45bn in property investments analysed in 2022, the branch has established that the highest risks in the portfolio are floods (39% of the total), hail (32%) and windstorms (28%).

5 Source: Link REIT, AXA, Marsh, "Sustainability-linked Insurance: Rewarding Climate Risk Adaptation".

6 Source: AXA, Ademe 2024.

A growing number of institutions are recognising both the costs of inaction and the benefits of investing in adaptation. Many studies estimate a positive net cost-benefit ratio of adaptation measures using different methodologies.[14] For instance, an analysis based on CDP data shows that many institutions report cost savings and avoided losses from adaptation investments, with economic benefit-to-cost ratios for measures like water efficiency and regenerative agriculture often ranging from 2:1 to 15:1. Notably, interventions in EMDEs have some of the highest benefit-to-cost ratios, with multinational companies often enhancing the resilience of local micro and small enterprises (MSEs) within their value chains (Chau *et al.* 2023). Estimates suggest that the investment in adaptation market could reach USD 2 trillion within the next five years, and that climate-resilient investments – such as in real estate – may yield higher long-term returns (World Economic Forum, 2021). Conversely, the cost of inaction is substantial: estimates suggest that the total global economic cost of failing to adapt could reach around USD 17 trillion per year between 2025 and 2100. (CPI, 2024b; United Nations Environment Programme Finance Initiative, 2022).

While high upfront costs can be a barrier for some large-scale projects, many adaptation measures are cost-effective, offer immediate resilience benefits, and are therefore considered 'low regret'. For example, low-cost interventions such as stone bunds have proven effective in building resilience to physical risks by reducing soil erosion and enhancing water retention during extreme weather events (Salack *et al.*, 2022). Such measures can help de-risk agricultural supply chains and rural lending portfolios, making them relevant for non-financial and financial institutions operating in or financing climate-vulnerable regions. Yet challenges remain: many adaptation projects generate returns over longer periods or yield broader benefits to a wider set of stakeholders that are harder to monetise by the funder. This is especially true for measures like retrofitting large-scale infrastructure, where high upfront costs are weighed against uncertain long-term

14 For instance, the Global Commission on Adaptation (2019) finds benefit-cost ratios ranging from 2:1 to 10:1 depending on the intervention, considering a triple dividend of avoided losses, economic benefits, and social and environmental benefits. The World Bank (2019) estimates that every US$1 invested in resilient infrastructure in low- and middle-income countries yields US$4 in net benefits. Analysis by Standard Chartered (2024) suggests that for every US$1 invested in adaptation this decade, up to US$12 in economic benefits could be generated.

gains. Adaptation investments such as resilient infrastructure or climate-proofed supply chains can reduce future losses but may lack clear revenue streams. While some projects, such as air conditioning, water desalination, or climate-smart agriculture, do generate more immediate returns, market inefficiencies, short-term investor preferences, and the absence of standardised data and metrics continue to limit private sector engagement at scale.

2.2 The role of transition plans

Transition plans are strategy documents that can serve as a tool to facilitate the assessment and management of physical risks. By incorporating physical risk considerations into business strategy, transition plans can help institutions assess location-specific vulnerabilities and improve decision-making around valuation, risk pricing, and resource allocation. In doing so, they support a structured and forward-looking approach to managing exposure to physical risks, while also helping to identify potential investment needs for building resilience. Evidence from CDP suggests that companies with transition plans are more likely to account for physical risks in a credible way (CDP, 2023 unpublished). In turn, this enables more informed decisions about operations, supply chains, and investment strategies, especially as responding to climate risks often requires business transformation. Transition plans can therefore play a key role in supporting long-term adaptation planning and guiding the development of targeted, forward-looking measures to safeguard resilience and profitability.

At the same time, transition plans can serve as strategic tools to facilitate the alignment of institutions' strategies with broader resilience needs. While their primary function is to support strategy, operational planning, risk identification and management, transition plans can also play a role in mobilising adaptation finance. By improving transparency around physical risk exposures and adaptation needs, and structuring this information in a consistent and comparable way, transition plans also enable financial institutions to more effectively assess the credibility, ambition, and progress of institutions' responses to climate change. In turn, this can help direct capital towards resilience-building activities, either by informing internal investment priorities or by signalling opportunities to external investors. In this way, transition plans not only guide institutions in managing their own risks but can also contribute – where aligned with an institutions' strategic objectives – to a broader market understanding of adaptation challenges and opportunities, potentially encouraging capital flows to underfunded areas of climate action.

A shift in emphasis is required as, to date, transition planning has primarily focused on reducing GHG emissions. Only 43% of non-financial institutions and 58% of financial institutions consider acute and chronic physical risks as part of their climate risk assessment[15] (CDP, 2023 unpublished). The absence of widely established metrics, methods, and targets for adaptation as well as lack of data and understanding of physical risks from exposure and activities of financial institutions poses practical challenges for institutions seeking to incorporate adaptation into their transition plans. Additionally, recognising risks does not automatically translate into adaptation investment – some firms may opt for divestment, while others may hesitate due to uncertainty over viable adaptation measures or lack of clear incentives. To overcome these barriers, adaptation considerations must be more systematically embedded into transition plans, supported by meaningful metrics and targets that can guide strategy, enable monitoring, and support informed decisions on resilience-building.

The financial sector has a key role to play in managing physical risks and financing adaptation measures, in connection with strong real economy planning. The availability of information and data from non-financial institutions influences the financial sector's ability to allocate capital toward resilience. Non-financial institutions' transition plans can provide essential forward-looking information for assessing adaptation needs and identifying viable investment opportunities. Non-financial institutions should integrate climate considerations into their business models by assessing physical risks and adjusting their operations accordingly. Yet, consideration of adaptation remains nascent within most institutional strategies (Spacey Martin *et al.* 2024).

15 The figures are from CDP's 2023 survey on climate change questionnaire of over 12500 institutions, including both financial and non-financial institutions. These show the percentage of institutions that provided a disclosure against an indicator and does not check the quality of the disclosure.

Large firms and those operating in regions with stringent climate regulations – particularly in Europe – tend to be more advanced in their adaptation planning, reflecting the influence of regulatory drivers on corporate action (Munday, 2024). Even among those that do consider adaptation, many lack concrete implementation timelines. Robust adaptation planning across the real economy – through clearer roadmaps, timelines, and policy alignments – can improve the quality of corporate transition plans, create clearer investment pipelines for financial institutions and strengthen the feedback loop between corporate planning and financial flows.

A supportive enabling environment for adaptation is also important for unlocking the full potential of transition plans. Coherent government policies, plans (NDCs, NAPs), regulatory frameworks, and targeted public investments can facilitate effective transition planning, supported by national climate information architectures (for example, encompassing standardised data, disclosures, and alignment approaches, sectoral transition pathways) which form the foundation for effective private sector engagement (International Monetary Fund, 2023). In addition, regulatory measures such as mandatory climate risk disclosures[16] and stress testing[17] can incentivise institutions to incorporate adaptation into their strategies. Without a proper enabling environment, the effectiveness of transition plans in enhancing private sector engagement in adaptation, and in addressing financing gaps, would be constrained.

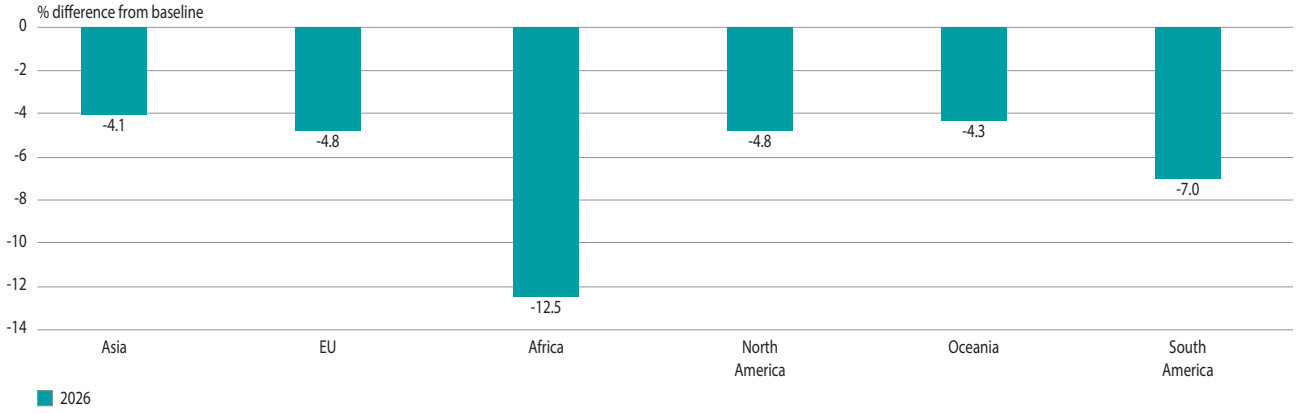
16 For instance, IFRS S2 (2023) Climate-related Disclosures.

17 For instance, World Bank (2024) "Double Trouble? Assessing Climate Physical and Transition Risks for the Moroccan Banking Sector", World Bank (2021) "Not-So-Magical Realism : A Climate Stress Test of the Colombian Banking System", IMF (2022) "Mexico: Financial Sector Assessment Program – Technical Note on Climate Risk Analysis", Hallegatte *et al.* (2022) "Bank Stress Testing of Physical Risks under Climate Change Macro Scenarios: Typhoon Risks to the Philippines".

The role of transition plans in strengthening resilience in EMDEs

Adaptation is a global challenge, but EMDEs face disproportionate climate risks with far less financial support. The poorest 40% are expected to suffer climate impacts 70% greater than the global average (World Bank, 2024a), yet EMDEs (excluding China) receive only 14% of global climate finance despite making up a quarter of global GDP (World Bank, 2024b). While adaptation flows to these countries have more than doubled since 2018, they remain just one-third of the estimated annual needs through 2030 (CPI, 2024a), though this is likely underestimated given data and methodological challenges. These financing shortfalls are particularly concerning given the scale of projected economic impacts. For example, NGFS short-term scenarios suggest that under a severe but plausible combination of extreme weather events and limited policy action, Africa could experience GDP losses of up to 12.5%, with similarly severe losses in other regions such as South America (Figure 5).

Figure 5 **GDP losses by region in 2026 under the NGFS Disasters and Policy Stagnation short-term scenario**



Note: Results are shown here as a global weighted average of a region being domestically impacted by a combination of heatwave-drought-wildfire events with a 1 in 50 years return period. The Disasters and Policy Stagnation scenario explores a series of severe and compound extreme weather events.
Source: NGFS short-term scenarios (NGFS, 2025a).

Integrating adaptation into transition plans in EMDEs is shaped by a mix of constraints and enabling factors. High capital costs, capacity constraints, and market inefficiencies can undermine firms' ability to assess, finance, and implement necessary adaptation measures. Private capital often struggles to identify investable adaptation projects. Less than 10% of African infrastructure projects reach financial close, and around 80% fail at the feasibility and business-plan stage due to technical, institutional, or financial design issues (McKinsey, 2020). Public sector tools, including subsidies, tax incentives, and public-private instruments like blended finance structures can help attract private capital to high-priority adaptation measures (OECD, 2022). Blended finance and public-private partnerships (PPPs) can play a key role in mobilising private capital, but they have yet to scale effectively. In this context, governments, central banks and supervisors could also help address some of these barriers by enhancing the visibility of physical risks and adaptation needs through consistent disclosure frameworks and risk assessments. Targeted concessions, robust risk-sharing mechanisms, and a stronger enabling environment – with better climate data, standardised disclosures, and clearer regulations – are essential for bridging the adaptation finance gap (NGFS, 2023a).

Institutions in EMDEs with low emissions and high vulnerability to physical risk may need or want to prioritise adaptation in their transition plans. The survey results from the NGFS report "Tailoring Transition Plans: Considerations for EMDEs" (NGFS, 2024c), show that financial institutions in advanced economies predominantly focus their transition plans on mitigation, while those in EMDEs, perceiving greater exposure to physical and nature-related risks, place more emphasis on adaptation within their transition planning.

3. Building blocks for integrating adaptation into transition plans

While adaptation and resilience require specific considerations, the structure of existing transition plans could be leveraged to support a consistent approach across mitigation and adaptation. Most climate transition plan frameworks are built on five key pillars:[18] (1) governance, (2) foundations, (3) implementation strategy, (4) engagement strategy, and (5) metrics and targets (Figure 6).

Figure 6 **Five pillars for integrating adaptation in transition plans**

Source: Adapted from existing transition planning guidance (for example from GFANZ, EFRAG, TPT, Climate Financial Risk Forum (CFRF)).

Governance is integral to the ambition, action and accountability for incorporating adaptation into transition plans and transition planning. However, this does not mean that a separate and new governance process dedicated to adaptation needs to be established. Institutions can leverage existing governance processes to support adaptation planning. Governance is a critical underpinning element across the whole process for institutions to regularly continue evaluating the effectiveness of its transition plan, risk management, and the appropriateness of the original climate objectives and business strategy. Governance for adaptation should represent a natural extension to the institutions existing governance practices. Once appropriate adaptation metrics and targets have been developed, monitoring and reporting should be aligned with climate governance bodies that may have been established for overseeing mitigation targets for a holistic view of the institution's climate transition and resilience plan. Since governance arrangements can be common to both mitigation and adaptation, they are not discussed in detail, and the remainder of this section addresses foundations, implementation and engagement strategies (section 3.1) and metrics and targets (section 3.2). The development of these pillars may be iterative in practice. This framework and the maturity model provided for adaptation metrics and targets seek to accommodate a diverse range of institutions at different levels of maturity with different risk profiles. These guidelines can be applied on a proportionate basis depending on the size, complexity and risk profile of the institution.

18 E.g., Glasgow Financial Alliance for Net Zero (GFANZ), European Financial Reporting Advisory Group (EFRAG), and the Transition Plan Taskforce (TPT) which has been adopted by the International Financial Reporting Standards (IFRS) Foundation. An international standard for net zero transition planning for financial institutions is being developed by the International Organization for Standardization (ISO), to be finalised in early 2026.

3.1 Integrating adaptation and resilience in the transition planning process

3.1.1 Foundations

Set ambitions and objectives

With no obvious analogue to a net zero emissions target for mitigation, integrating adaptation into transition planning can be structured around two complementary objectives:[19]

- **The first objective would focus on identifying and managing exposure and vulnerability to physical risks on an institution's balance sheet and through its operations.** This approach ensures that institutions can withstand the impacts of climate change by strengthening the resilience of their operations and assets. For example, property owners could consider flood risks in vulnerable areas. By implementing flood-resistant designs and choosing locations less prone to severe weather events where exposure cannot be avoided, they can safeguard their investments and ensure long-term business continuity. Similarly, farmers could prepare for drought conditions by developing water-efficient farming techniques and adopting resilient crop varieties. Managing exposure or vulnerability to physical risks could also include ensuring that any mitigation objectives complement, and consider potential impacts on, adaptation objectives.
- **The second objective, where applicable, seeks to seize adaptation-related business opportunities that align with the institution's strategic interests and may also contribute to systemic resilience.** This approach involves developing business strategies that enhance resilience through operations and assets, extending benefits beyond the institution itself (World Bank, 2024a). A seed company, for example, could develop drought-resistant crops to address increasing climate stress. This not only benefits farmers that are vulnerable to shifting weather patterns, but it could also open new markets for the company, enhancing its competitiveness and profitability. Alternatively, a business could invest in the development of an early warning system (for example for flood) that not only informs its own operations but also provides climate risk related information to the surrounding communities.

Through setting adaptation objectives in their transition plans using these two perspectives, institutions can set the foundation to both safeguard their own viability and facilitate wider societal and economic stability in the face of climate change. For example, financial institutions could offer green financing products that help businesses invest in climate-resilient infrastructure, such as flood-resistant buildings or drought-adaptive agriculture. This approach could benefit both the financial institution by reducing credit risk and their clients by enhancing their resilience.

Scoping and physical risk assessments

An institution could start by scoping and data gathering to enable an assessment of the exposure and, if possible, the vulnerability of its assets and portfolio to physical risk. For financial institutions, this assessment would cover both their own assets and those of their clients (the transition plans of the latter could be used for this purpose). As a next step, institutions could also cover key parts of their value chains, progressively increasing coverage over time. It is important to understand the minimum data requirements for the assessment being conducted (explored further in section 3.2.1), as institutions do not need to wait for fully complete and precise data sets. This is especially the case for financial institutions which often rely on data from others and non-financial institutions with very large and complex value chains. Data limitations pose significant challenges, particularly the lack of granular, asset-level information, such as precise data on asset locations (NGFS, 2024c). Nevertheless, the use of proxy data or estimates that are refined over time, along with data sharing frameworks developed in collaboration with public authorities and industry partners, can help address some of these challenges.[20] Where available, climate risk assessments developed by the public sector can also be leveraged to

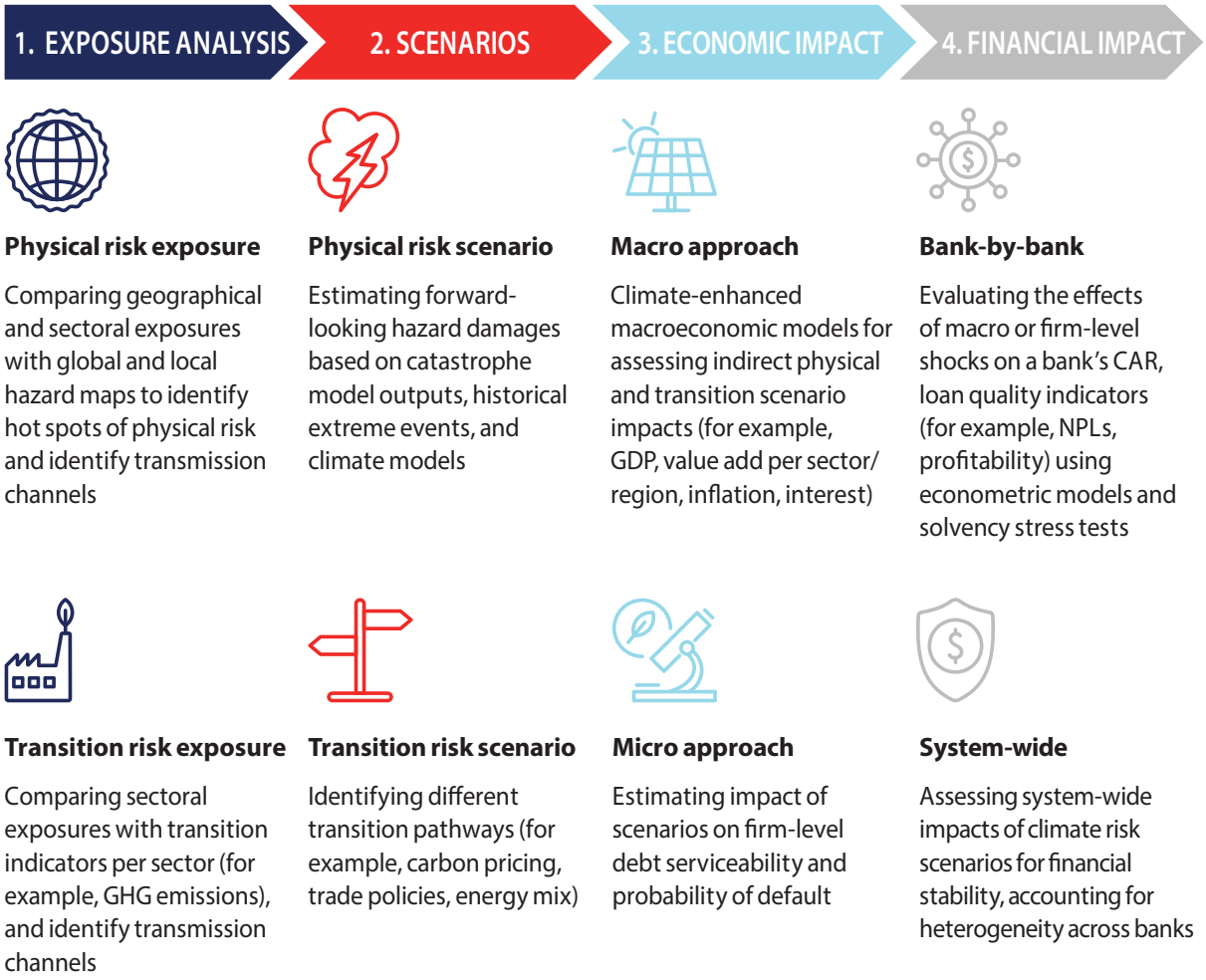
19 While the Global Goal on Adaptation (GGA) under the Paris Agreement sets out high-level aims for adaptation, it remains qualitative and challenging to operationalise at the entity level. Unlike mitigation, where quantified targets such as net zero emissions offer a clear anchor, integrating adaptation into transition planning can instead be structured around two complementary objectives.

20 For instance, the NGFS Data Directory aims to bridge this gap by providing a centralised repository of relevant information. Oxford University have also compiled a database of open-source hazard data and asset-level data.

help fill data gaps (further considerations around managing uncertainty in climate risk assessment, including dealing with climate variability and modelling limitations, are discussed in section 3.2.5).[21]

Next, sequenced and proportionate approaches can be considered to assess the most material parts of the institution, such as revenue, investment, or business criticality. This can start with an initial prioritisation of adaptation goals. For financial institutions, this could mean proportionate approaches based on the scale of investments and/or level of risk of specific sectors or specific asset classes. For non-financial institutions, this could mean using different assessment approaches and data based on the remaining life of physical assets. The Climate Financial Risk Forum Adaptation Working Group proposes this, with more scenario analysis for longer term assets and those with 'high regret' (high stakes) (CFRF, 2024). For climate stress-testing, a sequenced approach starting with an exposure assessment before exploring financial impact scenarios and modelling, can offer a way forward that is proportionate to the capacity of the institution (Figure 7). Beyond risks at institution level, it is also important to understand global transmission channels and system-wide financial impacts related to climate risks (FSB, 2025a).

Figure 7 **Example of a sequenced approach to climate risk analysis for the financial sector**



Note: This system-level approach can be applied at the level of an entity. A bank's capital adequacy ratio (CAR) measures its available capital as a percentage of its risk-weighted assets to assess its ability to absorb potential losses while maintaining operational stability. Non-performing loands (NPL) are loans where the borrowed money has not been repaid on schedule.
Source: World Bank (2024b).

21 See for example, Australia's National Climate Risk Assessment.

Physical risk assessments, including those using scenario analysis, are evolving rapidly, offering valuable insights despite ongoing challenges such as variable data quality and the need for more standardised methods. As mentioned in the NGFS report on Interactions Between Climate Scenario Analysis and Transition Plans (NGFS, 2025b), both scenario analysis and transition plans are forward-looking tools that identify and assess climate impacts on a financial institution's business in the short, medium, and long term. Given these commonalities, climate scenario analysis can provide a view of the potential risks and opportunities that may affect an institution's business strategy and operations. Therefore, scenario analysis can inform transition planning and transition plans (for example a financial institution's transition planning should follow a coherent narrative – founded on one or more reference scenarios – and should include both intermediate milestones and longer-term targets). IPCC defines physical risk as a function of hazard, exposure, and vulnerability and this is a useful framing for adaptation and resilience considerations. Institutions typically assess exposure by identifying key climate hazards in their operating regions and using historical data and scenario analysis to estimate potential impacts. Scenario analysis considers how acute risks, like extreme floods, and chronic risks, such as prolonged water scarcity, change under different hypothetical future scenarios. Vulnerability is a function of sensitivity (the degree to which exposed assets can absorb and rebound from climate-related impacts) and adaptive capacity (ability of systems, institutions, and assets to respond to potential damages and seize opportunities) (CFRF, 2024). To properly assess baseline resilience, sensitivity needs to be considered before determining whether and how to build adaptive capacity. These assessments become even more important when estimating the extent of impact that institutions may incur indirectly such as through risk transmission channels and in its value chains.

Based on the risk assessment, institutions can determine an acceptable level of risk. Once institutions have conducted physical risk assessments of assets or portfolios, they should have a comprehensive understanding of inherent (gross) risk levels and material risks. They can then leverage existing enterprise risk management processes, determine an acceptable level of risk and decide on actions to manage the residual (net) risk. These are further outlined below in section 3.1.2. The goal is not to eliminate all risk, but to ensure that the institution is resilient enough to withstand these changes in line with its risk appetite and risk tolerance. By evaluating the most material potential threats to business continuity, institutions can identify critical vulnerabilities and prioritise actions to address them. The assessment should be integrated into broader financial risk analysis, considering how climate risks could affect the solvency and liquidity of clients and, by extension, the institution itself.

When viewing adaptation as an opportunity, institutions can leverage government strategies and sustainable finance taxonomies (where they exist and include adaptation) to anticipate market opportunities and identify investment pipelines. The substantial financing gap between what is needed for adaptation and what is currently being funded highlights an opportunity for institutions to invest, innovate and/or offer new products and services. Government strategies could be a reference point to identify opportunities. This can be considered at all levels of government, from national, for example NAPs – particularly Paris-aligned plans, all the way through to regional, local and sectoral plans. Another useful reference point for institutions to assess potential adaptation opportunities is sustainable finance taxonomies. There are already examples of taxonomies globally that include adaptation considerations, including from the EU,[22] Malaysia,[23] the Philippines,[24] South Africa,[25] as well as private sector initiatives such as the Climate Bonds Initiative's Climate Bonds Resilience Taxonomy (2024), which has informed the Climate Policy Initiative's adaptation finance taxonomy criteria. The Bank Negara Malaysia's principles-based taxonomy sees adaptation integrated into several of its guiding principles, including climate change adaptation, doing no significant harm to the environment, and remedial efforts. Notably, the taxonomy reflects both adaptation risk and opportunity by defining economic activity as aligned with climate change adaptation if it involves implementing measures to increase

22 European Commission, EU taxonomy for sustainable activities (2020).

23 Bank Negara Malaysia, Climate change and Principle-based Taxonomy (2021).

24 Bangko Sentral Ng Pilipinas, Philippine Sustainable finance Taxonomy Guidelines (2024).

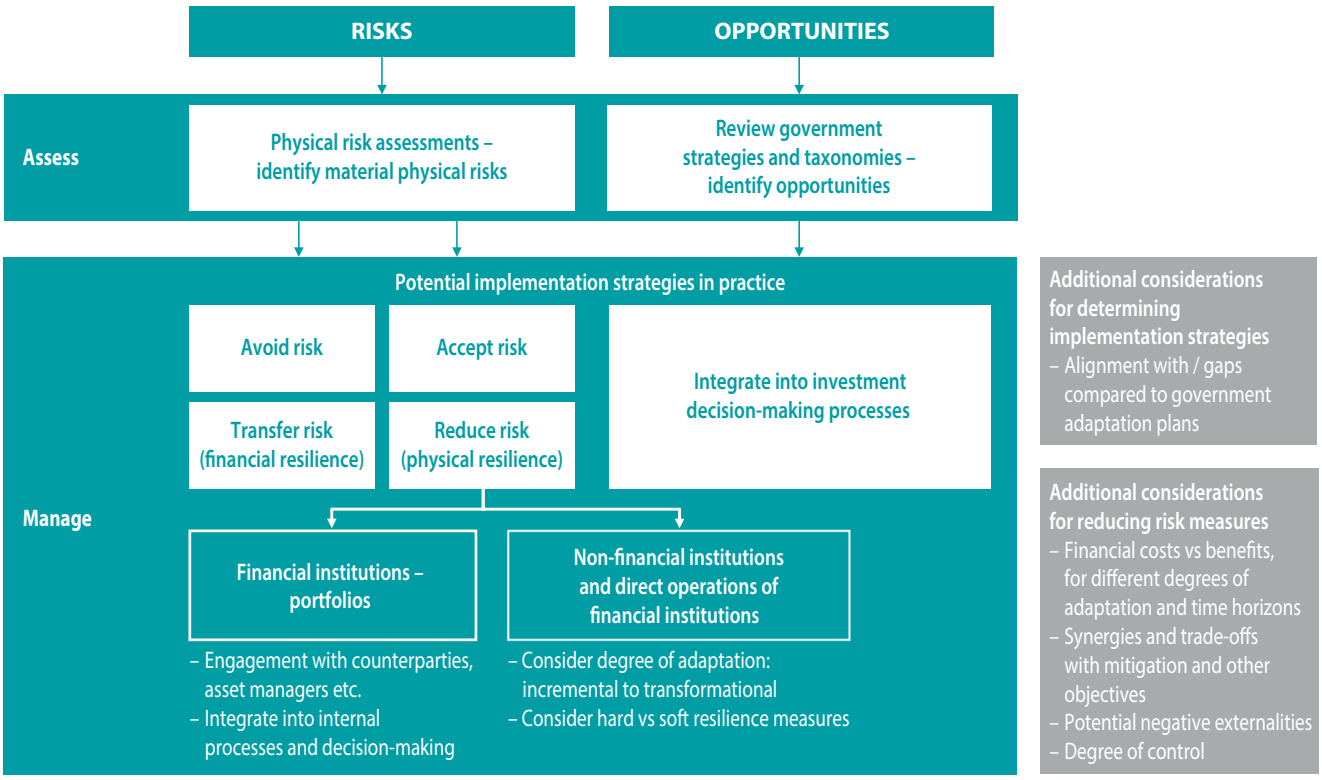
25 National Treasury Republic of South Africa, South African Green Finance Taxonomy (2022).

an institution's own resilience or if it enables other economic activities to adapt to climate change. These taxonomies play a pivotal role in shaping an enabling environment for transition planning by providing clear criteria for what constitutes 'adaptation-aligned' activities, thereby helping to standardise definitions, improve comparability, and guide both public and private investment decisions.

3.1.2 Implementation strategy

The following diagramme outlines the process from assessing to managing physical risks and opportunities, focusing particularly on various elements to consider when determining how to manage risks. These are explored in further detail in the subsequent sub-sections.

Figure 8 **Process from assessing to managing physical risks and opportunities**



Sources: Authors.

Potential implementation strategies in practice

For their most material risk and opportunity hotspots, institutions could then make use of their existing enterprise frameworks and processes to determine the appropriate response and level of residual (net) risk or opportunity. The options available are:

1. **Avoiding risk.** This is the simplest management response that involves the lowest physical risk exposure, for example, divesting of or avoiding business or value chains in a particular location due to high current or anticipated future physical risk. This may be the preferred option for institutions that have a low appetite for exposure to physical risks or when deciding on a location for critical assets. However, preventatively avoiding risk is not always possible for existing assets and there are other considerations, which may make completely avoiding risk unlikely to be desirable, such as cost, labour and barriers to market entry when moving operations. For the portfolios of financial institutions, avoiding risk exposure through divestment may appear as a comparatively easy option, but this is often the last resort when other attempts to influence have failed. Additionally, divestment can have undesirable unintended consequences such as financially excluding vulnerable households or institutions precisely when they need funding to adapt.

2. **Accepting risk.** This is an option if the risk level is inherently low or for institutions that have a high tolerance for physical risk. Some considerations at this stage may include how substitutable or critical the assets are to business operations. However, this requires continuous monitoring and periodic reassessment as a decision might become unsustainable in the face of increasing physical risk intensity, frequency and duration either impacting operations directly or indirectly through the value chain and/or transmission channels.

3. **Reducing risk.** This is the key management response to improve physical resilience for non-financial institutions, as well as the direct assets of financial institutions (for example operation centres or branches exposed to physical hazards). This response strategy has the widest potential scope for variation in terms of the ambitiousness of preventative adaptation measures and therefore the associated costs and effectiveness of risk management. There are several approaches that institutions can consider when determining measures to reduce risk:
   a. Incremental versus transformational adaptation. Incremental adaptation maintains the integrity of a social-economic system or process at a given scale. Examples include: "climate-smart designs" which foster infrastructure that is climate resilient and might prove cost-effective over longer periods and "low-cost preparatory and early actions". Conversely, transformational adaptation envisages changes in the fundamental attributes of a system in anticipation of further climate change and more severe impacts (World Bank (2024a) and Möller *et al.* (2022)). Examples include change of farming type from crops to livestock or changes to asset or infrastructure planning.
   b. Hard versus soft measures. Hard resilience measures refer to structural enforcements that usually require capital expenditure. This can be coupled with soft measures, which apply at the institutional or business function level, such as integration of adaptation considerations into existing systems, policies or processes (Institutional Investors Group on Climate Change, 2024). For example, the OECD estimates that less than 2% of infrastructure investment currently uses climate resilience principles (CPI, 2022). Simply introducing resilience considerations in infrastructure investment processes could effectively reduce future losses from climate hazards.

   Financial institutions have the potential to reduce risk to their portfolios by engaging with counterparties, clients and/or asset managers to encourage greater physical resilience and reduced vulnerability. This could be through direct engagement with financial institutions, or indirectly through integration of physical risk considerations into valuation and pricing decisions, or through financial or contractual terms and conditions.

4. **Transferring/sharing risk.** Institutions can improve financial resilience by transferring risks, such as through insurance, securitisation, or catastrophe bonds. Reinsurers also play a role in risk sharing by helping insurers hedge some of the financial impact of physical risks. Institutions could also engage with insurers on possible incentives for implementing adaptation measures in their transition plans, such as improving the physical resilience of their operations that could secure continuous insurance coverage while reducing insurance costs. However, where physical risks worsen over time, institutions are likely to face continued upward pressure on insurance costs. It may also be seen through insurers withdrawing from certain markets or discontinuing insurance for certain risks. This trend also has socioeconomic implications in terms of the availability and affordability of insurance, and financial inclusion more broadly, especially in EMDEs. In responding to these challenges, insurers have been and are continuing to evolve their products and business models to meet emerging insurance needs, turning risk into opportunity.[26] However, it is important to ensure that risks are not disproportionately transferred to the insurance sector alone, in order to safeguard the long-term viability of insurers within the financial system.

5. **Investing in new opportunities.** The insights from an adaptation opportunity assessment can help inform future strategy of institutions. For non-financial institutions, adaptation opportunities depend on their sector(s) of operation and nature of their business (section 2.1). However, it is still possible to adjust their business strategy, products and services towards adaptation opportunities. For example, in

26 For more information, refer to the IAIS-World Bank input paper on identifying and addressing insurance protection gaps (forthcoming).

engineering-related sectors, this may include creation or dissemination of climate-resilient building materials and techniques. In information technology, adaptation opportunities may exist to interpret meteorological forecasts and provide local, timely, and actionable information for relevant sectors such as agriculture or sectors dependent on long, complex supply chains (UNEP, 2022).

For financial institutions, there are already emerging examples from banks and insurers developing new products and services to encourage and enable increased physical and financial resilience of their customers. For example, banks can develop specialised loan products for businesses investing in climate-resilient infrastructure. These products could offer more favourable terms for projects that enhance resilience, such as flood-resistant buildings or drought-adaptive agriculture. Similarly, insurers can incentivise policyholders to implement adaptation measures and reduce their physical risk exposures by providing better pricing and terms when they do so. Over time this can have the benefit of retaining customers who may otherwise be priced out of the insurance market. Products which have incorporated adaptation could generate new revenue streams,[27] some of which are showcased in the Sustainable Finance Platform's report,[28] which lists various instruments that financial institutions can use to promote adaptation solutions among their clients such as risk analysis, information provision, price incentives, innovative financing, and enhancing product terms and conditions. Specific examples include:

- tooling developed for the analysis of biodiversity performance by farmers in conjunction with possible incentives by multiple stakeholders,
- insurers incentivising switches to adaptation-enhancing practices by offering discounts,
- insurers broadening the scope of insurance products to include flood protection.

Additional considerations for determining implementation strategies

Institutions should consider government adaptation plans as part of deciding whether or how to avoid, accept, transfer or reduce risk, or to capitalise on adaptation opportunities. In particular, institutions could consider which risks they will manage themselves and where they will rely on government initiatives (for example as identified through government adaptation plans). One key consideration in embedding adaptation would be to take stock of the national or regional adaptation plans (where available) and relevant international policy frameworks, incentives and other relevant emerging mechanisms. Institutions can make use of government adaptation plans as a useful reference point to establish their own adaptation and investment priorities,[29] along with associated timeframes for the measures. However, due to the inherently local nature of adaptation measures, NAPs may not have the level of granularity required to develop resilience actions for all institutions. Therefore, institutions should be prepared to minimise their own risk where there are risk hotspots or adaptation gaps unaddressed by policy that are material to them.

Where institutions have decided that risk reduction is their preferred response, they could then consider several questions related to cost, level of control and extent of adaptation:

- **What level of physical risk appetite will they set and what are they prepared to invest in adaptation measures to achieve this (section 3.2.4)?** As part of due diligence processes prior to committing capital expenditure on adaptation measures, an economic or financial cost-benefit analysis should be completed to ensure proportionality.[30] It is recommended that this includes some sensitivity analysis to understand the cost of adaptation, and potential losses avoided if the risk occurred for each option to identify the

27 E.g., UNEP-Principles for Sustainable Insurance Initiative (PSI) has piloted the use of climate scenarios and hosts the V20-SIF, a vulnerable country-led insurance facility that aims to deliver insurance protection to micro, small, and medium-sized enterprises (MSMEs) to build their climate resilience.

28 The Sustainable Finance Platform in the Netherlands is a network in which the financial sector, public sector and supervisory authorities cooperate. In its 2023 report, the Platform's working group in Climate Adaptation explores, inter alia, what financial institutions can do to promote adaptation and resilience among their clients (Sustainable Finance Platform (2023)).

29 An assessment of 56 NAPs by UNEP found that approximately two-thirds of these plans have identified priority sectors (UNEP, 2024).

30 See for example, the Coalition for Climate Resilience Investment's Physical Risk Assessment Methodology (PCRAM) for evaluating climate-resilience of infrastructure. It sets out a multi-stage approach to identify the most material physical risks and evaluates the resilience options through a financial analysis stage. The method is now owned by the IIGCC, which will broaden its application across various industries.

preferred balance between cost and benefit for the remaining life of the physical or financial asset. Overall, estimated cost differences in adaptation strategies can be significant: for example, the costs for protecting from river floods can vary by a factor of four between the economically optimal action, which results in the least residual damage (World Bank, 2024d). It is also important not to see all adaptation initiatives simply as a cost, as there are some initiatives that can generate a cash inflow, therefore making a stronger financial business case. For example, this may be developing and selling drought-resistant seeds.

- **Are there any "win-win" measures or synergies that address both adaptation and mitigation objectives? Are there trade-offs to consider between adaptation and mitigation?** While mitigation addresses the causes of climate change, adaptation addresses current or future physical risk impacts. Trade-offs can occur where these two purposes compete for a finite amount of capital. Synergies occur when actions provide dual benefits. For example, constructing energy-efficient buildings using climate-resilient materials simultaneously reduces emissions and enhances resilience to physical risks. Other examples include better agricultural management techniques, climate-proof data centres, decentralised energy systems and nature-based solutions. Some nature-based solutions such as mangroves restoration and reforestation could even lead to a triple benefit, achieving nature, mitigation and adaptation objectives. Conversely, some mitigation measures could conflict with adaptation needs, leading to trade-offs. For example, large-scale bioenergy plantations, while helpful for carbon sequestration, could strain local water resources, thereby undermining community resilience to droughts due to climate impacts. Understanding these interconnections is crucial to building robust transition plans, as climate change effects will persist even if global emissions are reduced. It is also therefore important that institutions are considering both adaptation and mitigation impacts when deciding on decarbonisation and adaptation actions.
- **Are there any unintentional negative externalities – a risk that adaptation measures, while well-intentioned, could lead to adverse effects?** An important step in evaluating adaptation is the assessment of potential negative externalities, including the risks of maladaptation. Maladaptation refers to adaptation measures that inadvertently increase vulnerability to climate change rather than decreasing it. Maladaptation can occur because of poor calibration of adaptation measures, inaccurate prognosis of future changes, or inappropriate responses to these prognoses. It can also happen when an adaptation measure transfers vulnerability from one system to another, or from one period to another. For instance, fire suppression in naturally fire-adapted ecosystems or the construction of hard flood defences can reduce space for natural processes and degrade an ecosystem. This in turn undermines their resilience to climate change and limits their ability to provide essential ecosystem services that support adaptation, as well as contributing to other unintended costs in the future.
- **What climate scenarios are assumed in the overall transition plan?** Current transition plans predominantly focus on mitigation measures, which are typically aligned with a lower temperature scenario (1.5 °C / well below 2 °C).[31] Conversely, physical risks are often assessed using a high physical risk scenario (3-4 °C). This is because the best practice for prudent risk management is to understand and prepare for the impact of tail risks – the potential impacts from more extreme scenarios, which would have the largest impact. However, practically, institutions may prefer to focus on the most likely or expected scenario based on current policies and trajectories for strategy setting. Institutions should therefore carefully consider what climate scenario they plan to adapt to. At a minimum, an institution should plan adaptation measures based on a 1.5 °C high transition scenario, as even warming within the Paris Agreement's 1.5 °C goal is still expected to have considerable physical impacts. The CFRF (2024) suggests that, where feasible, institutions should prioritise adaptation actions that help them strengthen resilience across multiple future scenarios.

31 To comply with the overarching goal of the Paris agreement, i.e. holding "the increase in the global average temperature to well below 2 °C above pre-industrial levels" and pursue efforts "to limit the temperature increase to 1.5 °C above pre-industrial levels."

- **Which time horizons are most important?** There is typically a difference between corporate planning time horizons which tend to have a shorter-term focus (3-5 years) and the timeframe over which physical risks are expected to intensify (in the latter half of the century). The NGFS has recently released its short-term climate scenarios to help bridge this gap and explore the economic and financial implications of severe but plausible occurrence of combined climate events (NGFS, 2025). In reality, institutions are already experiencing substantial losses from extreme weather events. Institutions may therefore consider it appropriate to already invest more in adaptation and plan for increased resilience in current planning cycles.
- **What is within their sphere of control or influence?** To operationalise some of these adaptation strategies, institutions will need to engage with a variety of stakeholders, including regulators, governments and institutions across their value chain. This particularly applies to adaptation measures which extend beyond the spheres of control or influence of an institution, which may not be financially sensible for a single institution alone or which depend on public infrastructure.

Some of these points may differ considerably by asset and location. These are not one-off considerations but should be periodically reassessed as part of strategy evaluation. While the general concept of adaptation is intuitive, its implementation, especially in conjunction with execution of transition plans, requires considerable planning and adjustments over time along with stakeholder engagement.

Box 1

A hypothetical example of the integration of adaptation in the five pillars of transition planning

Written by the International Transition Plan Network (ITPN)

A South African mining operator produces a mix of commodities including metallurgical and thermal coal, iron ore, copper, nickel and potash across Sub-Saharan Africa, Latin America, and South-East Asia. The company aims to remain resilient to future climate change while transitioning its portfolio towards transition-critical materials such as copper, cobalt, lithium, and nickel, and achieving net zero greenhouse gas emissions across its scope 1, 2, and 3 emissions by 2050. The company's transition plan is publicly available on its website.

The company has conducted a physical risk assessment across its operations and value chain, accounting for anticipated changes in operational scope, such as planned closures of thermal coal sites and new lithium sites. The assessment considered several climate scenarios across three time horizons, taking into account that warming trajectories are largely similar in the near and medium-term:

- Short-term (next 5 years): using both recent weather data and localised forward-looking projections to assess near-term, locked-in climate impacts.
- Medium-term (5-10 years): using a moderate action scenario to assess the climate hazards that it may be exposed to under a current climate policies scenario.
- Long-term (10-30 years): modelling three different emissions scenarios (strong mitigation, moderate action and delayed action) to explore the range of possible hazards it could be exposed to over the long term.

Based on this analysis the company identified key physical risks, including droughts and chronic water stress, extreme precipitation, flooding, landslides and acute heat events, which could lead to production stoppages, logistical disruptions, resource competition with other actors, tensions with local communities, and increased safety risks. The physical risk assessment informs all elements of the transition plan:

Foundations: The strategic ambition of the transition plan includes objectives to enhance the resilience of its own operations and the communities in which it operates, considering local/national adaptation plans.

…/…

It transparently discloses assumptions made for the assessment of physical risks (including time horizons and scenarios considered), as well as its dependency on factors related to physical risks (for example the availability and pricing of key natural resources).

Implementation strategy: The firm plans to integrate physical risk assessments into all exploration and development activities, including baseline, pre-feasibility, and feasibility studies. This will involve evaluating trade-offs and synergies with other transition planning objectives, such as emission reduction targets. It will further develop and implement water stewardship programmes at high-risk sites, which include steps to engage the community, improve data collection and implement monitoring and early warning systems. Investments in resilience measures are planned, including flood defenses, cooling and ventilation systems, nature-based solutions, drainage, and wastewater treatment and recycling systems. Finally, the firm integrates estimated financial exposures to physical climate and environmental risks into financial planning processes, such as capital expenditure investment decision-making and damage forecasts.

Engagement strategy: The firm plans to enhance collaboration with supply chain partners to improve risk assessments, data quality, and manage vulnerabilities, for example by including resilience clauses in contracts which require suppliers to monitor and mitigate key physical risks. In addition, the firm plans to develop strategic community partnerships at the project level to co-develop adaptation options and ensure no significant harm is done to local communities and the natural environment. Advocacy with local and national governments will be pursued to make a case for investments in public infrastructure resilience and local natural capital.

Metrics and targets: At the project level, site-specific water targets are set, including target efficiency, withdrawal, consumption, and discharge rates, as well as circularity targets. At the business level, the company monitors the amount of land exposed to each hazard type and sets short-term, mid-term, and long-term targets specifying the proportion of assets and operations to be resilient to specific hazards.

Governance: Board oversight of adaptation efforts is enabled via integration of physical risk metrics and information on environmental impacts in (or close to) ecologically sensitive locations into risk reports and management updates. Physical climate and nature risks are integrated into enterprise risk management, and a cross-functional transition planning committee is established which also explores trade-offs and synergies between mitigation and adaptation efforts. Senior executive incentives are linked to performance on adaptation and resilience targets.

3.1.3 Engagement strategy

Institutions can benefit from engaging with a range of stakeholders, who can help them to operationalise their implementation strategies, leveraging existing contacts related to mitigation topics where possible for a cohesive approach.

Engagement with government stakeholders

Institutions could proactively identify opportunities for cooperation with public stakeholders to enhance resilience. Effective adaptation in many local contexts will likely require close collaboration between private institutions and local/regional public authorities. When developing a transition plan, a company might rely on public initiatives or resources beyond its individual reach. Therefore, engagement with government could range from seeking policy clarity at national level from a NAP to providing support (financial or non-financial) for localised measures, such as flood protection. Engagement with public stakeholders can help institutions understand what public initiatives or resources they can rely on in their planning and may also help them to identify opportunities for public-private partnerships that support the resilience of the institution itself, and, if applicable, of the community in which it is situated.

Box 2

Role of insurance in promoting adaptation and resilience integration in transition plans

Written by the Sustainable Insurance Forum (SIF)

The UNDP Sustainable Insurance Forum (SIF)'s 2024 report 'Supervisory Thinking on Insurance-related Climate Transition Plans'[1] found that insurance supervisors recognise transition plans as an essential component of risk management, but observed there was still considerable complexity and challenges in developing supervisory requirements on transition plans. The report noted variation in the current supervisory thinking on the scope of transition plans and planning. While some insurance supervisors take a balanced view on both mitigation and adaptation, others primarily focused on mitigation in transition planning.

The IAIS[2] has stated that insurers can play a key role in climate change adaptation and risk mitigation. More specifically, insurers can (i) help society understand the risk from climate changes; (ii) encourage policyholders to take adaptative measures;[3] and (iii) build greater resilience through inclusive insurance.[4] More recently, the IAIS published an application paper on the supervision of climate-related risks in the insurance sector to support supervisors in effectively integrating climate-related risks into their supervisory practices, thereby strengthening the resilience of the global insurance sector.

There is a wide range of approaches taken by insurance supervisors to promoting climate risk assessment and adaptation measures in their jurisdictions, although these are not directly linked to transition plans yet. For example:

- In 2023, the European Insurance and Occupational Pensions Authority (EIOPA) published a report on insurers' incentives for climate-related adaptation measures in non-life underwriting practices.[5] It noted that adaptation features such as flood-resistant doors and windows, heat- and fire-resistant construction materials to protect against exterior fire events, or weather alert systems can reduce physical risk exposures and insured losses. Insurers can adjust their policies and propose premium rebates to policyholders implementing such adaptation measures. These measures, incentivised by insurers, can therefore be a key tool in maintaining the availability and affordability of insurance coverage against natural catastrophes, and ultimately help to limit the climate-related insurance protection gap. Additionally, EIOPA and the European Central Bank (ECB) pointed out the importance of carefully designed insurance offers to encourage adaptation and reduce vulnerability to climate-related catastrophes over time.[6] Currently EIOPA is consulting on an approach for raising awareness of natural catastrophe risk and prevention measures, to enable citizens to better understand the potential impacts of climate change on their properties, and possibilities for reducing these impacts.[7]

…/…

1 Sustainable Insurance Forum, Supervisory thinking on insurance-related climate transition plans (2024).

2 IAIS, IAIS commitment to amplify response to climate change (2021).

3 Also the FSI (2025 and 2023) describes how reinsurers and reinsurers consider risk adaptation measures in pricing and underwriting of (re)insurance products.

4 In the IAIS' Issues Paper on Conduct of Business in Inclusive Insurance (2015), inclusive insurance corresponds to "all insurance products aimed at the excluded or underserved market, rather than just those aimed at the poor or a narrow conception of the low-income market". As excluded populations and underserved markets are often the most affected by physical risks, the inclusivity of insurance products is key. By being inclusive, insurance can support adaptation measures – including in underserved markets – and promote a greater resilience of the financial system.

5 EIOPA, Report on the Implementation of Climate-related Adaptation Measures in Non-Life Underwriting Practices (2023a). EIOPA refers to 'impact underwriting' as the practice by which insurers would integrate climate-related adaptation measures in non-life underwriting practices.

6 EIOPA, Staff Paper on Policy options to reduce the climate insurance protection gap (2023b).

7 EIOPA, Consultation on a blueprint for an awareness tool for natural catastrophe risks and prevention measures (2024).

- The Solvency II Directive (Article 44(2b)) requires insurers to address financial risks arising from sustainability factors in the short, medium and long term, including those arising from the process of adjustment and transition trends towards the relevant regulatory objectives and legal acts, such as those set out in the European Climate Law.
- In France, the 2022-2024 *Autorité de Contrôle Prudentiel et de Résolution's* (ACPR) climate stress test[8] provided the industry with a set of assumptions, particularly concerning the modelling of physical risks. As part of the long-term scenario exercise, French insurers and the supervisor explored the risk of uninsurability, both quantitatively and qualitatively. This led them to reflect on the possible adaptation measures to be put in place to limit financial shocks linked to physical risks. It also promoted a degree of consistency in approaches that some insurers use to build their scenarios in Own Risk and Solvency Assessments (ORSAs). Finally, the exercise fostered internal networks between experts on the subject and increased undertakers' awareness of the implementation of forward-looking climate scenarios.
- The Swiss Financial Market Supervisory Authority (FINMA) is advocating for insurers to consider a corporate's climate-related risk exposure both for underwriting purposes and to support better risk-based pricing. It recently issued guidance for banks and insurers highlighting the relevance of regular materiality assessments through scenario analysis that consider possible direct and indirect effects of risks, as well as different relevant time horizons.[9]

8 ACPR, Main results of the ACPR climate exercise for the insurance sector (2024).

9 FINMA, Circular 2026/1 Nature-related financial risks and its supplementary material (2024). The circular will enter into force on 1 January 2026 and will initially apply exclusively to climate-related financial risks.

Engagement with value chain

Engaging across an institution's value chain is key to fostering an environment that enables adaptation through suppliers, customers, clients or portfolio companies. Institutions can engage with their value chain, including customers, clients, and investees, in various ways. Firstly, building awareness amongst value chain partners of the importance of understanding physical risk impacts and resilience is essential, particularly as these risks are mostly outside of institutions' direct control. Secondly, engagement can help in setting reasonable goals or expectations for physical risk management and adaptation. Thirdly, engagement can help to build capacity where appropriate and needed, and to identify adaptation needs and ways to manage these, drawing on the potential synergies from collaboration across the value chain. These are particularly important for upstream suppliers given the compounding downstream impacts of their adaptation and resilience to physical risks (S&P Global, 2025b). Financial institutions can engage either directly through stewardship activities for investments or more generally through their operations and product and service terms – for example financing certain adaptation activities that would protect the value of collateral or offering certain financial incentives for financing adaptation projects. Institutions could set out how they plan to conduct such engagements and develop appropriate tools to facilitate them (for example qualitative questionnaires). Large non-financial and financial institutions can strategically use value chain or client engagements to set up capacity building programmes. Being well-positioned to have access to and potentially influence multiple actors operating in the same value chain or location, such institutions could facilitate knowledge-sharing opportunities between industry peers, value chain actors and potentially government stakeholders.

Engagement with industry peers and academia

Knowledge sharing of adaptation technologies and emerging industry innovation can strengthen adaptation strategies. This knowledge sharing can occur through various channels including through an institution's research and development or collaborative partnerships with industry peers and academia. While many adaptation technologies are at or approaching a mature stage, significant barriers remain, particularly for EMDEs, in terms of access to these technologies and the capacity for effective adoption, both of innovative and more mature technologies (UNEP, 2024). By emphasising the importance of knowledge transfer, institutions can better position themselves to address adaptation challenges.

Finally, engagement with academia can also help with better understanding and appropriate use of climate data, as this is often produced by academic institutions. As physical risk assessments should not be a one-off exercise, future assessments can improve with access to higher quantity or quality of data. There are already databases and initiatives driven by academics to support this, including the University of Oxford's Resilient Planet Finance Lab and UK Centre for Greening Finance and Investment[32].

3.2 A maturity model for adaptation metrics and targets

The differences between mitigation and adaptation objectives require distinct metrics across these two domains. Assessing adaptation involves unique challenges that do not apply to mitigation, as:

- cause and effect outcomes are less clear when it comes to inputs translating into impacts for a wide range of beneficiaries,
- adaptation actions can be highly location-specific,
- there are limited clear, consistent and quantitative adaptation policy targets (such as the Paris Agreement for mitigation) to which institutions can align.

Despite a growing recognition of the role of adaptation, existing climate-related frameworks remain less comprehensive and consistent in addressing adaptation and resilience when compared to mitigation (OECD, 2024a). A common language and standardised categories for adaptation and resilience metrics and targets are still lacking (OECD-NGFS, 2024). While some jurisdictions have incorporated adaptation and resilience considerations into sustainable finance taxonomies and disclosure requirements, they rarely include quantitative metrics for outcome-based progress measurement, limiting their effectiveness in driving adaptation finance as institutions and investors often make decisions based on a financial business case.

This is an evolving area, with a number of emerging initiatives offering useful insights for developing adaptation metrics and targets.[33] These initiatives primarily target economic and development-level benefits and are helping to build a common foundation for adaptation reporting. However, entity-level approaches – such as the maturity model proposed in this paper – remain necessary to support institutions' operational risk management needs, allowing for more pragmatic, scalable progress where standardised, quantitative resilience metrics are still lacking. Together, these efforts reflect ongoing work to strengthen methodologies and could provide useful reference points for institutions as they advance their own adaptation metrics and targets.

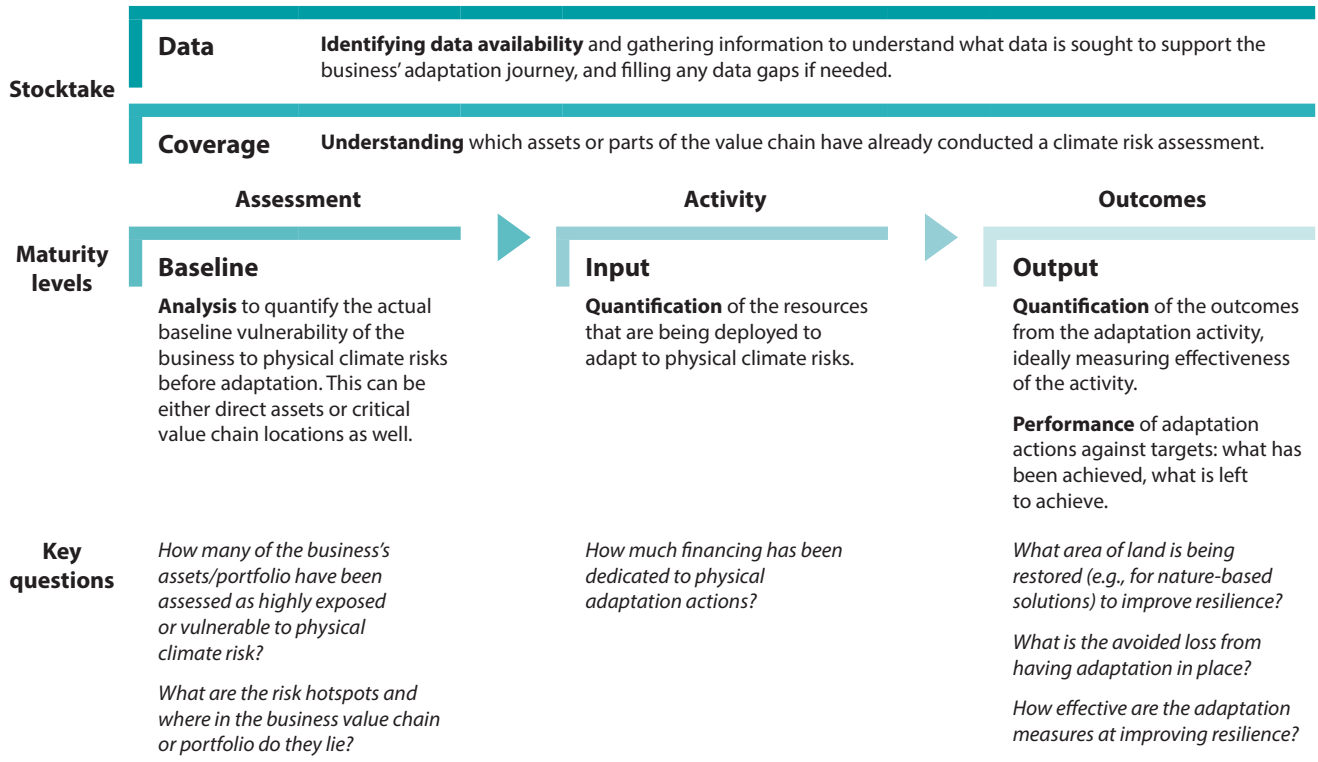
Institutions can approach the development of adaptation metrics and targets through a maturity pathway. As adaptation-related data and metrics are still developing, approaches for identifying key adaptation metrics should be practical and recognise the need for a step-by-step approach. This approach also provides for institutions that are starting out at the entry level. Targets can also reflect the adaptation journey, from the information that institutions will rely on to underpin adaptation actions, to setting expectations for both the activities undertaken (*inputs* to adaptation activities) and the impact of adaptation activities (*outputs* of adaptation activities). This paper sets out a maturity model for metrics and targets (Figure 9), which:

- commences with a stocktake (understanding data and coverage status) to facilitate a baseline of adaptation metrics and targets,
- progresses step by step towards a meaningful set of metrics: from baseline exposure and vulnerability to inputs applied towards adaptation activities, to output-led metrics that quantify the impact of adaptation activities and set these against a target.

32 Adaptation and Nature Finance Toolkit | Environmental Change Institute; UK Centre for Greening Finance and Investment (CGFI).

33 For example, the World Bank's Resilience Rating System (RRS) assesses how projects incorporate climate and disaster risk considerations and contribute to broader resilience objective. It does so by rating projects both on the resilience of their expected outcomes and their contribution to system-level adaptation, with an emphasis on qualitative assessments, stress testing, and tracking resilience outcomes through climate indicators (World Bank, 2021). Similarly, the Multilateral Development Banks (MDBs) climate results framework, and sectoral efforts such as Race to Resilience, contribute to shaping common approaches for measuring adaptation progress (World Bank, 2024e).

Figure 9 **Maturity Model for Setting Metrics and Targets**



Source: Authors.

3.2.1 Stocktake: Data availability and coverage

Understanding data needs, the availability of data and the access an institution has to data constitutes the foundation for subsequent assessment of physical risk upon which adaptation metrics can be built. A fundamental challenge in physical risk assessment is for institutions to understand their data needs, the available data, and data gaps. At a minimum, data collection for institutions should include the location of assets, and climate scenario data that show how physical hazards are projected to change in the future. To understand their *vulnerability* (specifically, sensitivity) to physical hazards, institutions would also need to collect data on the physical characteristics of assets – whether owned or financed – including any existing adaptation measures. Financial institutions rely on information from portfolio companies: the inclusion of adaptation in the transition plans of the business to which they are financially exposed would be a valuable source for this data and insight.

Box 3

A survey of over 12,500 institutions shows that there are gaps in the inclusion of specific adaptation-relevant information in transition plan disclosures

Written by the CDP

While institutions that provide transition plan disclosures are more likely to be disclosing some adaptation-relevant data than those that do not, there remain gaps in the integration of adaptation-specific information in transition plans, as seen in data disclosed by 11,970 non-financial and 575 financial institutions against CDP's 2023 climate change questionnaire. This gap can be addressed by identifying and standardising adaptation indicators within transition plan recommendations. The gaps were more pronounced for non-financial institutions compared to financial institutions and were consistent across the five pillars of transition planning[1] (see table below).

Table 1 **Disclosure against a selection of adaptation-relevant indicators mapped against the five pillars of transition plans**

Pillar	Indicator	Non-FIs	FIs
Foundation	Climate-related risk assessment process in place	79%	93%
	Risk assessment considers acute and chronic physical risks	43%	58%
Implementation strategy	Strategy informed by risk assessment process where physical risks identified*	92%	92%
	Financial planning informed by risk assessment process where physical risks identified*	96%	98%
	Taxonomy aligned spending/revenue identified in financial accounting, under adaptation objective**	6%	N/A
	Offer products and services that enable clients to adapt to climate change	N/A	51%
Engagement strategy	Engaging with policymakers on policy, law or regulation related to climate change adaptation	2%	9%
	Engaging with suppliers to collect climate-related risk information	4%	N/A
	Engaging with customers/clients on measuring exposure to climate-related risks***	N/A	10%
Metrics and targets	Disclosed anticipated financial effects of physical risk exposures	22%	36%
Governance	Climate-related issues integrated into board oversight of risk management process	38%	62%

* refers to a subset of 4,450 non-financial and 330 financial institutions that identified physical risks.

** refers to a subset of companies to which this question was applicable.

*** refers to a subset of FIs to which the question was applicable based on their portfolio activities. N/A non-available.

Note: Risk assessment process includes climate-related opportunities. The figures show the percentage of institutions that provided a disclosure against an indicator and does not check the quality of the disclosure.

Source: CDP (2023), self-reported responses to the CDP questionnaire.

1 As defined by GFANZ and TPT in its Disclosure Framework (2023).

Once institutions have collected sufficient data, they can move to entry-level metrics that identify how much of their business, assets or portfolio have undergone a risk assessment. This risk assessment should ideally use climate scenario analysis, but metrics may also identify how much of the asset stock or portfolio has conducted a general risk assessment without the use of climate scenarios. Additional considerations could include the relative value of different assets, and their substitutability or criticality to business operations. It is important to note that institutions do not need to wait for perfect data across their entire operations, but can simply start by prioritising key areas to assess, or using less granular or more accessible data, then iterate once better data is available.

Table 2 **Examples of risk assessment metrics and targets for early-stage adaptation planning (Stocktake phase)**

Applicable to	Metric	Source
Non-financial institutions and direct assets of financial institutions	Risk assessments completed for X% of assets/sites/offices owned/rented	New[1]
	Physical risk scenario analysis completed for X% of assets/sites/offices owned	New
Portfolio of financial institutions (including lending exposures, underwriting activity, and investments)	Physical risk assessments completed for X% of (the relevant) portfolio	UNEP FI
	Number of investment mandates that incorporate expectations relating to climate resilience	IIGCC
	Proportion of portfolio assessed as i) aligned, ii) aligning and iii) non-aligned with climate resilience objectives	IIGCC

1 "New" indicates metrics proposed by this paper based on technical expert input. These metrics have not been adopted by existing disclosure standards but are suggested to fill known gaps in adaptation measurement.

Source: Based on Bernhofen, M., Spacey Martín, R., and Ranger, N. (2024).

3.2.2 Baseline metrics and targets

Institutions could commence their climate risk assessment by identifying baseline metrics for the exposure and vulnerability of their assets or portfolio to physical risks, and to establish targets relevant to these metrics. With location- and portfolio-relevant data, institutions can assess i) whether exposure to physical hazards exists, and if so, ii) whether this exposure could lead to financial impact. Understanding the inherent vulnerability of assets to physical risk is the first step towards then managing physical risks.

Box 4

Banque de France Climate Indicator: an example of a central bank tool to help non-financial companies assess their exposure to physical and transition risks

Written by Banque de France

Banque de France's Climate Indicator provides an example of a central bank action that helps non-financial companies assess their climate risk exposure. The Climate Indicator offers an independent and objective assessment of companies' greenhouse gas emissions trajectory against Paris-aligned sectoral references (transition risk) and their exposure and adaptation to climatic hazards (physical risk). This analysis, free of charge for firms, is based on quantitative and qualitative data collected directly from companies.[1] The Climate Indicator allows the Banque de France to collect valuable information and thus serve as a "brick" to feed into climate risk analysis of non-financial institutions.

As a first step towards a fully-fledged physical risk indicator, from 2025, Banque de France's Climate Indicator will assess companies' preparedness to the evolution of climatic hazards, using data from the French meteorological agency. Most companies in France (roughly 5 million) will have access for free to a mapping of their exposures to hazards like rise in temperature, precipitation, and storms, based on three climate scenarios (+ 2 °C, + 2.7 °C, + 4 °C).[2] Using a dedicated online platform developed by Banque de France, firms will be able to directly view hazard trends for all their locations on a map of mainland France. In addition, qualitative data is collected using a questionnaire to assess companies' adaptation strategies including: (1) the assessment of physical risks by the company, (2) the way adaptation is accounted for in the governance process, (3) the consistency of the adaptation

…/…

1 These data include present and prospective business volumes, associated GHG emissions, decarbonisation drivers and information on adaptation strategies and the transition to a lower emissions economy.

2 Based on the 'Trajectoire de réchauffement de Référence pour l'Adaptation au Changement Climatique' (or 'TRACC' scenarios), corresponding to the French trajectory regarding climatic hazards evolution.

strategy with national or international regulations, (4) the impacts of the adaptation strategy of the company's institution, (5) the inclusion of adaptation considerations into financing decisions and (6) the actions undertaken to reduce vulnerability to physical risk, and the technologies mobilised (for example nature-based solutions). This service will help companies understand and improve their climate resilience.

The Climate Indicator also captures transition risks enabling companies to assess their own GHG emissions trajectory compared to their reference aligned with the objectives of the Paris Agreement. While it is mandatory for large companies,[3] it is being progressively deployed on a voluntary basis. It currently covers five sectors: Electric Power Generation, Transportation, Real Estate, Cement Production and Building Construction. By 2027, agriculture and five additional industrial sectors will be covered: Steel, Aluminium, Chemicals, Oil and Gas and Vehicle Manufacturing. The transition dimension of the Climate Indicator will be presented to over 20,000 companies by the end of 2027, providing them with a reliable view of their transition path and thus facilitating their access to financing.

3 Large companies, as defined by the Corporate Sustainability Reporting Directive (CSRD) perimeter.

Financial institutions could derive adaptation metrics from their risk management framework. Financial institutions might incorporate climate-related and environmental risks as drivers of existing risk categories into their risk management framework: some jurisdictions already set this expectation. This could cover credit, operational, market and liquidity risk management, as well as capital adequacy or risk quantification by means of scenario analysis and stress testing. From the baseline step of identifying physical risk exposure and/or vulnerability, more advanced metrics that identify estimated financial impact could follow. This would be in line with leading disclosure frameworks such as the International Sustainability Standards Board (ISSB)'s disclosure standards (IFRS S1, S2), which set the expectation that physical risk impacts should be linked to financial impacts.

Table 3 **Examples of baseline metrics and targets for assessing exposure and vulnerability to physical risks**[1]

Applicable to	Metric	Source
	Basic – hotspots	
Non-financial institutions and direct assets of financial institutions	Proportion of real assets exposed to 1:100 or 1:200 climate-related hazards (%)	Taskforce on Climate-related Financial Disclosure (TCFD)
Portfolio of financial institutions	Proportion of portfolio (%) highly exposed to key indicators of physical risks, by geography/sector	UNEP FI
	Number and value of mortgage loans in 100-year flood zones (# and $)	Sustainability Accounting Standards Board (SASB) Industry Specific Metrics
	Advanced – financial impact	
Non-financial institutions and direct assets of financial institutions	Total expected losses under climate scenarios ($m losses)	UNEP FI
Portfolio of financial institutions	Credit risk exposure of portfolio in relation to key indicators of physical risk, according to the bank's prioritisation of risk by geography/sector ($m risk)	UNEP FI
	Proportion of credit portfolio exposed to companies with business models highly dependent on one or more ecosystem services (%)	New
All	Anticipated financial effects from material physical risks, including the monetary amount and proportion (%) of assets at material physical risk over the short-, medium- and long-term before considering climate change adaptation actions; with the monetary amounts of these assets disaggregated by acute and chronic physical risk	European Sustainability Reporting Standards (ESRS) E1-9 §66, IFRS ISSB
	Total expected losses under climate scenarios ($m losses)	UNEP FI

1 Exposure metrics specifically for nature risks in the insurance sector are explored in Nations Environment Programme Finance Initiative United (UNEP-FI) reports ("UNEP-FI. Rooted in Risk. Framing nature-related assessments for insurers. Geneva. 2025" and "UNEP-FI. Breaking Ground. Getting practical with nature-related assessments for insurers. Geneva. 2025").

Source: Based on Bernhofen, M., Spacey Martín, R., and Ranger, N. (2024).

Targets should be relevant to the metrics that have been developed, and the objective that the institution is seeking to achieve. As explored in the NGFS Report on Target setting and Transition plans (NGFS, 2025c), the definition and scope of targets are essential to limit the possible risks associated with target setting (for example overly or insufficiently ambitious targets, leading to reputational risks and/or ineffective actions). Effective targets reveal to institutions both the gap between the current state and their desired outcome, and the timeframe over which the institution expects to close this gap. Targets will differ by institution, reflecting differing physical circumstances, data availability, and institutional objectives and risk appetites. In some circumstances, it may be possible and appropriate to set institutional adaptation targets in relation to regional or national adaptation plans or other relevant processes.

Distinct from the subsequent input and output maturity levels, baseline level metrics and targets include the built-in resilience of assets. They can inherently reflect risk avoidance (divestment) and risk acceptance decisions. Input- and output-level metrics and targets would be most useful for institutions that seek to better quantify their risk reduction actions.

3.2.3 Input metrics and targets

Input metrics are used to quantify the resources that an institution deploys to adapt to physical risks, and which enhance the physical or financial resilience (or both) of the institution. Input metrics focus on quantifying the action taken by the institution to adapt to physical risks, such as the investment committed, employee training completed, or internal policies developed. They may consist of more familiar or accessible types of metrics for institutions. Table 4 sets out examples of input metrics from a range of sources.

Targets for input metrics allow an institution to assess its adaptation investments progress over time and compare them against a desired level of input or investment. Building on the examples above, an institution could establish a target for its investment in adaptation activities, and this could be expressed as an absolute amount (an investment target in monetary terms), a relative amount (for example investment in adaptation as a percent of total investment), or against another benchmark for investment (for example relative to a national adaptation investment target). Financial institutions could similarly establish targets related to their exposure to physical risk through their lending, underwriting[34] and investing decisions.

Input metrics and targets can reflect both risk and opportunity. For institutions, this would reflect the level of financing dedicated to adaptation actions that enhance the resilience of its own operations and, if applicable, to broader society. For financial institutions, this could also reflect lending and investment decisions, such as the proportion of an institution's exposure to bonds directed at adaptation activities (for example green bonds that are aligned to adaptation actions).

Table 4 **Examples of input metrics and targets for tracking adaptation actions and resource allocation**

Applicable to	Metric	Source
All	Amount of adaptation finance mobilised towards adaptation as identified by state-of-the-art taxonomies (USD million/billion)	UNEP FI
	Number of people trained in climate resilience measures	Adaptation Fund
	Amount of capital expenditure, financing or investment deployed towards climate-related risks and opportunities	IFRS ISSB
	Number of new or improved policies or frameworks developed to address climate change	International Climate Initiative
	Number of new or improved methodological tools developed to address climate change and conserve biodiversity	International Climate Initiative

Source: Authors, based on Bernhofen, M., Spacey Martín, R., and Ranger, N. (2024).

34 Underwriting activities, such as insuring homes against natural perils, inherently involve an assessment of the physical risk and (where appropriate) adaptation actions to which an insurer is exposed over the term of the policy. However, it is also appropriate for insurers to consider longer term physical risks, as these may impact market size, event correlation, reinsurance pricing, and other longer term business strategy considerations.

3.2.4 Output metrics and targets

Output metrics seek to quantify the outcome, impact and/or effectiveness of the initiatives or measures taken to adapt to physical climate change. These metrics need to be applicable to a diverse range of potential adaptation outcomes, from forestry, coastal and agricultural projects, to outcomes from infrastructure development, and adaptation of varying scales.

In addition, the output metrics that institutions develop may vary depending on the use case or audience. Some output metrics may focus on outcomes that are easier to quantify, such as the area of land being protected or restored. More advanced output metrics may seek to quantify an institution's contribution to broader societal resilience, such as by focusing on the extent to which a project improves local adaptive capacities. An example would be the number of lives positively impacted through strengthening shared infrastructure to better cope with extreme weather events, or through implementing early warning systems for natural disasters. An important distinction for institutions to consider may be whether to develop output metrics that focus on financial benefits (that is, benefits which accrue to the institution funding the adaptation) or economic benefits that flow to a broader group of beneficiaries.

For the most aspirational institutions, an advanced version of an output metric could reflect the institution's risk appetite. Over time, metrics on adaptation for the financial sector would need to allow for comparability of the level of ambition, but few reference points are currently available. National, sub-national, and sectoral adaptation and resilience-related goals and policies could provide relevant reference points of ambition (Noels *et al.* 2024). Risk-based output metrics for corporates could focus on the financial or risk impact of adaptation, such as reduced down-time of operations, reduced repair costs, or minimising asset value exposed to physical risk. These avoided financial costs approaches can be linked back to a business' enterprise risk management criteria.

For financial institutions, risk-based output metrics could be incorporated into existing risk assessment processes. For example, credit risk assessment for lending could combine the impact of adaptation activities with other inputs to the credit risk assessment; insurers could incorporate the impact of adaptation activities on the assessed risk being underwritten; and investors could incorporate the impact of adaptation activities in their assessment of risk-based returns. In each case, the quantification of risk-based output metrics allows financial institutions to better understand and price the risk to which they are exposed.

Targets for output metrics, in common with earlier sections, should align to the metrics being pursued by institutions. Targets associated with initiatives that protect or restore land should be expressed in relevant terms, such as the absolute or relative amount of land to be protected or restored. Similarly, a target for "lives positively impacted" would need to be relevant to the scale and objective of the adaptation initiative. Setting these targets in context – for example why is the targeted land area to be protected an appropriate target – would further improve understanding of the relevance of the adaptation activity.

Targets for risk-based output metrics are potentially an area where adaptation can be benchmarked against a common measure of risk. The examples of adaptation strategies presented below provide potential benchmarks to consider. An example of an output target set at a constant relative risk level would mean achieving a given business interruption risk from flooding (for example reducing the risk of business interruption from flooding to 1 in 100-year frequency). This allows the target to be considered against historical or future risk expectations or industry standards and allows institutions to leverage insights gained from climate scenario analysis to set their targets. Risk-based metrics and targets also allow comparison across assets and risk types. For example, where the objective is to limit business interruption to below a given frequency, diverse businesses facing diverse risk drivers can establish a target that is independent from the underlying risk driver. Moreover, adaptation needs may change depending on the evolution of future physical risk: risk-based metrics and targets are adaptable to these potential changes.

Example of adaptation strategies that could be used for risk-based benchmarks

The World Bank offers a framework that sets out a range of adaptation strategies. These could be used to inform the setting of risk-based adaptation output targets.

Levels of adaptation strategies to enhance physical resilience

	Maintain	Constant relative risk level	Economically optimal level	Constant absolute risk level	Risk-intolerant level
Adaptation Cost	Low	Initially low, increasing over time	Variable	High	Very high
Residual (net) risk	High, increasing over time	Constant, depends on risk appetite set	High	Constant, depends on risk appetite set	Very low

Source: Adapted from World Bank (2024d).

- **Business as usual with maintenance of existing infrastructures.** This involves facing current and future maintenance costs for upkeep but with no additional enhancement or new infrastructure envisaged.
- **Stepping up adaptation measures to be exposed to a constant relative risk level** that is deemed as acceptable. For example, this might involve setting a standard for risk protection to protect, for example, against a 1-in-100-year flood event. With unabated climate change, the costs of protecting to this same level of risk would be expected to increase over time. This is because additional infrastructure investment is needed to deliver the same protection under a changing climate.
- **Protection to an economically optimal level of adaptation.** This would involve investing in adaptation to the point where the marginal costs of investment in adaptation equal marginal benefits. However, such an adaptation strategy might lead to lower levels of overall adaptation relative to other strategies or even maladaptation. Moreover, finding such an optimal level is very difficult, because of the high levels of uncertainty about potential impacts from climate change.
- **Maintenance of a constant absolute risk level.** This approach may involve maintaining a constant level of residual damage, for example, protection against a flood that may reach a certain height above ground. This may involve more protection and higher adaptation costs compared to the previous strategies over time as physical risks worsen under all climate scenarios.
- **Protection to a risk-intolerant level.** This approach may entail reducing average annual financial losses to very low levels, for example, setting an upper financial bound for financial impacts from a flood event of any intensity.

Thus, when setting risk-based adaptation output targets, there is a balancing act between adaptation costs, benefits, and the residual damages and losses after adaptation strategies and actions have been implemented. What makes such a choice complex is that the costs of adaptation are not fixed. They change with the rise in climate hazards and damages and losses, the level of ambition, and the objective.

In all cases, for targets to be truly effective they should include a time horizon for successful delivery and can greatly benefit from interim targets towards the final goal. This will improve understanding for both the institution and its stakeholders. For some output-based targets, this could be relatively straightforward: for example, setting a minimum percent of land to be protected by a given year. For risk-based output targets, the approach could be more complex as climate change will alter the likelihood of extreme physical climate events over time. In these cases, it is important to clarify both the target frequency for the event and the time that the target frequency is based on. However, such goals and policies appear to be currently lacking. A survey of OECD member countries revealed that only 30% of respondents indicated that a timeframe accompanied their adaptation objectives, and that none of them systematically included a baseline with their objectives (OECD, 2024b).

Table 5 **Examples of output metrics and targets for measuring adaptation outcomes and effectiveness**

Applicable to	Metric	Source
	Basic – activity level	
Non-financial institutions and direct assets of financial institutions	Number of assets produced, developed, improved, or strengthened to support resilience objectives	Adaptation Fund
	Hectares of natural habitat restored/preserved	Adaptation Fund
	Area of ecosystems improved or protected through adaptation measure	International Climate Initiative
	Reduction in the amount of time (hours/days) that a system or elements of a system are rendered inoperable due to acute climate risks	EBRD GET
	Reduction in repair costs/damage to assets due to acute climate risks	EBRD GET
Portfolio of financial institutions	Proportion of portfolio assessed as aligning or non-aligned to resilience activities that is under direct or collective engagement	IIGCC
	Increase in % of property, infrastructure or other alternative asset portfolios with adaptation measures or insurance in areas subject to high physical risk	UNEP FI
	Advanced – aggregated	
Non-financial institutions and direct assets of financial institutions	Reduce % of asset value exposed to acute and chronic physical risks by X% in 20X0	TCFD
Portfolio of financial institutions	%/$ assets under management (AUM) aligned with/adapted to a X °C climate scenario	New
	%/$ AUM aligned with National Adaptation Plans	New
	Impact of adaptation activity on frequency and magnitude of future natural catastrophe events	New
All	Ensure at least X% of risk-exposed assets have risk mitigation in place in line with the 20X0 projected 100-year risk event	TCFD
	Reduce value-at-risk from physical climate impacts by X% after mitigation measures are implemented.	New

Source: Based on Bernhofen, M., Spacey Martín, R., and Ranger, N. (2024).

3.2.5 Additional considerations to set meaningful metrics and targets

While location-specific features of adaptation need to be accounted for, certain differences are unavoidable, there is a range of considerations that would support adaptation metrics and targets to have broader applicability, and in some cases national or cross-border comparability, including the development of aggregate indicators (FSB, 2025b). This includes:

- **Availability and coverage** of the necessary data across institutions (and jurisdictions).
- **Comparability** of metrics and targets, that are consistent within and across different companies using common approaches and assumptions.
- **Relevance** of metrics and targets, that are appropriate to the business, industry or risk that is being addressed.
- **Transparency** of the methods, assumptions, and information used to calculate and aggregate these indicators.
- **Continuity** of metrics over time, enabling progress to be tracked, rather than being limited to use as a one-off measure.

Metrics also need to be meaningful to their users, including investors, counterparties, customers and other stakeholders that may require distinct types of information to understand the implications of adaptation initiatives. For example, investors may be interested in metrics reflecting the financial performance of adaptation projects, while community stakeholders may put a stronger emphasis on social and environmental impacts. In the former case, metrics that provide a clear link between the adaptation investment and profitability may be important. To understand the return on investment from a riverside wall upgrading project, a useful metric could quantify the financial returns in terms of present value of future flood-related costs avoided discounted to today's value, reduced insurance costs, and uninterrupted economic activities relative to the cost of upgrading the walls. Advanced risk modelling, probabilistic, scenario-based approaches, and long-term performance tracking systems can be used to alleviate challenges in measuring financial performance of adaptation as compared to mitigation projects. In the latter case, community stakeholders may benefit more from qualitative insights that illustrate the broader social and environmental impacts of adaptation, such as improved public health outcomes resulting from enhanced green spaces or air quality improvements due to urban greening initiatives.

A multi-faceted pathway approach that integrates quantitative and qualitative indicators can enhance the relevance and transparency of metrics, fostering a more informed discussion of adaptation activities. While adaptation impact quantification is not explicitly required in many current disclosure standards, such adaptation metrics and targets will be helpful in supporting the financial business case for adaptation financing and investment.

4. Conclusion and suggested next steps

This paper furthers the G20 SFWG's ongoing work on advancing credible, robust and just transition plans. It builds on the SFWG's 2024 high-level principles by proposing a practical approach for integrating adaptation into transition planning. In doing so, it supports the broader objective of strengthening institutional responses to climate-related risks in a way that aligns with diverse capacities and evolving climate priorities.

As climate change accelerates, integrating adaptation into risk management and strategy is essential to manage the full spectrum of climate-related risks. While transition planning has traditionally focused on emissions reduction, physical risks from climate change are already materialising and will only become more severe over time, even in a net zero scenario. For some EMDEs, where exposure to climate hazards is high and institutional capacity to manage them remains limited, the need to prioritise adaptation is even more pressing. To effectively address this challenge, climate strategies must systematically incorporate adaptation as a core component of risk management alongside mitigation.

Transition plans can serve alongside other tools to support this shift. In addition to guiding decarbonisation efforts, they also offer a structured approach to assess physical risk exposures, identify potential responses, and clarify how resilience measures may inform operational and financial decisions. At a minimum, institutions can use transition planning to understand and manage material physical risks. In some cases, they may also choose to pursue adaptation-related business opportunities aligned with their strategy, which can simultaneously contribute to broader societal resilience.

This paper demonstrates that integrating adaptation into transition plans is both achievable and necessary. Institutions do not need to start from scratch. Instead, they can build on existing transition planning frameworks by adapting the foundations, implementation and engagement strategies, metrics and targets, and governance arrangements to include adaptation and resilience dimensions. Embedding adaptation within this structure can also help to align mitigation and resilience goals, increase internal coherence, and lower the barrier to entry for those at earlier stages of their adaptation journey.

Planning for adaptation should be anchored by targets and supported by appropriate metrics. While metrics provide a way to monitor and quantify progress – such as tracking exposure to physical risks or the completion of climate risk assessments – targets articulate the intended outcomes and level of ambition. Many institutions may initially rely on baseline or input-level metrics due to capacity constraints or data limitations. However, the objective should be to progress toward setting outcome-based targets that are specific, time-bound, and aligned with broader resilience goals. This in turn helps to establish the business case for investing in adaptation, as challenges to date include uncertainty around the benefits of adaptation measures. A clear articulation of metrics and targets enhances the credibility of adaptation planning and supports the translation of strategic objectives into measurable outcomes.

To guide this progression, the paper proposes a maturity model that recognises different starting points and levels of readiness. This model recognises that adaptation is location- and context-specific, and that progress will be iterative. By beginning with data stocktakes and evolving towards outcome- and impact-based metrics, institutions can meaningfully track their adaptation journey and better align internal strategies with stakeholder needs and expectations.

An enabling environment will play a critical role in unlocking the full potential of adaptation-focused transition plans. National adaptation strategies, regulatory clarity, data infrastructure, and public-private coordination can accelerate momentum – but they should not be seen as a prerequisite for action. Institutions can begin where they are, using transition plans as a forward-looking tool to assess, manage, and respond to physical risks and opportunities. To operationalise these ideas and translate intent into impact, it is vital for all relevant actors to play their part. The following key considerations are tailored to financial institutions and non-financial institutions, governments, policymakers and financial authorities, and academia and international bodies to enhance their adaptation efforts.

Both financial and non-financial institutions can:

- Approach transition planning, whether voluntary or mandated, to bring adaptation into sharper focus, ensuring that it complements mitigation and strengthens broader risk management and strategic alignment with resilience goals.
- Assess exposure to physical risks across operations, portfolios, and value chains, starting with qualitative assessments and advancing as data and capabilities improve.
- Enhance transparency of risk exposures and adaptation actions, using clear metrics and targets that evolve over time to support engagement with stakeholders.
- Align internal adaptation efforts with public strategies, such as NAPs, to help clarify expectations and support coordinated action.

Governments, policymakers and financial authorities

Governments, policymakers and financial authorities play a role in fostering an enabling environment for adaptation. Coherent government policies, plans (NDCs, NAPs), regulatory frameworks, and targeted public investments can facilitate effective transition planning, supported by national climate information architectures (for example, encompassing standardised data, disclosures, and alignment approaches, sectoral transition pathways) which form the foundation for effective private sector engagement. Depending on their mandates, policymakers and financial authorities can support adaptation efforts in the following ways:

- Encourage greater attention to physical risk management, including how regulated institutions assess and respond to material adaptation needs, where relevant.
- Support enabling environments through improved access to data and enhancing disclosure practices underpinned by clearer supervisory expectations. This includes advancing NAPs and taxonomies, while promoting international comparability and interoperability to ensure consistency across jurisdictions.
- Support capacity building and knowledge sharing to improve understanding and practical implementation of adaptation-related transition planning.

Academia and international bodies:

Further progress on adaptation-focused transition planning will require continued work by a broad range of actors beyond firms and regulators.

- Research institutions and academic bodies have an important role to play in advancing the methodological foundations for adaptation planning, including improved data, metrics, and tools for assessing physical risk and the potential role of natural and biodiversity in supporting resilience outcomes.
- Standard-setters can help drive convergence and clarity by developing frameworks and guidance that support the consistent and comparable disclosure of adaptation-related information.

Collaboration across these communities can help build a more coherent ecosystem for adaptation action, supporting better-informed decision-making and more efficient capital allocation.

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