



Climate Change Adaptation Financing

From Tracked Flows to Untapped Potential

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About this Report

The Center for Sustainability Studies at Fundação Getulio Vargas (FGVces), in partnership with Morphosis, Instituto Itaúsa, the Paulson Institute, and Basilinna, has collaborated to advance understanding of how climate adaptation finance, particularly from private sources, can be scaled to meet the growing resilience needs of a climate-impacted world.

This technical paper builds on a diverse and expanding body of work from academia, international organizations, consultancies, and financial institutions, reflecting the increasing urgency and complexity of the adaptation finance agenda. It seeks to bridge a critical gap in the literature: the lack of a comprehensive and integrated overview of adaptation finance flows, with a particular emphasis on private sector engagement, investment mechanisms, and definitional challenges.

The report offers a diagnostic exploration of the global landscape of adaptation finance, combining bottom-up tracking of tagged financial flows with top-down macroeconomic modeling of climate-related damages. It also identifies key actors, instruments, and barriers in the ecosystem of private adaptation finance, and proposes initial recommendations for improving tracking, mobilization, and policy alignment.

Although exploratory in nature, this contribution provides a foundation for more structured debates on how to define, measure, and mobilize adaptation finance. It aims to inform policymakers, investors, and researchers about the scale of the challenge, the limitations of current approaches, and the opportunities for innovation and coordination across sectors and regions.

We hope this work will support the development of more effective strategies to unlock private capital for adaptation, enhance resilience, and reduce climate vulnerability, especially in regions most exposed to climate risks. As the adaptation finance field continues to evolve, we offer this paper as a stepping stone toward more inclusive, transparent, and impactful financial frameworks for climate resilience.

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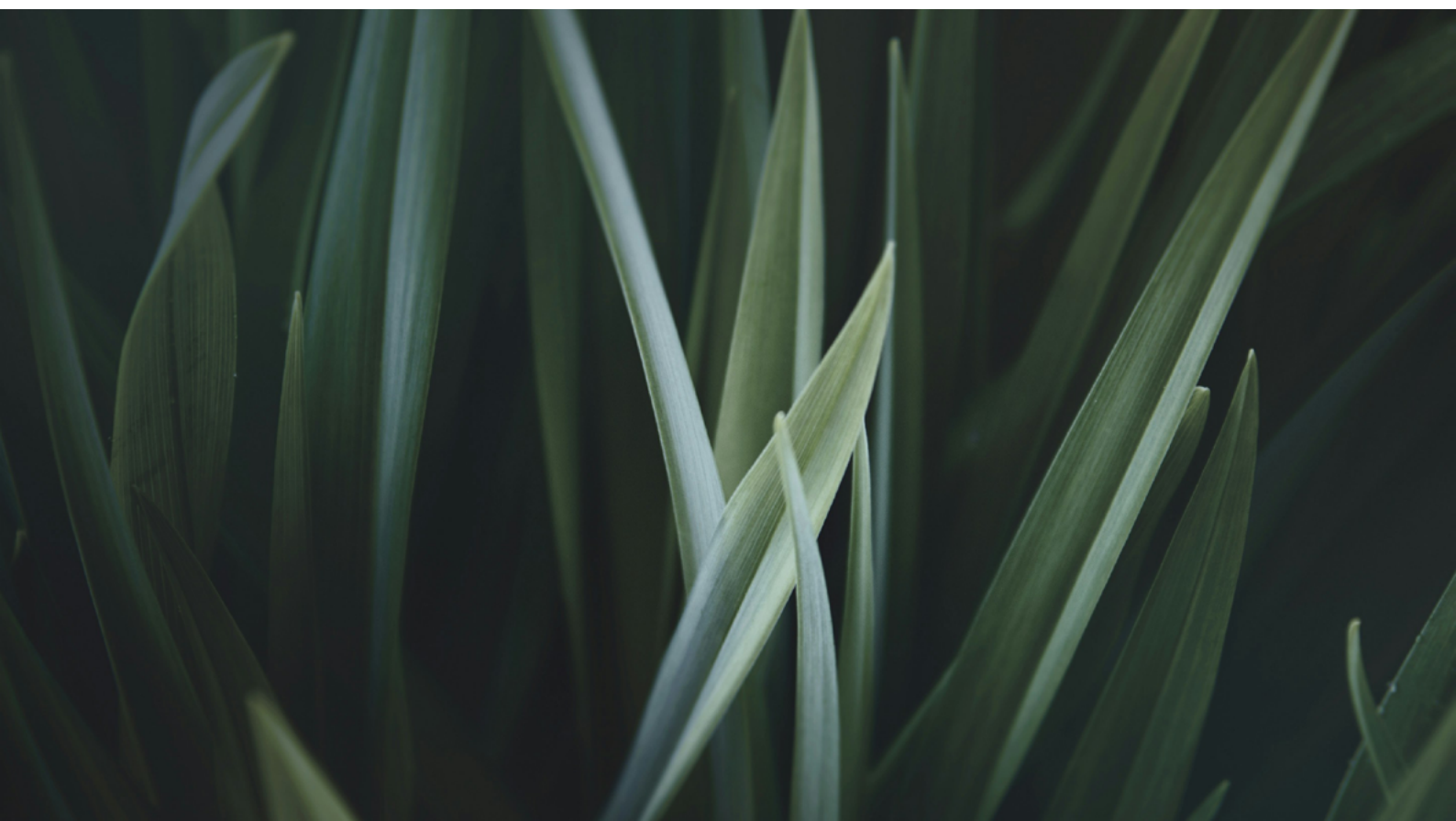
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List of Abbreviations

ABM	Adaptation Benefits Mechanism
AFOLU	Agriculture, Forestry and Other Land Use
BCG	Boston Consulting Group
CPI	Climate Policy Initiative
DFIs	Development Finance Institutions
GCF	Green Climate Fund
GDP	Gross Domestic Product
IFC	International Finance Corporation
MDBs	Multilateral Development Banks
NAPs	National Adaptation Plans
NDCs	Nationally Determined Contributions
OECD	Organisation for Economic Co-operation and Development
PDBs	Public Development Banks
PE	Private Equity
PPPs	Public–Private Partnerships
SMEs	Small and Medium-sized Enterprises
VC	Venture Capital



Glossary

Adaptation Finance

Financial resources allocated to help businesses, communities, ecosystems, and economies anticipate, respond, and adjust to the impacts of climate change.

Bankable Projects

Projects that are financially viable and attractive to investors. In adaptation, many initiatives lack clear revenue streams, making them harder to finance without public support or risk-sharing mechanisms.

Blended Finance

A strategy that combines public (often concessional) and private capital to reduce investment risks and attract private sector participation in climate-related projects.

Capital Allocation

The process of deciding how financial resources are distributed across different investments. In adaptation finance, this involves prioritizing sectors or regions most vulnerable to climate risks.

Catastrophe Bonds

High-yield debt instruments designed to raise money for insurance against natural disasters. Investors receive interest payments, but if a predefined catastrophic event occurs (e.g., a major flood), the issuer may use the principal to cover losses, reducing or eliminating repayment.

Climate Budget Tagging

A method used by governments to identify and track climate-related expenditures within national budgets.

Concessional Loans

Loans offered at below-market interest rates, typically by public institutions, to support development or climate-related goals.

Dual-Benefit Finance

Investments that simultaneously address climate mitigation (e.g., reducing emissions) and adaptation (e.g., increasing resilience).

Externalities

Unintended side effects of economic activities that affect third parties. Adaptation projects may generate positive externalities (e.g., improved public health) or negative ones (e.g., ecosystem disruption).

Green Bonds

Debt instruments issued to raise funds for environmentally beneficial projects. While widely used for mitigation (e.g., renewable energy), their use in adaptation (e.g., flood defenses) is still limited.

Impact Investing

Investments made with the intention of generating measurable social or environmental impact alongside a financial return. In adaptation, this may include funding small businesses or infrastructure that enhance climate resilience.

Insurance-Linked Instruments

Financial products that transfer climate-related risks to capital markets. Examples include catastrophe bonds (see entry above), which can help communities recover from extreme weather events.

Private Adaptation Finance

Capital provided by private entities, such as corporations, banks, and investors, for activities that, for instance, reduce climate vulnerability or enhance resilience.

Public–Private Partnerships (PPPs)

Long-term collaborations between government entities and private firms to finance and deliver infrastructure or services.



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Introduction

Climate change adaptation finance has emerged as a critical but still underdeveloped component of the global response to climate risk. While mitigation finance has attracted the bulk of attention and capital flows, the resources allocated to adaptation remain limited, fragmented, and insufficient, particularly in developing countries that are most vulnerable to climate impacts. Over the past decade, several initiatives have attempted to track adaptation finance, clarify its definition, and propose mechanisms for scaling it. Despite these efforts, tracking remains inconsistent, and investment flows fall short of estimated needs.

This report addresses a key gap in the available evidence: the absence of a comprehensive and integrated overview of the current landscape of climate change adaptation finance, with particular attention to private sector engagement. While various reports have quantified adaptation flows or discussed private finance in isolation, few have connected both dimensions in a systematic

... the resources allocated to adaptation remain limited, fragmented, and insufficient, particularly in developing countries

and comparative manner. Bridging this gap is essential not only to inform public policies and institutional strategies, but also to guide capital allocation and improve the design of instruments aimed at mobilizing private investment in resilience.

This paper seeks to answer the following guiding questions: ***What are the most recent estimates of adaptation investment needs and flows? What are the main sources and mechanisms of adaptation finance? And what barriers hinder the mobilization of private capital for adaptation?*** The objective of this paper is to map and critically assess the current state of adaptation finance globally, with a focus on identifying the role, potential, and limitations of private financial flows.

The paper draws on secondary data and recent reports¹ to offer a structured view of adaptation finance trends, barriers to private sector engagement, and the types of investments currently being tracked. The analysis is situated within a broader context of increasing global attention to climate resilience, the need for harmonized definitions and reporting standards, and the recognition that public resources alone will be insufficient to meet the scale of the adaptation challenge.

1 Methodology Note: This technical paper introduces and synthesizes secondary data from academic and policy literature. Sources were selected based on relevance to the research questions and recency. Definitions were compared across studies, and limitations in data availability and consistency are acknowledged.



Framing the Challenge

Before delving into the research questions, it is necessary to establish a clearer understanding of some foundational aspects of adaptation finance and its framing.

First, a key aspect of inquiries into adaptation investment and finance concerns the identification and differentiation of what constitutes an investment in adaptation. On the one hand, tagged investments are explicitly identified as climate change adaptation measures. On the other hand, not tagged investments contribute to resilience but are not explicitly labelled as adaptation measures (Table 1).

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TABLE 1. TAGGED VS. NOT TAGGED INVESTMENTS IN ADAPTATION

Type of Investment	Description	Illustrative examples (agriculture)
“Tagged”	Explicitly identified as climate change adaptation measures, for instance, relying on climate models of future impacts.	• Building flood defences; • Implementing early warning systems for extreme weather events.
“Not tagged”	Not explicitly identified as adaptation measures, but that contribute to greater resiliency and/or lower vulnerability. Business-as-usual, climate beneficial.	• Upgrading irrigation systems; • Improving water management practices.

Source: the authors.

Second, adaptation efforts can happen at different times in relation to climate risks, thus with different characteristics:

- **Before:** enable to prepare and prevent physical climate risks by increasing the ability of people, nature, physical assets or businesses to understand climate-related risks and manage them with foresight.
- **During:** enable to respond to physical climate risks by increasing the ability of people, nature, physical assets or businesses to cope and adjust to adverse conditions.
- **After:** enable to recover from adverse physical climate impacts by increasing the ability of people, nature, physical assets or businesses to mitigate the adverse impacts of climate events and “build-forward-better” (GARI, 2024).

Third, adaptation and mitigation efforts often overlap:

- **Nature-based solutions can deliver dual benefits.** Practices like reforestation, wetland restoration, and sustainable agriculture not only sequester carbon (mitigation) but also enhance ecosystem resilience to climate impacts such as floods and droughts (adaptation);
- **Urban planning and infrastructure can be designed for synergy.** Investments in green buildings, efficient public transport, and climate-resilient infrastructure reduce emissions while also protecting populations from extreme weather events. For instance, cool roofs and green spaces lower urban heat island effects (adaptation) and reduce energy demand (mitigation);
- **Energy system transitions can support both goals.**

Decentralized renewable energy systems, such as solar microgrids, reduce reliance

on fossil fuels (mitigation) and enhance energy access and reliability in the face of climate disruptions (adaptation), particularly in vulnerable regions;

- **Integrated policy and finance frameworks can unlock co-benefits.**

Aligning adaptation and mitigation in climate finance strategies, such as through blended finance or climate-smart agriculture funds, can improve cost-effectiveness and attract private investment by bundling risk reduction with emissions reduction (CPI, 2024a; Klein et al., 2007).

Fourth, adaptation and resilience “compete as ways to frame discussions about meeting the challenge of climate change”, but actually entail different forms of mobilization (Wong-Parodi et al., 2015):

- **Resilience can be deemed as a trait or broader systemic property**, which refers to the capacity of systems to absorb, recover from, and reorganize in response to climate-related shocks and stresses. It reflects a general ability to master challenges, encompassing adaptation, recovery and transformation, including through self-organization and learning (Schipper et al., 2022; Wong-Parodi et al., 2015);
- **Adaptation is a deliberate response to climate impacts.** It is a state that reflects how individuals deal with a given stressor and, thus, involves specific actions to reduce vulnerability and exposure to climate risks (Schipper et al., 2022; Wong-Parodi et al., 2015);
- Adaptation efforts may be **incremental**, with adjustments made to existing systems and practices without altering their core structure (such as reinforcing existing infrastructure); or **transformational**, changing the foundations of a social-ecological system (such as regenerative agriculture for climate-resilient food production) (UNFCCC, 2025).

- As a result, adaptation is a necessary, but not sufficient condition for resilience (Schipper et al., 2022; Wong-Parodi et al., 2015).

And fifth, adaptation finance presents many challenges to proper tracking, including:

- **Context dependency:** an investment's classification as adaptation depends on the local climate vulnerability context (CPI, 2024b);
- **Lack of a common language:** use of diverse methodologies and varied definitions of adaptation. There is a need to develop, harmonise and increase the interoperability between the various climate adaptation taxonomies and reporting standards to enable adaptation finance tracking using a common language (Buchner et al., 2023);
- **Lack of standards and reporting requirements:** lack of incentives for adaptation finance reporting as there are often no mandatory reporting mechanisms on adaptation and resilience for private actors (CPI, 2024b);
 - Also, private firms and early-stage startups are not subject to the same reporting requirements as publicly traded companies.
- **Lack of technical capacity:** limited technical capacity for reporting (UNEP, 2023);
- **Lack of visibility and awareness:**
 - Domestic governments fund adaptation through public budgets, but the bulk of this cannot yet be tracked due to limited climate budget tagging (CPI, 2024a);
 - Adaptation is often done unconsciously and related investments are often unknown (UNEP, 2023);

- Public actors often only explicitly account for the isolated costs of adaptation-relevant components of their investments rather than tagging the entire investment (as commonly done for mitigation) (CPI, 2025).

- **Presence of externalities:** adaptation projects are often associated with externalities, both positive and negative, which require further regulations to reduce negative impacts and/or monetize positive effects (OECD, 2025).

Aware of these issues and limitations and without adhering to any particular definition, in the following sections we reproduce secondary data and figures on private financing for climate change adaptation. The objective is merely to inform and provide broad notions regarding the scale of investment needed and currently allocated.

By highlighting the diverse methodologies and varied definitions of adaptation, **we also seek to underscore the importance of harmonizing climate adaptation taxonomies and reporting standards, which would facilitate a better understanding of the financial landscape and the necessary steps to enhance adaptation finance tracking.** We return to the issue of how to define and track adaptation finance at the end of this report.



Climate finance needs and flows

Adaptation finance is commonly assessed using a so-called bottom-up approach, which aggregates reported financial flows explicitly tagged for adaptation. This method, which could also be conceived as endogenous, given its focus on tracking financial budgets and/or politically established climate targets, is widely adopted and offers a grounded view of current funding levels and financing gaps. In addition, this paper explores a complementary and less conventional perspective: a top-down approach based on macroeconomic modelling, which estimates the economic damages associated with climate change and, thus provide a higher bound, exogenous (i.e. stemming from biophysical conditions) for the investments required to address it (**Box 1**). Together, these two perspectives help reframe the adaptation finance challenge and its implications for policy and investment strategies. Here, however, the purpose of presenting these two approaches lies primarily in reinforcing the underreporting of climate adaptation investment needs and flows.

Bottom-up estimation of adaptation needs and flows

Adaptation finance is a critical component of the global response to climate change, aimed at helping countries, particularly developing ones, to cope with the adverse effects of climate change. Despite growing recognition of its

importance, adaptation finance remains vastly insufficient when compared to estimated needs. The scale of the gap becomes evident when looking at both cost-based and commitment-based estimates. For instance, from a cost perspective, **developing countries require US\$ 222 billion per year through 2030 (and US\$ 248 billion per year from 2031-2050) to reduce the economic impacts of climate change** (CPI, 2025)². From a climate adaptation commitment perspective, **the finance needs to implement the National Adaptation Plans (NAPs) and Nationally Determined Contributions (NDCs) of developing countries amount to US\$ 387 billion per year until 2030**³ (Buchner et al., 2023; Bueno Rubial et al., 2024).

These financing gaps are not merely a matter of volume but also reflect deeper structural challenges in the adaptation finance ecosystem. Despite its importance, adaptation finance remains insufficient and faces several challenges, including inadequate data collection, lack of harmonized accounting methods, and limited private sector involvement (Barrett, 2022).

According to the Climate Policy Initiative's (CPI) 2025 Global Landscape of Climate Finance, average annual climate finance

² The UNEP's 2024 Adaptation Gap Report does not provide similar figures for developed countries.

³ Figures extrapolated to all developing countries

flows reached an all-time high of US\$ 1.9 trillion in 2023 (with an initial analysis estimating climate flows surpass US\$ 2 trillion for the first time in 2024). Though growing at a compound rate of nearly 26% per year since 2023, this figure still represents a fraction of the average climate investment needs, estimated at between US\$ 6.7 and US\$ 11.7 trillion per year through 2050 under a 1.5°C scenario (CPI, 2025).

Mitigation finance dominates the landscape (amounting to US\$ 1.78 trillion), with adaptation finance accounting for only 3.4% of total climate finance flows in 2023 (US\$ 65 billion), a figure even smaller than in 2022 (CPI, 2025). According to other estimates, global adaptation finance more than doubled from US\$ 10.1 billion in 2016 to US\$ 28.6 billion in 2020 (Ahairwe & Bilal, 2023). In any case, it seems reasonable to assume that current figures fall short of the estimated investment needs for climate and, especially, for adaptation.

As for recipient sectors, the water and wastewater sector received 34% of adaptation finance (US\$ 22.3 billions), highlighting its relevance to building resilience against floods and drought; 10% (US\$ 6.5 billions) was channeled to the Agriculture, Forestry and Other Land Use (AFOLU) & fisheries sector; while disaster risk management (US\$ 6.3 billions) and Policy & national budget support & capacity building (US\$ 5.8 billions) represented the other major recipients (CPI, 2025).

Despite the figures mentioned above, it is also worth noting that, on occasion, finance serves a dual-purpose, that is, addressing simultaneously mitigation and adaptation elements. Indeed, this dual-benefit finance roughly equates adaptation flows, with nearly US\$ 58 billion investments in 2023, more than three times the observed in 2018 (CPI, 2025).

Taken together, these figures illustrate a bottom-up approach to estimating

adaptation finance, one that is rooted in the identification, tagging, and aggregation of actual financial flows explicitly reported as adaptation-related. This method relies on tracking what has been committed or disbursed across sectors, geographies, and instruments, based on available reporting by public and private actors. While this approach provides a grounded view of current efforts, it also tends to underestimate the true scale of adaptation needs, as it captures only what is labeled, visible, and measurable within existing frameworks⁴. The absence of standardized definitions, limited disclosure by private entities, and the prevalence of “unconscious adaptation” further constrain the comprehensiveness of this bottom-up perspective, reinforcing the need to complement it with broader, forward-looking estimations.

⁴ It also considers the scenario of 1.5°C for 2050, a very optimistic scenario with very stringent mitigation objectives (i.e., net-zero) according to AR6 IPCC.

BOX 1. TOP-DOWN ESTIMATION OF ADAPTATION NEEDS, BUSINESS, AND INVESTMENT OPPORTUNITIES

While the figures presented above indicate some progress in tracking adaptation finance and offer a grounded view of current allocations, they likely underestimate both the true scale of resources required and the business and investment opportunities linked to adaptation. A top-down approach, relying on macroeconomic modelling, treats the economic impact of climate change as a proxy for those needs. Indeed, CPI (2025) recognizes that inaction would result in economic losses of 30% of GDP by 2100 (under a 3°C warming scenario).

Similarly, an article by Kotz et al., (2024) estimates that the global economy is already committed to a 19% reduction in income by 2050 - equivalent to US\$ 38 trillion annually - due to past emissions and socio-economic inertia. This damage, which falls within a likely range of 11–29%, is independent of future emission pathways and exceeds the cost of limiting warming to 2°C by a factor of six over the same period. The most severe economic losses are projected for low-latitude regions with low historical emissions and lower current income levels, highlighting a profound climate injustice. Because a substantial share of future economic harm is already locked in, mitigation alone will not prevent significant near-term losses. This underscores the urgent need for large-scale adaptation investments. The diverse climatic drivers of damage point to an equally diverse set of adaptation responses, from resilient infrastructure and climate-smart agriculture to health systems equipped for extreme heat. Moreover, since the study excludes key impact channels such as sea-level rise, cyclones, tipping points, and non-market damages, and does not fully capture spatial spillovers, the actual scale of economic disruption, and thus the investment required in adaptation, may be considerably larger.

A study by Bilal & Känzig (2024) finds that the macroeconomic damages from climate change are six times larger than previously estimated, with a 1°C rise in global temperature reducing world GDP by up to 12% at its peak and a 46% decline in GDP by 2100, an effect comparable to that of major financial crises. Unlike local shocks, global temperature increases serve as a powerful predictor of systemic, economically damaging events, leading to sustained declines in capital stock, investment, and productivity, indicating that climate change undermines long-term productive capacity rather than simply triggering short-term reconstruction-led rebounds. Because economic damage is driven by structural erosion rather than temporary shocks, adaptation must focus on protecting and enhancing core productive assets (physical, natural, and human capital). Although global temperature shocks have widespread effects, lower-income and warmer countries remain disproportionately affected, reinforcing the need for equitable adaptation finance and accelerated technology transfer.

Viewed through this lens, these figures underscore that the economic stakes of inaction are far greater than current adaptation finance flows suggest. While realized and tracked finance estimates offer a grounded, bottom-up picture of current commitments, macroeconomic modelling provides a high-end, top-down benchmark that helps reframe the true scale of the adaptation challenge (**Table 2**). It is worth noting, however, that an estimate of the values at risk does not equate to actual financing needs, given that occasionally there may be a case for allowing the asset to perish and investing in a different asset.

TABLE 2. COMPARING BOTTOM-UP AND TOP-DOWN ESTIMATES OF ADAPTATION NEEDS, BUSINESS AND INVESTMENT OPPORTUNITIES

Approach	Source	Estimate	Scenario/ Assumptions	Implication
Bottom-Up	CPI (2025)	US\$65 billion/year in adaptation finance	Based on tagged financial flows	Reflects current, trackable investments
Top-Down	Kotz et al (2024)	US\$38 trillion/year in income loss by 2050	Historical emissions; 19% GDP loss	Indicates committed damages from past emissions
Top-Down	Bilal & Känzig (2024)	46% GDP by 2100 (capital shrinks and consumption drops by 37%)	Business-as-usual warming; neoclas-sical growth model	Suggests much higher adaptation needs

Source: the authors based on the listed sources.



Identifying private finance for adaptation

There is increasing recognition that the private sector has a critical role to play in addressing the climate change adaptation challenge. Private sector

entities are not only affected by the impacts of climate change but also have the financial resources, technical expertise, and innovative capacity to contribute to

adaptation efforts (Lu, 2022; Takemae, 2023). **Private adaptation finance refers to the financial resources provided by private sector entities, such as corporations, investors, and financial institutions, to support activities that help communities and ecosystems adapt to the impacts of climate change.**

The level of private sector engagement in adaptation varies significantly across regions and sectors. In some regions, such as Asia and the Pacific, there is a growing emphasis on scaling up private sector involvement in adaptation, driven by the need to build climate-resilient economies (Lu, 2022), particularly given that low-income and least developed countries often receive low amounts of public adaptation finance, and much of that finance is not delivered through proper channels and local organizations, limiting its effectiveness (OECD, 2023). Still, in many regions, private sector engagement in adaptation remains limited, with many countries struggling to attract private investment due to perceived high risks and lack of enabling environments (Hlatshwayo & Qutieshat, 2024; OECD, 2023).

To address this gap, a variety of innovative financing mechanisms have emerged, aiming to attract private sector resources for adaptation. These include green bonds, impact investing, and public-private partnerships (PPPs). For example:

- The Green Climate Fund (GCF) has been at the forefront of efforts to leverage private sector finance for climate action, including adaptation (Fujiwara & Mahajan, 2023; Kalinowski, 2024);
- European Development Finance Institutions (DFIs) and Public Development Banks (PDBs) are encouraged to adopt innovative financing mechanisms and develop a pipeline of bankable projects to close the adaptation financing gap (Ahairwe & Bilal, 2023);

- The Adaptation Benefits Mechanism (ABM) by the African Development Bank aims to provide a transparent means of channeling funds to adaptation projects, potentially overcoming financial barriers to private sector investment (Glemarec, 2022).

The supply side of private finance for adaptation

To have a comprehensive overview of the financial ecosystem for climate adaptation, one can see how funds flow from various sources to concrete adaptation investments. On this point, common sources of finance can be divided into three main groups: Public-Domestic (e.g., national governments and development finance institutions); Private (including households, corporations, SMEs, and financial institutions); and Public-International (such as multilateral organizations, bilateral donors, and climate funds like the Green Climate Fund).

These sources channel funds through a variety of mechanisms, including public investment, procurement, corporate spending, debt instruments, consumer purchases, and private equity. Ultimately,

Private sector entities are not only affected by the impacts of climate change but also have the financial resources, technical expertise, and innovative capacity to contribute to adaptation efforts

these financial flows support a range of adaptation investments, from early warning systems and resilient infrastructure to supply chain adaptation and capacity building (OECD, 2024; UNEP, 2023).

Private finance for climate adaptation is shaped by investor expectations of risk-adjusted returns. Investors assess adaptation investments through the lens of financial viability, risk mitigation, and strategic alignment. Adaptation projects may generate returns by protecting physical assets, reducing operational disruptions, or opening new markets for resilience-enhancing technologies and services. Conversely, they may also introduce risks, such as uncertain revenue streams or long payback periods, that deter investment. For instance, infrastructure upgrades or climate-smart agriculture may yield long-term cost savings, but lack immediate monetization pathways. In this context, **public finance (domestic and/or international) can play a catalytic role, since it often aims to correct market failures, reduce systemic vulnerability, and crowd in private investment by improving project bankability and aligning incentives across sectors** (OECD, 2024; UNEP, 2023).

BOX 2. CLIMATE ADAPTATION AND MARKET FAILURES

Market failure typically occurs when “a more or less idealized system of price-market institutions” does not sustain desirable activities or prevent undesirable ones (Bator, 1958). In the context of climate adaptation, market failure arises when decentralized market mechanisms fail to allocate resources toward resilience-enhancing activities, even when such investments would improve societal welfare.

This failure to allocate resources efficiently toward climate adaptation is not merely theoretical, but also empirically substantiated. The study “Strengthening the Investment Case for Climate Adaptation”, by Brandon et al. (2025), demonstrates that adaptation investments yield high returns and often generate benefits even in the absence of climate-related disasters. Yet, these investments remain underfunded, particularly by private actors due to a classic market failure: the full social value of adaptation, including avoided losses, induced economic growth, and environmental co-benefits, is not adequately priced or internalized in private decision-making. For instance, the study’s triple dividend framework reveals that many adaptation benefits are non-market or difficult to monetize, such as improved health outcomes or ecosystem services, which further impedes their visibility in conventional investment appraisals.

Source: the authors based on Bator (1958); and Brandon et al. (2025).

In particular, on the supply side of private finance, main focus of the present report, actors include:

- **Households:** groups of persons who share the same living accommodation, pool some, or all, of their income and wealth and consume certain types of goods and services collectively, mainly housing and food;

- **Corporations (nonfinancial):** corporations and quasi-corporations whose principal activity is the production of market goods or nonfinancial services;

- **Financial sector:**

- **Commercial banks:** Commercial banks can finance adaptation via lending to businesses and consumers seeking to respond to climate hazards, for instance, providing household loans for home renovation to address climate risks, developing innovative mortgage products to guide consumers toward climate-resilient home ownership;

- **Asset managers:** can invest in adaptation across public and private equity and debt, use voting and engagement power in investee companies and assess portfolios' climate risks;

- **Pension funds:** separate funds established for purposes of providing incomes on retirement for specific groups of employees. Control large pools of capital (US\$ 44 trillion globally) that could be directed toward adaptation efforts. Many pension funds hold a substantial portion of their assets in national markets, making them vulnerable to physical climate risks, such as extreme weather events or rising sea levels.

- **Insurance corporations:** provide financial benefits to policyholders through risk-sharing and risk-transfer contracts. They are uniquely positioned to operate both ex-ante and ex-post (CPI, 2024b; IMF, 2019).

adaptation finance, it is essential to understand which financial mechanisms have been most widely used to allocate resources for climate adaptation. Although data remains fragmented, evidence from multilateral development banks, public development banks, and climate finance tracking initiatives points to a limited yet growing use of structured mechanisms to channel funds into adaptation projects.

Table 3 provides an overview of some of the most relevant instruments used to date, their characteristics, illustrative examples, and an assessment of their relative prevalence in the current adaptation finance landscape. While concessional loans and grants still dominate, especially in public adaptation funding, there is increasing experimentation with instruments and investment strategies designed to attract private capital, such as blended finance, green bonds, and impact investing. However, their actual deployment in adaptation remains modest compared to mitigation finance.

Efforts to expand the use of these instruments, strategies, and mechanisms must address structural barriers such as the lack of bankable adaptation projects, limited risk-return profiles, and difficulties in monetizing adaptation outcomes.

In addition to identifying key actors in

TABLE 3. OVERVIEW OF FINANCIAL INSTRUMENTS, STRATEGIES AND MECHANISMS FOR CLIMATE ADAPTATION

Instrument/Strategy/ Mechanism	Description	Illustrative Examples	Prevalence in Adaptation Finance
Concessional loans & grants	Loans with below-market interest rates or direct grants from public sources.	Green Climate Fund, Adaptation Fund, bilateral donor programs.	High (main mechanism in public finance).
Blended finance	Use of concessional capital to de-risk private investment.	GCF Private Sector Facility; IFC's blended finance platform.	Moderate, increasing but still limited.
Green bonds (and/or sustainability-linked, catastropheⁱ or similar bonds)	Debt instruments earmarked for climate-related investments, including adaptation.	World Bank Green Bonds; subnational green bond programs (e.g. Mexico, India).	Low for adaptation; dominated by mitigation.
Impact investing	Investments seeking both financial return and measurable adaptation outcomes.	Adaptation SMEs, local infrastructure funds.	Low, though promising in niche markets.
Public-Private Partnerships (PPPs)	Long-term contracts between public entities and private firms for infrastructure projects.	Climate-resilient water and sanitation systems; early warning infrastructure.	Low to moderate, highly context-dependent.
Insurance-linked instruments	Products that transfer climate risk to capital markets.	Resilience bonds, catastrophe bonds, microinsurance.	Emerging, with potential for scale.

Source: Adapted by the authors based on CPI (2024b), OECD (2024), Fujiwara & Mahajan (2023), and Glemarec (2022).

i: Instruments such as catastrophe bonds raise complex ethical and design considerations, which merit further exploration beyond the scope of this diagnostic report.

Merely for introductory purposes, **Table 4** points to some core issues and provides an initial overview on drivers, barriers and

recommendations found in the literature on how to increase private financial flows towards climate adaptation.

TABLE 4. DRIVERS, BARRIERS AND RECOMMENDATIONS FOR PRIVATE ADAPTATION FINANCE

Theme	Drivers	Barriers	Recommendations
Business Incentives	Firms invest to protect assets or access new adaptation markets.	Perceived high risk and uncertain returns. High costs and climate uncertainty delay action.	Use guarantees, concessional finance, and equity to reduce risk. Develop bankable projects.
Information & Risk	Investors seek returns and risk diversification, relying on good disclosures.	Lack of climate risk data hinders pricing and targeting.	Signal priorities through plans. Improve disclosure to guide capital to resilience.
Market Demand	Demand for resilient infrastructure and sustainable practices attracts capital.	Adaptation lacks direct revenue, reducing financial appeal.	Offer tax breaks, grants, and regulatory incentives to support adaptation.
Impact Investing	Investors pursue both financial returns and positive societal outcomes.	—	Align public-private efforts. Build technical capacity across sectors.
Systemic Challenges	—	Firms prioritize self-interest, sometimes shifting risks to others.	Align public-private efforts. Build technical capacity across sectors.
Market Distortionsⁱ	—	Mispricing of climate risks and lack of valuation standards	Improve climate risk disclosure and integrate adaptation into asset valuation frameworks.

Source: Adapted by the authors based on CPI (2024b), OECD (2024), Fujiwara & Mahajan (2023), and Glemarec (2022).

i: For a deeper discussion on market distortions and climate risk mispricing, see the companion paper on the adaptation economy.

BOX 3. TRACKING PRIVATE FINANCIAL FLOWS FOR ADAPTATION

Private sector finance for climate adaptation remains significantly underreported and underutilized, despite its critical role in meeting global resilience goals. While public finance continues to dominate adaptation funding, the private sector has the potential to mobilize substantial capital—if the right conditions are in place.

In 2024, CPI revised its methodology to track private adaptation finance, using machine learning to collect and analyse data from asset managers, commercial financial institutions, individuals and households, and corporations. As presented in the report “Tracking and Mobilizing Private Sector Climate Adaptation Finance”, the update increased tracked financial flows from US\$ 1 billion to US\$ 4.7 billion (annual average) in the 2019-2022 period.

level investments, particularly in the water and sanitation services sectors. **Within the Financial Sector, Commercial banks financed, on average, annual US\$ 2.52 billion in the 2019-2022 period, 95% of which was for the water and sanitation sector**, focusing on wastewater treatment, sanitation services and industrial after reuse and concentrated in East Asia and the Pacific; Asset managers (US\$ 165 million) are focused on the infrastructure (US\$ 99 million) and water and sanitation (US\$ 564 million) themes; while Private equity were responsible for US\$ 92 million annually on project level investments.

However, no adaptation finance tracking effort has fully captured aggregate investment in key areas such as adaptation-focused SMEs, PE/VC funding for early-stage adaptation firms, insurance premiums promoting resilient construction, consumer spending on adaptation technologies, or corporate balance sheet investments in asset resilience. Hence, the figures above represent a very conservative, lower-bound, to actual private finance specifically or indirectly oriented towards adaptation projects and businesses.

Source: (CPI, 2024b)

The critical role of definitions

While the Climate Policy Initiative has made significant strides in tracking climate finance, its approach to estimating adaptation finance has notable limitations. CPI's methodology often relies on narrow definitions and tagged investments, which may exclude substantial adaptation-related expenditures that are not explicitly labeled as such. This results in underreporting and a skewed understanding of the actual financial landscape (Buchner et al., 2023; CPI, 2024b).

Moreover, CPI's estimates are constrained by the lack of standardized metrics and reporting requirements, particularly from private sector actors. This limitation is compounded by the context-dependent nature of adaptation, where investments may serve multiple purposes and are not easily categorized (UNEP, 2023).

In sum, despite growing attention and investment, **there is still no universally accepted or operationally ideal definition of what constitutes adaptation finance**. This ambiguity persists even in the most recent academic and policy literature. Some definitions focus on explicitly tagged investments aligned with climate models, while others include broader resilience-enhancing activities that are not labeled as adaptation but serve similar purposes. This lack of definitional clarity complicates tracking, reporting, and mobilizing finance, especially from private sources.

Recent reports from institutions like the OECD, McKinsey, and Boston Consulting Group (BCG) echo this concern.

The OECD (2025) emphasizes the need for harmonized taxonomies and better integration of adaptation into national planning. BCG (2023) highlights the business case for adaptation but notes that definitional uncertainty hampers private sector engagement. McKinsey & Company (2024) points out that while capital is available, the lack of clear frameworks and investable definitions limits deployment.

Table 5 below, displays some of the similar, but different views on the definitions of adaptation and adaptation finance found in the academic and grey literature. The purpose here is to highlight how differences in definitions, focus and approaches can lead to different measurements and, consequently, policy proposals.

... despite growing attention and investment, there is still no universally accepted or operationally ideal definition of what constitutes adaptation finance

TABLE 5. ILLUSTRATIVE DEFINITIONS OF ADAPTATION AND ADAPTATION FINANCE

Source	Adaptation	Adaptation Finance
Venner et al. (2024)	Actions to reduce vulnerability and build resilience, especially for climate-vulnerable communities.	Financial flows for adaptation, often missing the most vulnerable due to political and institutional biases.
Pauw et al. (2016)	Adjustments in ecological, social, or economic systems to respond to climate stimuli.	Financial resources for adaptation, highlighting the gap between public goals and private action.
Stoll et al. (2021)	Managing climate risks through planning, implementing, and monitoring resilience activities.	Public and private investments, but hindered by lack of metrics and private finance mobilization.
Khan & Munira (2021)	A global public good essential for equitable climate resilience.	Requires multilateral support and innovative mechanisms as a shared global responsibility.
Glemarec (2022)	Proactive and reactive steps to reduce climate vulnerability.	Focuses on mechanisms like ABM to attract private finance for adaptation.
OECD (2025)	Adjustments to climate impacts to reduce harm or seize opportunities, enhancing resilience.	Public and private flows correcting market failures and incentivizing resilient development.
McKinsey & Company (2024)	Preparing for and responding to physical climate impacts like extreme weather and sea-level rise.	Capital to reduce exposure and vulnerability, including infrastructure and data investments.
BCG (2023)	Actions to reduce climate impacts and build resilience in communities and ecosystems.	Public and private investments in adaptation and resilience, stressing need for impact metrics.

Source: the authors, adapted from the original sources with AI assistance.

To address these issues, **a broader and more modern definition of adaptation finance is needed, one that includes ecosystem-based adaptation, community-led initiatives, and investments that indirectly enhance resilience.** Such a definition would better capture the diversity of adaptation efforts and provide a more accurate picture of financial flows. Harmonizing taxonomies and improving data interoperability across sectors and regions are essential steps toward this goal (Fujiwara & Mahajan, 2023; Pauw et al., 2016).



Conclusion

This technical paper set out to explore the scale and scope of climate change adaptation finance by combining two complementary perspectives: a bottom-up approach, grounded in the tracking of actual financial flows, and a top-down approach, derived from macroeconomic modeling of climate-related damages. The objective was to provide a more comprehensive and forward-looking understanding of the adaptation finance landscape, with particular attention to the role of the private sector.

The analysis revealed that **while adaptation finance flows have increased in recent years, they remain significantly below the levels required to meet projected needs.** The bottom-up estimates highlight sectoral allocations and the dominance of public sources but also expose persistent gaps in tracking methodologies and private sector mobilization. The figures presented, however, likely represent a lower bound, as they exclude substantial corporate investments and blended strategies that

integrate adaptation with broader business transformations.

The top-down macroeconomic modeling, on the other hand, shows that the world is already committed to substantial economic losses due to past emissions and socio-economic inertia, losses that far exceed current investment levels. These projections provide a high-end benchmark for adaptation needs, reinforcing the urgency of scaling up investment and innovation. Still, these estimates should be viewed as indicative of potential exposure rather than direct investment requirements, given the possibility of strategic asset reallocation.

For policymakers, the paper underscores the importance of aligning adaptation policy with economic development and fiscal planning. It also highlights the need to improve tracking systems and create enabling environments that lower barriers to private sector participation.

For investors, the findings point to a growing and underexplored market, which includes investment opportunities in resilient infrastructure, climate-smart agriculture, risk management, and health systems, all of which are essential to reducing economic exposure to climate risks.

For businesses, the results suggest that integrating adaptation into core strategy is not only a matter of risk management but also of long-term competitiveness and value creation in a climate-constrained world. Moreover, there are emerging opportunities for new businesses to be created and scaled by offering solutions tailored to a rapidly changing climate reality.

Given this initial exploration on the subject, we can, albeit in a highly exploratory and normative fashion, postulate the following recommendations for different actors involved in the ecosystem for adaptation

finance:

- **Governments:** Develop national adaptation taxonomies and integrate adaptation into budget tagging.
- **Multilateral Development Banks (MDBs) and Donors:** Support capacity building for adaptation finance tracking and reporting.
- **Private Sector:** Engage in blended finance mechanisms and disclose adaptation-related investments.
- **Researchers:** Advance methodologies for identifying and evaluating adaptation finance flows.

In summary, meaningful debates regarding public policies and business practices in the field of adaptation require greater consensus on what is being measured and how.

In closing, the paper offers a reframing of adaptation finance: not simply as a cost to be borne, but as an investment in resilience, stability, and opportunity. Understanding the full scale of adaptation needs, from both historical and forward-looking perspectives, is essential to catalyzing the capital, innovation, and coordination required to build a more resilient global economy.

... there are emerging opportunities for new businesses to be created and scaled by offering solutions tailored to a rapidly changing climate reality.

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