Transformative Adaptation:

A Whole-Economy Approach

Technical paper

November 2025

Produced by

morphosis.

Financial support

INSTITUTO ITAÚSA

Technical partners

FGV EAESP CENTRO DE ESTUDOS EM SUSTENTABILIDADE

PAULSON INSTITUTE

BASILINNA

About this Report

Morphosis, with its partners the Center for Sustainability Studies at Fundação Getulio Vargas, Instituto Itaúsa, the Paulson Institute, and Basilinna, have come together to explore how climate adaptation finance, particularly from private sources, can be scaled to meet the growing needs of a climate-impacted world.

Our efforts have built on the evolving body of work on adaptation economics by academics, think tanks, consultancies, international organizations and businesses, which is itself a testimony to the growing recognition of the importance of the adaptation agenda.

This technical paper contributes to the broader adaptation finance agenda by expanding our understanding of what is required to unlock investment into adaptation well beyond the prevalent finance supply-side approach. It introduces the foundational concepts of adaptation markets and the adaptation economy—a whole-economy approach that views adaptation as an economic transformation rather than a sectoral or project-based intervention.

The paper establishes the analytical basis for understanding how adaptation emerges through the interaction of market systems, policy environments, and investment dynamics, emphasizing that effective adaptation requires functioning markets that deliver resilience as a good, service, and public benefit. By reframing adaptation as a systemic economic transition—akin to the green or digital transitions—it identifies the structural features and institutional conditions that enable private initiative, innovation, and capital flows toward adaptation solutions.

This contribution is a work-in-progress that will evolve as experience expands and learning deepens. We hope, however, that it is sufficient to engage policymakers, businesses and thought leaders in exploring how best to make markets work better in advancing adaptation in a rapidly changing, severely climate impacted world.

Produced by

Financial support

Technical partners

About the Partners

Morphosis is an integrated adaptation solutions business for a climate-impacted world beyond 1.5°C. Our purpose is to deliver affordable transformative adaptation solutions to low and middle-income households by catalyzing the adaptation economy through investment, policy engagement, research and advisory work. Morphosis orchestrates a network of private capital investors, market, policy and other stakeholders, and invests in a growing portfolio of adaptation solution businesses.

www.morphosis.solutions Contact: info@morphosis.solutions

The Center for Sustainability Studies at Fundação Getulio Vargas (FGVces) at FGV's São Paulo School of Business Administration is a dynamic space for learning, innovation and knowledge production, driven by a multidisciplinary team committed to societal transformation. FGVces develops public and corporate strategies, policies and management tools for sustainability across local, national and international contexts.

www.portal.fgv.br/en Contact: ces@fgv.br

Launched in 2023, **Instituto Itaúsa** is part of Itaúsa's sustainability strategy. Its mission is to accelerate Brazil's transition toward a more productive and positive economy for the climate, nature, and people. As a nonprofit organization, the Institute supports innovative and scalable initiatives—or those at the forefront of philanthropy—through co-investments with other philanthropic entities or direct investments, across two strategic fronts: Environmental Conservation and Productivity & Sustainability.

https://www.itausa.com.br/sustentabilidade/instituto-itausa/ Contact: ri@itausa.com.br

The Paulson Institute (PI) is a non-partisan, independent "think and do tank" dedicated to fostering global relationships that advance economic prosperity, promote sustainable growth, and maintain global order in a rapidly evolving world. Operating at the intersection of economics, financial markets and environmental protection, PI promotes market-based solutions to ensure green economic growth.

www.paulsoninstitute.org Contact: info@paulsoninstitute.org

Basilinna is a global strategic advisory firm that combines geopolitical and sector expertise with strong networks to deliver counsel, insights and implementation. Through Basilinna Advisory and the Basilinna Institute, the firm supports governments, companies and NGOs with data-driven strategies and global policy engagement. Basilinna specializes in financial services, biodiversity and nature financing, culture, technology, trade and health, critical sectors where the stakes are high and the status quo no longer serves.

www.basilinna.com Contact: info@basilinna.com

Acknowledgements

Morphosis, The Center for Sustainability Studies at Fundação Getulio Vargas, the Instituto Itaúsa, the Paulson Institute and Basilinna would like to acknowledge the following people for their invaluable contributions to this report.

Lead co-authors are Jennifer Blanke and Simon Zadek, with contributing authors Annelise Vendramini, Gustavo Breviglieri, Johanna Costigan and Ruihan Huang.

We are grateful for the contributions made by other team members from all four organizations: Elisabeth Erasmus, Samruddhi Kothari, Ingrid Kukuljan, Feifei Lu, Deborah Lehr, Natalia Lutti, Niall Murphy, Natalia Nunes, Lucy Oulton, Gracie Sun and Camila Yamahaki.

We extend our thanks to the external reviewers who provided constructive, insightful and fearless comments: Silja Baller, Gemma Corrigan, Pamela Divinsky, Callum Douglas, Ceandra Faria, Mark Halle, Gregory La Montagne, Dorothy Maseke, Andreas Merkl, Guo Peiyuan, Rick Samans, Atsuko Toda, Terry Townshend, Simon Winter and Chunping Xie.

This report would have not been possible without the financial support of our partner, Instituto Itaúsa, and many thanks in particular to Marcelo de Camargo Furtado and Natalia Cerri Oliveira.

All errors and omissions in this report are the responsibility of the authors and partner institutions.

Citation: MORPHOSIS SOLUTIONS SA. **Transformative Adaptation: A Whole-Economy Approach**. Geneva: Morphosis, 2025.

Contents

Exhibits

As climate change breaches critical planetary thresholds, adaptation is no longer a peripheral concern, it is an existential imperative. The lived experiences of climate impacts such as wildfires, storms, floods and droughts are capturing the attention of citizens and businesses worldwide and pressuring politicians of every persuasion to consider what actions to take. The question is no longer whether to adapt, but how fast and how well. As Kristalina Georgieva, Managing Director of the IMF has succinctly put it, “Adaptation is not a defeat, but rather a defense against what is already happening. The right investments will deliver a “triple dividend” by averting future losses, spurring economic gains through innovation, and delivering social and environmental benefits to everyone.”[1]

The question is no longer whether to adapt, but how fast and how well.

The adaptation finance gap is most acute for low- and middle-income households in vulnerable regions, where impacts are accelerating just as public resources are increasingly constrained. Private capital will be needed at scale to create inclusive pathways to sustained prosperity in a world beyond 1.5°C. Some projections suggest a 2–3°C warming scenario world marked by growing systemic stress.[2] The French government, for instance, is planning for a 3°C global increase, potentially translating to a 4°C rise for mainland France by the end of the century.[3] For the many countries already coping with significant climate stress, these estimates are alarming.

Climate losses are already severe, valued at more than US$300 billion in 2024.[4] Such losses are devastating for those affected. They are largely concentrated in 55 countries, home to 3.6 billion people and considered by the UN to be highly vulnerable. Yet sadly this is just the beginning, amounting to less than 0.3 percent of global Gross Domestic Product (GDP) Without effective adaptation, these losses could escalate by some estimates to 20 percent of global GDP by 2050 and as high as 50 percent by 2070.[5]

Clearly there is a need to continue to act ambitiously to reduce emissions, thereby minimizing the need for adaptation. However, across governments, businesses and civil society, there are growing calls for urgent action on adaptation as the evidence mounts that measures to date have been wholly inadequate, notably in advancing transformative adaptation in light of science-based predictions that we are heading into unknown climate change territory.

More generally, what is needed is “transformational” adaptation, which goes beyond the largely incremental approaches that have characterized climate resilience efforts to date. While incremental adaptation seeks to adjust existing systems to withstand gradually changing conditions, transformational adaptation recognizes that the scale, speed and systemic nature of climate impacts are now outpacing the effectiveness of such measures.

1 https://www.imf.org/en/Blogs/Articles/2019/12/02/blog-the-adaptive-age

2 https://www.naturefinance.net/wp-content/uploads/2023/11/Beyond15Web.pdf

3 This is reflected in France’s National Climate Change Adaptation Plan (PNACC3) and its focus on adapting to a 4°C warming scenario. See https://www.i4ce.org/en/adaptaption-putting-the-reference-trajectory-into-law-climate/

4 https://www.munichre.com/content/dam/munichre/mrweb-sitespressreleases/MunichRe-NatCAT-Stats2024-Full-Year-Fact-sheet.pdf/_jcr_content/renditions/original./MunichRe-NatCAT-Stats2024-Full-Year-Factsheet.pdf

5 https://www.nature.com/articles/s41586-024-07219-0

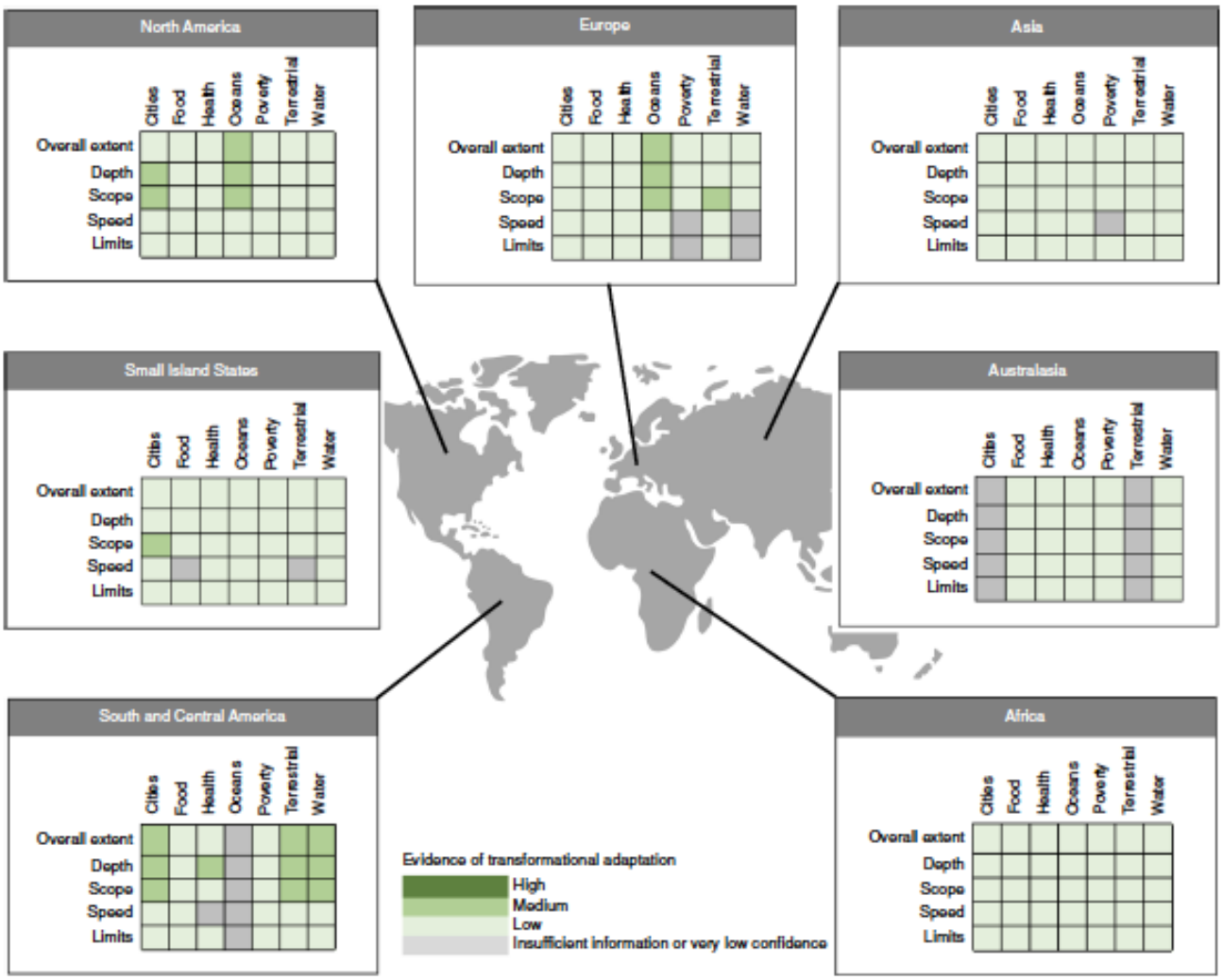
The term is already well-established in international discourse, used by the United Nations Framework Convention on Climate Change (UNFCCC)[6] and explored in academic literature, with recent work showing that transformational adaptation remains rare and unevenly distributed (Exhibit 1).[7] The implication is clear: true adaptation will require not just marginal improvements, but deep, structural change in how societies organize, produce and invest.

Understanding the need for transformative adaptation also underpins the logic of the emerging adaptation economy that we put forward in this paper. As climate risks become pervasive across sectors, markets themselves must evolve, reshaping investment priorities, regulatory systems and value chains to internalize resilience and sustainability. Transformational adaptation is therefore both an outcome and a process. It refers not only to the nature of adaptation interventions (for example, redesigning coastal settlements or reconfiguring food systems), but also to the broader economic transition they demand. It calls for new models of innovation, finance and governance that can reorient economies toward adaptation as a driver of prosperity, rather than as a cost to be minimized. It calls for an adaptation economy.

6 https://unfccc.int/sites/default/files/resource/tp2024_08.pdf

7 https://www.nature.com/articles/s41586-024-07219-0

EXHIBIT 1: INADEQUATE ADAPTATION MEASURES – WEAK EVIDENCE OF IMPLEMENTATION



Source: Berrang-Ford, L, 2021

Adaptation is still too often framed as the responsibility of centralized public action, with private capital seen mainly as a supplement through de-risking mechanisms. Yet these centralized models are increasingly strained by the compounding impacts of climate shocks, underscoring the need for more decentralized, adaptive approaches. Demand is already surging: people require secure food and water systems, climate-resilient construction materials, efficient cooling technologies, and other essentials to live and work in a hotter world. But the markets capable of delivering these goods and services at scale and affordably remain underdeveloped, even though every asset, sector and community will need to adapt to function and thrive in the future.

Meeting this challenge requires a fundamental shift in how investment, both public and private, is directed, and in how markets and innovation are mobilized. Adaptation is no longer just a matter of risk management; it is fast becoming a central driver of economic value.

Situating Adaptation in the Climate Debate

There is increasing discussion and emphasis on adaptation in global climate discussions, but the specific focus and goals are not always clear. A range of terms are used—*adaptation, resilience, risk reduction, disaster preparedness, climate-proofing*—sometimes interchangeably, sometimes with different meanings depending on the context. This lack of clarity can create confusion and limit the effectiveness of policy and investment efforts and coordination across actors.

It is particularly useful to untangle adaptation and resilience, which are closely related but distinct concepts. Current debates on adaptation finance, often led by organizations like the Multilateral Development Banks (MDBs), the Organisation for Economic Co-Operation and Development (OECD) and the United Nation's Environment Programme (UNEP), have done important work to assess resilience and quantify the size of financing gaps. These perspectives have been invaluable in establishing a common baseline: they highlight unmet needs, mobilize resources, and focus attention on the urgency of action. At the same time, they capture only part of the picture, as they tend to conceptualize adaptation primarily through the lens of vulnerability reduction rather than as an economic process.

The Intergovernmental Panel on Climate Change (IPCC) defines adaptation as "the process of adjustment to actual or expected climate and its effects, in order to moderate harm or exploit beneficial opportunities." This forward-looking framing emphasizes not just addressing current risks but also anticipating future conditions and unlocking new opportunities. By contrast, resilience is defined as "the capacity of interconnected social, economic and ecological systems to cope with a hazardous event, trend or disturbance, responding or reorganizing in ways that maintain their essential function, identity and structure." Resilience thus highlights a system's ability to withstand shocks and preserve continuity.[8]

Both concepts are essential, but the distinction matters. In our interpretation, adaptation can be seen as a proactive process that fosters innovation, promotes transformation, and generates value, while resilience often emphasizes defensive capacity. When the two are conflated, the focus risks narrowing to protecting the status quo, rather than enabling adaptation to drive renewal and long-term opportunity.

The MDBs' 2023 Joint Report on Climate Finance, for example, defines adaptation's objective as "to reduce the risks or vulnerabilities posed by climate change and to increase climate resilience."[9] Similarly, the OECD's Climate Adaptation Investment

8 https://www.ipcc.ch/report/ar6/wg2/chapter/annex-ii/

9 https://thedocs.worldbank.org/en/doc/3077331569469f-690c6e82b35052766c-0020012024/original/2023-Joint-Report-on-MDB-Climate-Finance.pdf

Framework[10] and UNEP's annual Adaptation Gap Reports[11] provide rigorous metrics that clarify where gaps remain and how far current flows fall short of estimated needs. This body of work has been critical to advancing the global conversation. The natural next step is to complement this resilience-focused lens with one of economic dynamism: to see adaptation not only as a cost to be met but as a driver of innovation, competitiveness and inclusive growth.

This broader framing brings into view both physical climate risks—storms, droughts, sea-level rise—and systemic risks such as institutional breakdowns, social instability and capital market disruptions, which also shape investor confidence and long-term growth potential. It also helps shift the focus from vulnerability reduction alone to the creation of adaptive systems—climate-resilient infrastructure, technologies, water systems, digital climate services and resilient urban design—that can stimulate new markets and deliver value.

Estimating Adaptation Investment Needs and Flows

The economics of adaptation has to date been largely framed as a financing challenge. Demands, analysis and debate have centered on 'adaptation finance' volumes, sources and gaps, and instruments. This current landscape of adaptation financing has been mapped by our partner the Fundação Getulio Vargas (FGV) in *Climate Change Adaptation Financing: From Tracked Flows to Untapped Potential*, in a companion technical paper to this one.

Their bottom-up analysis indicates that developing countries alone require an estimated US$ 222 billion per year through 2030, and US$ 248 billion per year from 2031-2050, to cover the costs of the economic impacts of climate change. Estimates made from policy commitments set out in National Adaptation Plans (NAPs) and Nationally Determined Contributions (NDCs) of developing countries indicate needs of US$ 387 billion per year until 2030.[12]

Although large, these numbers remain modest compared to estimates of overall annual climate investment needs, estimated at between US$ 9.3 and US$ 12.2 trillion per year through 2050.[13] That said, these estimates have been made within an optimistic 1.5°C scenario, and it is likely that the relative and absolute scale of adaptation financing needs would increase significantly under more severe climate change scenarios.

According to the Climate Policy Initiative, actual climate finance flows reached an all-time high of US$ 1.9 trillion in 2023, with initial estimates suggesting that flows exceeded US$ 2 trillion in 2024. Of this total, adaptation finance accounted for an estimated 3.4 percent in 2023 (US$ 65 billion). These investments were particularly focused on water and waste treatment, land use and fisheries, and disaster risk management. To this total should be added the finance that serves a dual purpose in addressing both mitigation and adaptation elements, estimated as an additional US$ 58 billion in 2023[14]. Much of what has been identified has been supported by the public purse, for example via de-risking guarantees, concessional loans and other forms of blended finance (see Exhibit 2). Overall, estimates of private sector investment into adaptation have been less than 5 percent of the total.

10 https://www.oecd.org/en/publications/climate-adaptation-investment-framework_8686fc27-en.html

11 https://www.unep.org/resources/adaptation-gap-report-2024

12 Vendramini, A. & Breviglieri, 2005a

13 https://www.climatepolicyinitiative.org/the-cost-of-inaction/

14 https://www.climatepolicyinitiative.org/publication/global-landscape-of-climate-finance-2025/

EXHIBIT 2: OVERVIEW OF FINANCIAL MECHANISMS FOR CLIMATE ADAPTATION

Instruments, Strategies and Mechanisms	Description	Illustrative Examples	Prevalence in Adaptation Finance
Concessional loans and grants	Loans with below-market interest rates or direct grants from public sources.	Green Climate Fund, Adaptation Fund, bilateral donor programs, MDBs.	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, catastrophe 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, particularly 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 from FGV, 2025[15]

15 Vendramini, A. & Breviglieri, 2005a

The mismatch between needs and flows of private capital has led to much hand wringing and calls for more derisking and new climate financing vehicles. There is no doubt that insufficient private capital is being invested in adaptation. But the dominant approach to collecting this data makes it one of the most intractable data gaps in climate finance. The numbers most often cited tell us little about the true picture.

As described above, conventional wisdom treats adaptation finance as a labelled, purposeful flow aimed explicitly at resilience outcomes**.** Unsurprisingly, such a basis for defining adaptation finance creates both conceptual and measurement challenges. Especially problematic is that these definitions seek to combine notions of intentionality (i.e. purposeful adaptation), with normative perspectives (i.e. not just that it is meant to do good but that it does so in practice).

The challenge is not merely undercounting adaptation finance as it is a fundamental mis-framing. Labeling investments as "adaptation" implies that adaptation exists as a discrete, identifiable asset class, but it does not. Adaptation is a systemic feature of how economies evolve and function in a warming world. Most private investments that enhance resilience, such as heat-resistant construction materials, drought-tolerant seeds, or weather analytics for supply chains, are embedded within broader infrastructure, agricultural or technology projects. These investments are motivated primarily by profitability, competitiveness or operational continuity, not by climate labels.

From Risk to Opportunity: The Emerging Adaptation Economy

This perspective reframes the debate. Building on this systemic perspective, the next logical step is to shift the lens from what value could be lost to how economies

Adaptation is a systemic feature of how economies evolve and function in a warming world.

are already adapting and where the most dynamic opportunities lie. This moves the focus beyond tagged flows or damage-based models to the adaptation economy itself, the evolving fabric of investment, innovation and growth in a warming world.

The adaptation economy is not just the small, labelled portion captured in current datasets; that is merely the tip of the iceberg. The much larger, often invisible share of private and public investment already flows into goods and services that remain viable under climate change. Agriculture in Brazil offers a vivid example, where farmers are steadily shifting to more resilient crops and practices, not as "adaptation projects," but as the core of their business strategy.[16]

Definitions focused on the impact of investments are also problematic. For this lens to be effective will require a view of what might constitute a 'sufficient' difference, and this can only be measured by in-depth, ex-post analysis. Such analysis is fraught with difficulties and available evidence is not encouraging. One global stocktake of implemented human adaptation to climate concluded, from an analysis of almost 50,000 articles and reports, that robustly verified adaptations were "largely fragmented, local and incremental, with limited evidence of transformational adaptation and negligible evidence of risk reduction outcomes".[17]

16 https://journals.plos.org/climate/article?id=10.1371/journal.pclm.0000522

17 https://www.nature.com/articles/s41558-021-01170-y

In sum, the idea of "adaptation finance" is often framed as a problem of data and measurement. Yet, as illustrated above, this framing is both conceptually limiting and analytically misleading. What truly matters is not simply the labeling of finance as "adaptation," but understanding the adaptive features of financial flows themselves.

• **For policy purposes**, intentionality and measurable adaptive outcomes matter most, as does the distribution of benefits across communities and regions.

• **For businesses**, the priority lies in productivity gains, supply chain security, and the profitability of new products and services that meet adaptation needs.

• **For investors**, the focus is on risk profiles and expected returns under shifting market and climate conditions.

Adaptation, and the financing that enables it, should therefore not be treated as a separate category or niche asset class. It must be understood as a transversal, embedded characteristic of development and investment.

The challenge is not to narrowly count "adaptation finance" flows, but to recognize how much of today's traded economy already has adaptation at its core—and how these dynamics can be accelerated. At the same time, it is critical to acknowledge what is excluded: the non-market world of ecosystems, households and communities, which is equally at risk but harder to capture in conventional economic metrics. Together, these realities demand a systemic adjustment: moving from labels and flows toward outcomes and economic transformation.

Climate change, and our responses to it, will fundamentally reshape the global economy. The transition to a low-carbon system is already widely recognized. Less appreciated is that adaptation, too, will drive profound change, disrupting established business models, rendering some economic activities unviable, and catalyzing entirely new markets, products and services.

A demand-side perspective is central to this shift. Instead of focusing narrowly on the size of the "financing gap," this lens highlights rising demand for adaptation goods and services in housing, agriculture, water, health and beyond. Adaptation, in this framing, is not merely about minimizing losses. It is about creating value, driving innovation and catalyzing transformation across the economy.

The good news is that private investment in adaptation is reaching a "hockey-stick" moment, signaling a rapid acceleration in interest and engagement. This shift reflects growing recognition that portfolios are increasingly exposed to disruptive climate risks, and that adaptation itself is becoming a source of competitive advantage. Investors are beginning to see the commercial potential of assets and solutions that are climate-resilient, and the market for these opportunities is expanding.

Instead of focusing narrowly on the size of the "financing gap," this lens highlights rising demand for adaptation goods and services

A SHORT HISTORY OF THE ADAPTATION ECONOMY: ROOTS IN RESEARCH, FINANCE AND POLICY

An adaptation economy lens emphasizes a holistic approach to catalyzing private investment into adaptation solution businesses and assets. Rather than focusing solely on the financial innovations that can de-risk and in other ways incentivize such investments, it emphasizes the need to stimulate effective demand for affordable adaptation goods and services in ways that reward businesses sufficiently to attract private investment.

Over roughly the past decade, this idea has been evolving simultaneously within three distinct but interlinked communities—research, finance and policy—each advancing complementary understandings of how economies can adapt to climate change (see Exhibit 3). The result is a growing convergence toward an economic framing that treats adaptation as both a necessity and an opportunity for sustainable, inclusive growth.

EXHIBIT 3: MULTI-FACETED ROOTS OF THE ADAPTATION ECONOMY

Category	Core Definition	Primary Objective	Key Characteristics
Research	The total spending on activities defined under adaptation and resilience to climate change	Measurement and Analysis	Backward-looking, expenditure-based, analytical tool for tracking and comparison.
Financial	A commercial proposition which can generate market returns	Investment and Mobilization	Forward-looking, opportunity-based, promotional tool for attracting private capital.
Policy	Adjustments in ecological, social or economic systems	Implementation and Governance	Holistic, process-oriented, normative framework for guiding national and international policy.

Source: Authors' analysis

Research Roots: Tracking and Quantifying Adaptation

Within the research community, the foundations of the adaptation economy emerged from efforts to define, measure, and analyze adaptation expenditures and impacts. Early initiatives from UNEP, International Institute for Environment and Development and the World Bank developed methods to classify adaptation within national accounts and development spending, largely to support monitoring of official development

assistance and National Adaptation Plans (NAPs).[18] The IPCC's Fifth and Sixth Assessment Reports (AR5 and AR6) formalized the conceptual distinction between *incremental* and *transformational* adaptation, emphasizing that adaptation can reshape economic systems rather than merely adjust existing ones.[19]

These advances were deepened by the Global Commission on Adaptation[20] and UNEP's annual Adaptation Gap Reports[21], which began quantifying adaptation investment needs and measuring global progress. The OECD's tracking methodologies[22] and UNDP's Climate Public Expenditure and Institutional Reviews (CPEIRs) [23] also played pivotal roles in building the evidence base for adaptation as an economic system. This research lineage has developed metrics and analytical frameworks that, while not yet directly driving adaptation investment at scale, provide a foundation on which policy and financial institutions could build such investment strategies.

Financial Roots: Investment and Market Formation

Within the financial community, the concept evolved as climate resilience became recognized as both a financial risk factor and a market opportunity. Institutions such as the International Finance Corporation (IFC),[24] UNEP Finance Initiative (UNEP-FI)[25], and later the Network for Greening the Financial System (NGFS)[26] and Task Force on Climate-related Financial Disclosures (TCFD)[27] began incorporating adaptation into frameworks for sustainable finance, credit risk assessment, and disclosure.

As understanding grew that climate change affects asset values and long-term returns, adaptation shifted from a defensive posture to a strategic investment frontier. The Global Innovation Lab for Climate Finance[28] and Climate Policy Initiative (CPI)[29] have demonstrated how blended finance and insurance mechanisms can be used to unlock adaptation projects. Meanwhile, private investors from infrastructure funds to impact-oriented venture capital are beginning to approach adaptation resilience as a source of durable value, sparking nascent markets in adaptation solutions like resilient infrastructure, precision agriculture, water efficiency and risk-management technologies among others. Financial institutions are thus helping to shape the

18 https://unfccc.int/national-adaptation-plans

19 https://www.ipcc.ch/assessment-report/ar5/ and https://www.ipcc.ch/assessment-report/ar6/

20 https://gca.org/about-us/the-global-commission-on-adaptation/

21 https://www.unep.org/resources/adaptation-gap-report-2023?utm_source=chatgpt.com

22 https://www.oecd.org/en/publications/climate-adaptation-investment-framework_8686fc27-en.html.com

23 https://www.undp.org/asia-pacific/publications/climate-public-expenditure-and-institutional-review-cpeir-methodological-note

24 https://www.ifc.org/content/dam/ifc/doc/mgrt/Enabling-Environment-for-Private-Sector-Adaptation-Stenek-Amado-Greenall.pdf

25 https://www.unepfi.org/climate-change/adaptation/

26 https://www.ngfs.net/en/what-we-do/adaptation and https://www.ngfs.net/system/files/import/ngfs/medias/documents/ngfs_conceptual_note_on_adaptation.pdf

27 https://www.fsb-tcfd.org/

28 https://www.climatefinancelab.org/

29 https://www.climatepolicyinitiative.org/

forward-looking, opportunity-driven dimension of the adaptation economy, though significant scaling and standardization remain necessary.

Policy Roots: Governance, Planning and Institutional Alignment

The policy community has provided the third crucial strand, embedding adaptation within formal governance frameworks. From the UNFCCC's original adaptation provisions to the Paris Agreement's Global Goal on Adaptation (GGA), policy evolution has progressively framed adaptation as a whole-of-government and whole-of-society endeavor.[30] The development of NAPs, the integration of adaptation into NDCs,[31] and the scaling of Green Climate Fund (GCF)[32] and Global Environment Facility (GEF)[33] financing have institutionalized adaptation planning at national and regional levels.

More recently, initiatives such as the Antigua and Barbuda Agenda for Small Island Developing States (ABAS) have emphasized private sector engagement, data-driven decision-making, and integrated resilience planning as essential to national competitiveness.[34] Policy institutions are thus starting to lay the groundwork by establishing normative and governance frameworks that align incentives, promote inclusivity, and integrate adaptation into macroeconomic and fiscal systems. This points toward a more structured approach to policy that can foster robust markets and transformational adaptation over time.

Convergence and the Emergence of an "Adaptation Economy"

Bringing together what we have learned from these different strands of work, the **adaptation economy** can most generally be understood as: **"the activities, policies and institutions that deliver the goods, services and systems that advance inclusive prosperity in a climate-impacted world."**

This framing repositions adaptation not as a narrow or reactive policy issue, but as a catalyst for whole-economy transformation, a restructuring of how markets, institutions, and technologies interact to sustain prosperity in a climate-impacted world. Beyond de-risking investment, the adaptation economy approach emphasizes creating effective demand for adaptation goods and services and building markets that reward firms for delivering adaptation solutions at scale.

Having traced the intellectual and institutional emergence of the adaptation economy, the next step is to understand its current and potential scale: how large it already is, how rapidly it may grow, and which segments are driving that growth. Quantifying this emerging economic system is essential for policymakers and investors alike, as it moves the discussion beyond public and blended finance toward a clearer understanding of the market forces shaping adaptation itself.

30 https://unfccc.int/topics/adaptation-and-resilience/workstreams/gga

31 https://unfccc.int/sites/default/files/resource/Policy-brief-NAPs-NDCs-AdComs.pdf

32 https://www.greenclimate.fund/theme/adaptation

33 https://www.thegef.org/what-we-do/topics/climate-change-adaptation

34 https://sdgs.un.org/documents/outcome-document-antigua-and-barbuda-agenda-sids-abas-renewed-declaration-resilient

Beyond Adaptation Finance: Sizing Up the Adaptation Economy

The adaptation economy is on the rise. Despite the modest levels of measured private investments in adaptation to date, there is growing optimism that exposure to adaptation will become increasingly important in the coming years. That said, estimates differ widely and are based on very diverse lenses and methodologies (see Exhibit 4). For example, Singapore's sovereign wealth fund, the GIC, is the first sovereign wealth fund to frame adaptation explicitly as a strategic investment opportunity, predicting substantial growth from US$ 1 trillion today to US$ 4 trillion by 2050.[35]

35 https://www.gic.com.sg/thinkspace/sustainability/sizing-the-climate-adaptation-opportunity/

EXHIBIT 4: THE RISE OF THE GLOBAL ADAPTATION ECONOMY

Source	Base Year Value (US$)	Forecast Year Value (US$)	Key Methodological Assumption
London Stock Exchange Group	2024: US$1 trillion	N/A	Bottom-up analysis of revenues from 2,100 companies in 35 green micro-sectors.
World Economic Forum	N/A	2026: US$2 trillion/ year	Broad market opportunity analysis.
GIC / Bain & Company	2025: US$1 trillion	2050: US$4 trillion	Investment trend analysis.
Fortune Business Insights	2024: US$30.13 Billion	2032: US$104.93 Billion	Market analysis of specific adaptation solutions and technol-ogies.
Polaris Market Research	2024: US$22.90 Billion	2034: US$59.84 Billion	Market analysis of specific adaptation solutions and technologies.
Boston Consulting Group and Temasek	N/A	2030: US$0.5-1.3 trillion	Exclusively focused on private equity investment opportunities.

GIC's estimates resonate with other estimates such as those put forth by the London Stock Exchange Group and the World Economic Forum. The Boston Consulting Group and Temasek have further analyzed the adaptation landscape for private investors. In highlighting opportunities for private equity strategies, they conclude that the adaptation and resilience market may grow to between US$0.5 trillion and US$1.3 trillion by 2030.[36]

The bottom line is that adaptation is not peripheral; it is a catalyst for resilience, innovation and inclusive growth. Just as clean energy moved from niche to mainstream, adaptation is poised to become a defining driver of 21st-century prosperity. As climate impacts intensify, industries will need to reimagine themselves to thrive under new conditions. From infrastructure and agriculture to insurance, digital services and urban systems, adaptation is already stimulating demand for new products, services and business models. As Patrick Verkooijen of the Global Center on Adaptation has noted, "adaptation is smart economics."

Far from being an add-on, adaptation will form part of the DNA of tomorrow's global economy. It will stand alongside the clean energy transition, artificial intelligence and other transformative forces as a core engine of growth. For policymakers, this requires creating enabling environments that attract private investment and accelerate solutions. For investors, it signals a vast emerging market where adaptation represents not just risk management, but a frontier of opportunity.

The economy of the future will look markedly different from today's. Climate change is one of the central forces driving this transformation, but it is unfolding alongside other disruptive dynamics: artificial intelligence and robotics, demographic change, shifting political economies, and evolving geopolitics. In this context, adaptation is not about preserving yesterday's systems. It is about shaping the economies we need—locally, nationally, and globally—for inclusive prosperity in a world defined by overlapping transformations.

Effective adaptation will underpin both innovation at the firm level and resilience at the macroeconomic level. Investments in resilient infrastructure, skilled workforces and businesses delivering adaptation-relevant goods and services can raise productivity, boost labor incomes, expand tax revenues, and strengthen fiscal health. Many adaptation solutions—such as climate-smart agriculture or nature-based infrastructure—are also labor-intensive, creating jobs while enhancing resilience. Evidence shows that infrastructure investments in water and sanitation yield strong productivity gains, while adaptation-relevant projects can generate two to five times more employment per dollar than fossil fuel investments.[37] Adaptation, therefore, is both a near-term engine of job creation and a long-term driver of competitiveness.

Just as clean energy moved from niche to mainstream, adaptation is poised to become a defining driver of 21st-century prosperity.

36 https://web-assets.bcg.com/b0/07/11ba848b4ae8a55e-19ce9955aa92/the-private-equity-opportunity-in-climate-adaptation-and-resilience-may-2025.pdf

37 https://www.ilo.org/resource/news/nature-based-solutions-can-generate-32-million-new-jobs-2030-investments and https://impact.economist.com/new-globalisation/harnessing-economic-benefits-investment-water-sanitation-and-hygiene-africa

In short, adaptation is not only sound climate policy, it is sound economic policy. What is required is nothing less than a new adaptation economics, one that catalyzes inclusive growth and anchors the emergence of a truly global adaptation economy.

Adaptation Potential Unrealized

Despite these opportunities, adaptation markets remain underdeveloped and uneven. Systematic data on private adaptation investment is still limited, but evidence suggests strong commercial promise. Recent research finds that sectors aligned with adaptation—resilient infrastructure, sustainable agriculture, climate-informed health services, and data and analytics—have outperformed broader market benchmarks over a five-year period, generating cumulative returns 16.3 percent higher than average indices.[38] Other studies, using a "triple dividend" lens, estimate that every US$1 invested in adaptation can yield over US$ 10.50 in benefits, with average annual returns of 20–27 percent across 320 investments in 12 countries.[39] These findings reinforce that adaptation investments are not philanthropic or purely defensive, but commercially viable and competitive.

Adaptation-related businesses already exist from agribusinesses adopting climate-resilient seeds, to companies producing weather-resistant building materials, to bottled water firms meeting rising demand. Yet current activity falls far short of what is needed. Many solutions remain more expensive than conventional alternatives, some fail to reach markets, and adaptation gaps exacerbate risks such as migration from water-scarce regions. Progress is often reactive, emerging after losses, rather than proactive, embedding resilience into business models and value chains. This imbalance reflects structural constraints in both demand and supply.

On the demand side, climate risks are not yet fully priced into markets. Investors, firms and households often underestimate the likelihood or severity of climate impacts, depressing demand for adaptation goods and services. On the supply side, many adaptation solutions are costlier than conventional options or struggle to scale due to fragmented markets, weak standards and limited enabling conditions. Even when profitable solutions exist, they are deployed too slowly to meet the scale of need. Public policy and fiscal support are decisive in correcting this imbalance.

Private investment is constrained by absent and distorted markets. Despite the growing investor appetite for exposure to adaptation solution businesses and assets, the broader market sentiment remains that investing in adaptation solutions is unprofitable in today's markets. Notwithstanding the oft stated helicopter-level statements that there are extraordinary societal returns to adaptation investment, negative market sentiments are often correct. Barriers include poor climate risk data, distorted pricing signals, entrenched perverse subsidies, and lagging and suppressed expectations (see Exhibit 5).

In short, adaptation is not only sound climate policy, it is sound economic policy.

38 https://www.smithschool.ox.ac.uk/sites/default/files/2023-06/Mission-climate-ready-Unleashing-finance-and-investment.pdf

39 https://www.wri.org/research/climate-adaptation-investment-case

EXHIBIT 5. WHY PRIVATE INVESTMENT IN ADAPTATION IS SO LOW

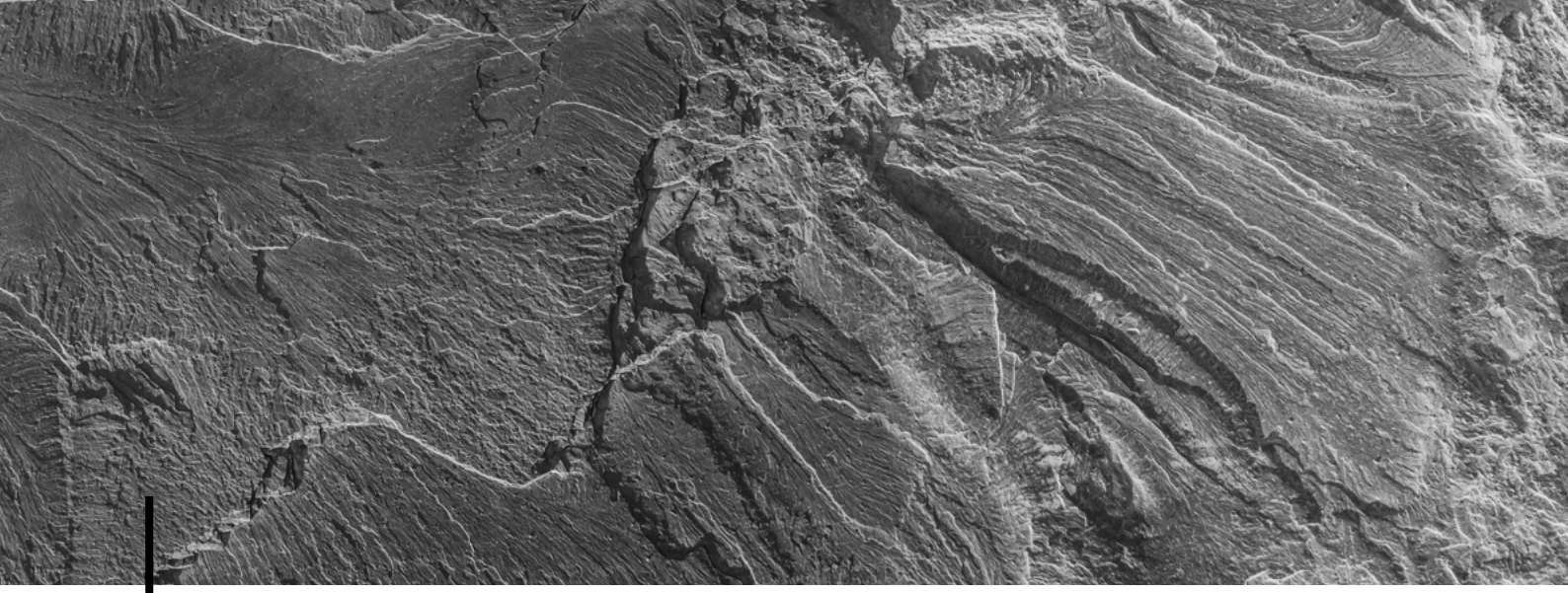
Theme	Drivers	Barriers
Business Incentives	Firms invest to protect assets or to access new adaptation markets.	Perceived high risk and uncertain returns. High costs and climate uncertainty delay action.
Information and Risk	Investors seek returns and risk diversification, relying on good disclosures.	Lack of climate and related risk data hinders pricing and targeting.
Market Demand	Demand for resilient infra-structure and sustainable practices attracts capital.	Adaptation lacks direct revenue, reducing financial appeal.
Impact Investing	Investors pursue both fi-nancial returns and positive societal outcomes.	Lack of robust data, and absence of accepted metrics for measuring adaptation impacts.
Systemic Challenges	_____	Firms prioritize self-interest, sometimes shifting risks to others.
Market Distortions		Mispricing of climate risks and lack of valuation standards.

Source: FGV, 2025[40]

This creates a vicious cycle of undervaluation and underinvestment in adaptation solutions businesses and assets, which in turn constrains innovation, scale and, through this, affordability. This in turn limits access to greatly needed adaptation solutions for low- and middle-income households, which represent huge global demand; think of home cooling, for example, or access to potable water through desalination, or protection of home and livelihoods through effective water management and appropriate building materials.

So, despite the growing investor appetite for exposure to adaptation solution businesses and assets, the broader market sentiment remains that investing in adaptation solutions is unprofitable in today's markets.

40 Vendramini, A. & Breviglieri, 2005a



From Needs to Markets: Understanding the Barriers to Adaptation

Just as the clean energy revolution was seeded through a combination of innovation, investment and enabling policy, the emergence of a robust adaptation economy will require deliberate action to create the conditions under which adaptation solutions become not only needed, but also commercially viable, scalable and investable. While some adaptation solutions have already achieved commercial viability, many remain stuck in early-stage development or fragmented deployment. This is because despite the huge potential, there are several barriers to the emerging adaptation economy.

First is the issue of risk mispricing. Adaptation projects sometimes involve long time horizons and uncertain benefits. Climate risks, particularly physical risks, are often poorly quantified at local levels, resulting in underestimation by investors and financial institutions. Without adequate climate risk data and standardized impact metrics, many adaptation investments appear too risky or insufficiently profitable, and alternative investments appear unrealistically secure. Evidence that financial markets and asset owners continue to struggle to translate climate model outputs into investable physical-risk metrics is growing. Practical frameworks and industry guidance (including work used to support TCFD-aligned physical risk assessments) highlight persistent gaps in translating climate scenarios into asset-level exposure and probability estimates, limiting accurate pricing of long-term climate risk.[41]

A second and particularly insidious barrier is the false expectation of enduring public service provision. In many countries, populations continue to assume that governments will guarantee uninterrupted access to essentials such as clean water, flood protection and healthcare, even as climate change makes such continuity increasingly unlikely. This misalignment dampens willingness to pay for private or decentralized alternatives. Evidence from water and sanitation sectors shows that user expectations of public provisions, combined with political resistance to service reforms, strongly influences both demand for private actors and the design of market interventions.

...the emergence of a robust adaptation economy will require deliberate action...

41 https://www.tcfdhub.org/wp-content/uploads/2019/07/CISL-Climate-Wise-Physical-Risk-Framework-Report.pdf

In practice, perceived entitlement to public services suppresses uptake of paid private options unless reforms are paired with visible improvements in service quality and robust public engagement.[42]

A third barrier is the lack of affordability of many adaptation-related products and services, especially for low- and middle-income households. While decentralized water treatment, climate-resilient housing materials, or early warning systems may offer long-term savings and resilience, their upfront costs are often prohibitive for the majority of potential users. This affordability gap dampens demand and undermines the business case for providers to scale solutions, particularly in underserved markets. It also complicates policy reform, as efforts to phase out harmful subsidies or introduce cost-reflective pricing can appear regressive or politically infeasible in the absence of well-designed safety nets or targeted support. Evidence from off-grid energy and other distributed-service markets shows this clearly. Even with innovations such as pay-as-you-go consumer finance, a large share of households remain unable to afford the upfront or near-term costs of resilient technologies, constraining market growth without complementary financing or subsidy redesign.[43]

Fourth, structural market failures abound. Many adaptation benefits are non-excludable, making it difficult for firms to monetize them. In addition, positive externalities, such as community-wide resilience from individual home upgrades, go unrecognized in pricing. Coordination failures and a lack of credible information exacerbate this challenge, limiting the scalability of promising solutions. The literature on nature-based and public-good adaptation illustrates this. Large-scale coastal protection benefits from ecosystems (for example, mangroves and salt marshes) accrue to communities and downstream assets rather than to the investor who restores or maintains them. This complicates private financing unless mechanisms exist to capture avoided-damage values or aggregate beneficiaries. Rigorous, spatially explicit valuations of these benefits demonstrate both the scale of the unpriced public good and the need for aggregated financing models to make such projects bankable and point to an area where public investment is critical to unlocking private investment downstream.[44]

Fifth, and more broadly, are policy distortions. Existing policies often inadvertently discourage adaptation. For example, subsidies that lower the cost of water or energy services to obscure the true risk and diminish consumer incentives to create or invest in resilient alternatives. Similarly, lax enforcement of building codes and poor integration of climate considerations into urban planning increase vulnerability without creating space for private solutions. Analyses by major fiscal and development institutions document how poorly targeted subsidies can distort incentives and the allocation of investment (for example in energy and water), and how weak regulatory enforcement in built environments raises systemic vulnerability, both of which blunt demand signals and reduce the market opportunity for adaptation innovators.[45]

42 See for example this paper by the World Bank and the Water and Sanitation Program about the private sector provision of sanitation and water in rural areas and the key role of the public sector: https://documents1.worldbank.org/curated/en/450101468179030315/pdf/104505-WPS-Box394877B-PUBLIC-Add-series-WSP.pdf

43 See for example this report drawing from the experience of off grid solar provision by the World Bank and partners: https://www.esmap.org/sites/default/files/esmap-files/2024-Off-Grid-Solar-Market-Trends-Report.pdf

44 This recent article explores the downstream value of publicly funded Mangrove restoration to the food sector, for example: https://www.nature.com/articles/s41598-020-61136-6

45 See here for an IMF analysis of the distortive nature of fuel subsidies, a particularly pertinent example: https://www.imf.org/en/Topics/climate-change/energy-subsidies

Existing policies often inadvertently discourage adaptation.

A final barrier to highlight is resistance from entrenched interests that benefit from the status quo, which can make progress in all others difficult. Adaptation often requires shifts in resource allocation, infrastructure design, land use planning and service delivery, disrupting established political and economic arrangements. Incumbent utilities, real estate developers, agribusinesses or industrial actors may view adaptation reforms, such as pricing externalities, enforcing risk-based zoning, or opening markets to new entrants, as threats to their profitability, influence or market control. These actors often possess significant lobbying power, institutional access or informal leverage, enabling them to delay, dilute or block reforms that would level the playing field for new adaptation solutions.

In some cases, adaptation efforts may expose long-standing inefficiencies or vulnerabilities in public infrastructure systems, prompting bureaucratic defensiveness or political risk aversion. This resistance creates a drag on reform momentum, complicates inter-agency coordination, and weakens the credibility of policy signals needed to attract private investment into adaptation markets. Political-economy studies and empirical analyses of water and tariff reform, fossil fuel subsidy reform, and broader adaptation governance document recurring patterns of enclosure, entrenchment, and blocking by vested interests, and make clear that technical fixes alone cannot overcome these forces.[46] Addressing these dynamics requires not only technical solutions, but also political strategies to build coalitions for change and mitigate concentrated opposition, and efforts to foster social cohesion.

The Nuanced Role of Government in Delivering Adaptation Markets

As a result of these many barriers, adaptation goods and services, when they do exist, are often accessible only to wealthier households, reinforcing inequalities and limiting systemic resilience. Breaking this cycle, and generating a virtuous loop of innovation, investment and scale, will require far more than capital alone. Governments and international institutions must deploy smart policies, targeted regulations and forward-looking standards to create functioning adaptation markets. This process is not without precedent. The democratization of electricity, for example, required major public investments, rural electrification policies, and regulatory reforms that enabled competition and affordability. The same pattern can be seen in the widespread diffusion of automobiles, the internet and mobile phones, transformative technologies that were initially accessible to a small elite but became ubiquitous through supportive policy and market shaping.

Of course, not every adaptation solution can or should be delivered by markets. Basic public health, social protection and civil security remain core public responsibilities. However, given the deepening constraints on public finance governments will increasingly need to leverage markets to deliver a majority of adaptation solutions, including those targeting low- and middle-income households. This is not ideological; it is pragmatic. In a world where fiscal space is shrinking and climate impacts are accelerating, the state's role must shift from direct provider to market enabler.

The central challenge in growing adaptation markets, then, is in unlocking *effective demand* as well as unlocking capital.

46 https://pmc.ncbi.nlm.nih.gov/articles/PMC11211386/

Climate vulnerability creates need. But need alone does not constitute a market. For adaptation goods and services to attract private investment, several conditions must be met: the problem must be clearly identifiable and valued; end users (or intermediaries such as governments or donors) must be both willing and able to pay; solutions must be scalable; and the underlying unit economics must support commercial viability.

Take, for example, drought-prone regions where there is latent demand for water-saving technologies. If public water systems are perceived as sufficient, water is underpriced, or political dynamics make cost recovery infeasible, this demand will never materialize into a functioning market. But with the right mix of pricing signals, public awareness campaigns, and enabling policies, that same latent demand can become *effective* demand, one that firms and investors can recognize and respond to.

Well-designed public spending can effectively crowd in private capital, underscoring the catalytic role of government action.[47] Evidence from Europe shows that adaptation investment by firms, while growing, remains low and uneven across sectors. In the United Kingdom, regulatory innovations such as the Regulated Asset Base (RAB) model demonstrate how infrastructure serving public goods can attract long-term private investment through predictable returns and de-risking mechanisms.[48] Without deliberate policies, however, adaptation risks being treated narrowly as a finance problem, focused on mobilizing capital for predefined needs, rather than as a full market-building challenge that aligns supply, demand and enabling frameworks.

The central challenge in growing adaptation markets, then, is in unlocking effective demand as well as unlocking capital.

If these conditions are not addressed, capital will flow to piecemeal projects, high-cost stopgaps or defensive measures instead of transformative solutions. This reduces efficiency and limits the diversity of financial instruments and investment models. The challenge is not only to demonstrate profitability but to create the enabling environments that allow adaptation markets to flourish. That requires public policy support, robust metrics and financial innovation to align incentives and crowd in private capital. For lower- and middle-income countries, where risks are greatest, opportunities may be greater. With less legacy infrastructure to retrofit, they have the potential to leapfrog into more adaptive systems and solutions, positioning adaptation as a driver of inclusive growth. For all countries, the imperative is the same: to put in place the policies and frameworks that unlock the adaptation economy, so citizens and businesses alike can thrive in a warming world.

In short, shaping the adaptation economy will require the same deliberate and systemic efforts that enabled past industrial transformations. This includes not only policy and finance, but also a shift in mindset: from seeing adaptation as a primarily public good, to recognizing it as a source of innovation and economic opportunity, one that markets can and must be structured to deliver.

47 https://www.nature.com/articles/s43247-025-02454-3

48 https://www.smithschool.ox.ac.uk/sites/default/files/2023-06/Mission-climate-ready-Unleashing-finance-and-investment.pdf

A Market Typology of Adaptation Solutions

In designing the right policy environment for scaling adaptation solutions, it is important to recognize their inherent diversity and stages of market maturity. Some adaptation measures may be affordable, while others may not be and may never be. To design effective policies and incentives, we find it useful to classify adaptation needs into three types based on their market characteristics:

1. **Pure Market Solutions (Type 1):** Goods and services that can be delivered profitably by the private sector under the right enabling conditions. Examples include resilient construction materials, efficient cooling technologies, climate data analytics, or water-efficient irrigation technologies. Policy action focuses on removing barriers, increasing transparency, and facilitating competition.

   Example 1: Companies that produce hurricane-resistant glass for commercial and residential buildings, which is commercially viable without subsidies.[49]
   Example 2: India's solar-powered cold storage units that provide farmers with reliable cooling to reduce post-harvest losses. These are commercially viable products financed by private investors, especially as food security demand rises.[50]

2. **Subsidized Market Solutions (Type 2):** Solutions that require public support, through subsidies, guarantees, or blended finance, to become financially viable. Drought-resistant seeds for smallholder farmers, early-stage climate-smart irrigation technologies, or off-grid renewable energy solutions may need partial subsidies due to high upfront costs or adoption barriers. Policy efforts should target catalytic support mechanisms that enable private delivery and scaling.

   Example 1: The Kenya Agricultural and Livestock Research Organization (KALRO) developed drought-resistant seeds for smallholders. Initial adoption was supported through subsidies and donor-backed programs, which reduced risk for private seed suppliers. Over time, as farmers adopted the seeds at scale, the market began to sustain itself commercially.[51]
   Example 2: In Bangladesh, solar home systems initially scaled through heavy subsidies and donor-backed guarantees. This de-risking enabled local firms and microfinance

49 https://www.archivemarketresearch.com/reports/hurricane-resistant-glass-371852#

50 https://www.ecozensolutions.com/ecofrost

51 https://www.irri.org/news-and-events/news/climate-resilient-and-eco-friendly-rice-africa-welcomes-kalro-its-fold

institutions to create viable distribution models that now operate largely on commercial terms.[52]

3. **Non-Market Solutions (Type 3):** Adaptation needs that cannot be met through markets alone. Large-scale public infrastructure, such as coastal flood barriers, urban drainage systems or river basin management, are pure public goods. These require full public investment but often create enabling conditions for private investment in adjacent sectors, such as housing, tourism, or resilient supply chains.

   Example 1: The Thames Barrier protects central London from storm surges. While entirely publicly funded, its presence reduces flood risk for nearby properties, enabling developers to invest in resilient housing and commercial infrastructure.[53]
   Example 2: The Netherlands' Delta Works, a system of dikes, storm surge barriers and dams, is a publicly funded megaproject that protects large swaths of the country from flooding. Its existence underpins private investment in agriculture, logistics hubs and urban real estate in otherwise vulnerable areas.[54]

Understanding where a solution lies on this spectrum helps policymakers and financiers determine the appropriate combination of regulation, subsidy and direct investment. Currently, most "tagged" adaptation finance is concentrated in Type 3 solutions, while public discourse often focuses on Type 2. Yet creating a thriving adaptation economy requires moving solutions up the ladder wherever possible into Type 1 market-based solutions and using Type 3 investments strategically to unlock private activity. This demands a mindset shift: public resources must be targeted not just to fill gaps, but to catalyze markets, reduce risk and expand the supply of affordable, scalable adaptation solutions. To illustrate:

- **Type 3 to Type 2:** A modular urban flood barrier in Rotterdam initially fully funded by municipal authorities attracted private engineering firms through partial subsidies and contracts for maintenance and upgrades. The public good remains, but private actors now contribute to delivery, creating a partially market-supported solution.
- **Type 2 to Type 1:** Subsidized solar-powered irrigation pumps in India were initially supported with blended finance and government incentives. As adoption grew and production scaled, private manufacturers and distributors began selling them profitably without subsidies, creating a self-sustaining market.
- **Type 3 enabling Type 1 solutions:** Large-scale water retention projects in Cape Town, South Africa, reduced risk for surrounding urban and agricultural areas. This enabled private companies to invest in climate-resilient housing and agribusiness, illustrating how public infrastructure can catalyze market-based solutions.

This typology makes clear that adaptation cannot be approached with a one-size-fits-all model. Some needs will always require public goods provision, while others can evolve into vibrant markets if barriers are reduced and risks appropriately shared (see Exhibit 6 for a similar typology elaborated by the OECD).

52 https://www.worldbank.org/en/news/feature/2021/04/08/a-game-changer-in-bangladesh-growth-story-solar-home-systems

53 https://www.britannica.com/video/Flood-control-London-Thames-Barrier/-16691

54 https://www.ice.org.uk/what-is-civil-engineering/infrastructure-projects/delta-works

EXHIBIT 6: MARKET AND NON-MARKET ADAPTATION SOLUTIONS

Adaptation activity	Examples of activities	Usually publicly funded	Mixed (below-market)	Commercially viable
Enabling environments	Development of national adaptation plans and strategies			
	Provision of climate-related data and risk maps			
	Implementing Early Warning Systems covering climate related			
	Development of new technologies and services for adaptation			
	Development of financial services to support adaptation (e.g. credit and insurance)			
	Consultancy services for adaptation			
Agriculture	Afforestation and reforestation			
	Changing production towards better-adapted crops and varieties			
	Installing water ellicient ingation			
Coastal zones	Restoration of coastal wetlands			
	Relocation of properties from high-risk areas			
	Beach nounshment			
	Flood defences			
Infrastructure	Integrating climate resilience into the design of new infrastructure			
	Increase backup systems in infrastructure networks			
	Making existing infrastructure resilient			
Water	Expanding water storage capacity			
	Desalination			
	Reducing leaks in existing infrastructure			
	Protecting watersheds			
	Improving water efficiency of major water users			

Note: The shading expresses the extent to which they relate to the respective financial returns, with white cells having no financial return and dark grey having the highest potential for returns.

Source: OECD, 2023

The task for policymakers and investors is not simply to mobilize more capital, but to channel it strategically: to use scarce public funds where they are indispensable, to leverage subsidies and guarantees where they can unlock commercial scaling, and to clear the path for private innovation where market solutions are viable. In doing so, governments and financiers can accelerate the transition from isolated interventions to a functioning adaptation economy, one where public investment, private enterprise and social benefit reinforce each other in building adaptation at scale.

Charting a Path Towards an Adaptation Economy

A strategic approach to adaptation markets and economies is urgently needed. The clean energy transition offers a clear parallel. It has not only sparked a wave of new technologies, value chains and capital flows, but also reshaped institutions and mindsets. It has created a new way of thinking about the future, influencing business models, national strategies and global financial systems. Similarly, the rising focus on nature has catalyzed the vision of a nature-positive global economy, reshaping supply chains and economic architecture in ways once thought implausible.

Adaptation economies will build on these shifts, but with important differences. Unlike clean technologies or nature-based solutions, adaptation is not a discrete sector, a technology suite or even an enabler like “nature as infrastructure.” It cuts across every household, community, sector and business. It demands the deployment of the best available technologies alongside the restoration and sustainable use of nature, in ways that are inherently human-centered and society-wide. In this sense, adaptation is not an add-on, it is the lens through which economies must evolve.

Adaptation is therefore not about mere survival. It is about laying the foundations of an economy in which societies and businesses can thrive. Recent momentum, from sovereign wealth funds to private investors, shows that adaptation is moving

from a defensive necessity to a proactive driver of innovation, competitiveness and long-term value creation.

Crucially, adaptation economies will be shaped by structural forces beyond climate. They will be influenced by the return of national economic planning, policies that emphasize sovereignty and security, the reconfiguration of global trade, and the disruptive impacts of artificial intelligence and automation. These dynamics can and must be harnessed to steer investment into assets that are both resilient and profitable in a climate-disrupted future. Emerging trends—localized supply chains, distributed and tech-powered infrastructure, and greater household autonomy—may prove more resilient not only to climate shocks but also to geopolitical and economic volatility.

The pathways to adaptation economies will vary sharply across nations. Physical geography will matter, given the uneven distribution of climate impacts, but so too will the resilience of existing development models and the ambition with which governments and societies respond. Poorer and smaller nations face the gravest challenges, though no country will escape the pressures of climate disruption. While all nations could benefit from resilient, distributed and clean energy systems, access to affordable capital will determine who can pursue such capital-intensive strategies. Likewise, automation will reshape labor-intensive growth paths, forcing vulnerable economies to consider alternatives such as local-for-local production, managed labor migration or expanded virtual service exports.

In many cases, adaptation economics will require breaking with convention. Current arrangements may deepen rather than reduce vulnerability. In severely affected countries, for example, capital markets may raise borrowing costs or withdraw altogether, while dependence on global trade for essential goods like food and medicine may prove untenable as climate

...adaptation economies will be shaped by structural forces beyond climate.

shocks reverberate through global supply chains. Openness to moving beyond conventional wisdom will also be essential in establishing an inclusive adaptation economy. Innovations and practices conventionally rejected may be needed at scale. For example:

- **Financial regulation** will remain a primary driver to incorporating climate and nature risks into global finance, but to accelerate this may require them to have extended policy mandates, as do many non-OECD central banks such as the People's Bank of China.
- **Citizens' direct investing**, a marginal area today except for the significant investment-linked remittances from migrants, may become far more important as segments of the mainstream financial community withdraw from severely impacted nations.
- **Resilient infrastructure** will look very different, more linked to nature and at the same time more decentralized physically, in use and in ownership largely due to technological developments and related financing innovations.
- **Onshoring for resilience** is set to accelerate, driven by multiple factors. This shift in production patterns will, whether by design or consequence, enhance supply security, create local employment, and strengthen macroeconomic stability — outcomes that are inherently adaptation-friendly.

The adaptation economy will look different

across countries and sectors, but its purpose will be universal: to sustain and expand human well-being in a changing climate. Charting that path demands new thinking, new partnerships and above all, the conviction that adaptation is not the end of development, but its evolution.

The Crucial Role of Policy in Unleashing Adaptation Markets

If adaptation markets are to emerge at scale, they must be deliberately shaped in the public, as well as private, interest. Left to themselves, barriers will prevent viable solutions from reaching scale, leaving enormous economic potential untapped. Governments cannot afford to remain passive observers of financial flows. They must act as facilitators and shapers of markets. By lowering entry costs, reducing risks and sending credible long-term signals, public policy can create the conditions under which private capital, entrepreneurship and innovation flourish.

This requires a coordinated policy effort that goes beyond mobilizing capital to actively structuring markets. Governments play the pivotal role in creating enabling environments through regulatory reform, targeted public investment and institutional innovation. The critical question is not only how much finance is mobilized, but whether the conditions exist for businesses and investors to meet society's growing adaptation needs.

Encouragingly, the building blocks already exist. The OECD's Climate Adaptation Investment Framework,[55] the World Bank's work on enabling private adaptation investment,[56] and the International Finance Corporation's *Enabling Environment for Private Sector Adaptation.*[57] Standard Chartered has led much of the financial community in using the adaptation economy to frame its thinking, analysis and approach, summarized in its *Guide for Adaptation and Resilience Finance.*[58] The task now is to connect these efforts into a cohesive, scalable framework that countries can systematically apply.

Around the world, governments are demonstrating what this can look like in practice. For example, China's "sponge city" initiative combines large-scale public infrastructure with incentives for private providers of drainage and flood management technologies, showing how public leadership can unlock private delivery.[59] Brazil has lowered the cost of agricultural insurance premiums, enabling farmers to access risk management instruments that would otherwise be unaffordable.[60] Kenya passed legislation that provides a structured mechanism for private sector participation in public infrastructure projects while embedding standards for resilience and sustainability.[61] Bangladesh has integrated climate resilience into social protection systems.[62] And New Zealand is not alone in requiring climate-related financial disclosures.[63]

Across these diverse contexts, the principles are consistent: public investment can demonstrate feasibility and reduce risk; blended finance and targeted subsidies can unlock adoption; cross-sectoral coordination aligns incentives;

55 https://www.oecd.org/en/publications/climate-adaptation-investment-framework_8686fc27-en.html

56 https://openknowledge.worldbank.org/entities/publication/6219bf23-87e1-5f30-aaf9-30e0cd793ce3

57 https://www.ifc.org/content/dam/ifc/doc/mgrt/Enabling-Environment-for-Private-Sector-Adaptation-Stenek-Amado-Greenall.pdf

58 https://www.sc.com/en/uploads/sites/66/content/docs/Standard-Chartered-Bank-Guide-For-Adaptation-And-Resilience-Finance-FINAL.pdf

59 https://iwaponline.com/wst/article/88/10/2499/98252/Review-of-Sponge-City-implementation-in-China

60 https://www.oecd.org/en/publications/agricultural-policy-monitoring-and-evaluation-2023_b14de474-en/full-report/brazil_6226dfb7.html

61 https://vision2030.go.ke/public-private-partnerships-to-drive-final-leg-of-vision-2030/

62 https://socialprotection.gov.bd/wp-content/uploads/2025/08/Guidelines-on-Adaptive-Social-Protection-2.pdf

63 https://www.legislation.govt.nz/act/public/2021/0039/latest/whole.html

risk disclosure and standards provide predictability; and innovation ecosystems translate public policy into investable opportunities.

Such innovations already exist on the margins, but need to be incentivized, standardized and guided to achieve purposeful scale. Tax code reforms, for example, improved licensing of citizen investment platforms, and advances in retail and sovereign performance linked resilience bonds, can all play a role in aligning financial market design to adaptation investments.

In short, governments should not simply urge the private sector to engage; they must incentivize it, structure the market, and remove barriers. By standardizing and connecting existing levers into a coherent framework, countries can accelerate the emergence of robust adaptation economies, turning resilience from a financing gap into a global growth opportunity.

The lesson is clear: adaptation economies will not emerge by accident. They must be deliberately built through policies that structure markets, investments that de-risk innovation, and institutions that link public purpose with private initiative. What is at stake is not only resilience in the narrow sense, but the opportunity to shape an economy fit for the realities of the 21st century. The next step, then, is how to move from early signals and scattered initiatives to a coherent, systemic pathway toward thriving adaptation economies.

Conclusion: Charting the Path to a Thriving Adaptation Economy

Adaptation is no longer optional; it is a defining economic and social imperative. Needs are expanding across every sector and geography, yet markets and institutions remain far behind. The good news is that the building blocks of an adaptation economy already exist. Businesses are innovating, households are shifting behaviors, and governments are beginning to create the policies needed to catalyze

scalable solutions. What is missing is a systemic approach, one that connects these fragments into a cohesive strategy that delivers affordable, investable and scalable solutions at speed.

This white paper underscores a central truth. Adaptation is not simply a cost or a defensive exercise. It is a source of value, innovation and growth. Reframed as an economic opportunity, adaptation reveals enormous potential for private investment to scale solutions, ranging from resilient housing and climate-smart agriculture, to urban infrastructure, water systems, and climate analytics.

Four lessons stand out. First, adaptation markets require deliberate market-shaping, not just the mobilization of capital. Risk must be priced correctly, demand must be unlocked and enabling conditions must be set. Second, innovation and entrepreneurship are central—incubators, technology transfer and challenge funds show how new solutions can be developed and scaled efficiently. Third, regulatory frameworks and public investment are essential catalysts: credible policies signal priorities, align incentives, and de-risk private participation, while coordination across sectors ensures that public and private capital reinforce rather than crowd each other out. Fourth, adaptation sits on a spectrum, from public goods to fully commercial markets, and policies must help solutions climb that ladder toward self-sustaining growth.

The work presented here lays the conceptual and analytical foundation for building adaptation economies. It identifies the barriers, clarifies the systemic nature of adaptation investment, and shows how public and private actors can work together to scale solutions. To translate these insights into action, a companion policy framework accompanies this paper, offering guidance on regulatory, fiscal and institutional levers, with practical design principles suited to diverse country contexts.

The roadmap is clear: with deliberate, coordinated action, adaptation can move from the margins to the mainstream of economic growth. It can create affordable solutions, attract private investment, and power innovation that strengthens resilience while expanding opportunity. The challenge is urgent, but the opportunity is transformative. An inclusive, thriving adaptation economy is within reach—and it is the foundation of prosperity in a climate-challenged world.

References

Alberti, C. *The Cost of Inaction.* The Climate Policy Initiative. (2024) Retrieved from *https://www.climatepolicyinitiative.org/the-cost-of-inaction/*

Berrang-Ford, Lea, et al. *A Systematic Global Stocktake of Evidence on Human Adaptation to Climate Change*. *Nature Climate Change*, vol. 11, no. 11, 2021, pp. 989–1000. Retrieved from *https://doi.org/10.1038/s41558-021-01170-y.*

Brandon, C. et al. *Strengthening the Investment Case for Climate Adaptation: A Triple Dividend Approach | World Resources Institute.* World Resources Institute (WRI). Retrieved from *https://www.wri.org/research/climate-adaptation-investment-case*

Buchner, B. et al. *Global Landscape of Climate Finance 2023*. Climate Policy Initiative. (2023, November 2). Retrieved June 29, 2025, from *https://www.climatepolicyinitiative.org/publication/global-landscape-of-climatefinance-2023/*

Carleton, T., Duflo, E., Jack, K., & Zappalà, G. *The economics of climate adaptation: From academic insights to effective policy*. VoxEU. (2025, April 15). Retrieved from *https://cepr.org/voxeu/columns/economics-climate-adaptation-academic-insights-effective-policy*

Chikhi, F., et al. Review of Sponge City implementation in China: performance and policy. Water Sci Technol (2023) 88 (10): 2499–2520. Retrieved From *https://iwaponline.com/wst/article/88/10/2499/98252/Review-of-Sponge-City-implementation-in-China*

ClimateWise. *Physical risk framework Understanding the impacts of climate change on real estate lending and investment portfolios*. University of Cambridge Institute for Sustainability Leadership (CISL). (2019). Retrieved from *https://www.tcfdhub.org/wp-content/uploads/2019/07/CISL-Climate-Wise-Physical-Risk-Framework-Report.pdf*

Connolly, J., Richmond, M., Wallock, W., Abraham, S., Chin, N., & Grant, C. *Tracking and mobilizing private sector climate adaptation finance*. Climate Policy Initiative. (2024, September 25). Retrieved June 29, 2025, from *https://www.climatepolicyinitiative.org/publication/tracking-and-mobilizing-privatesector-climate-adaptation-finance/*

Convergence. State of *Blended Finance 2024: Climate Edition*. (2024). Retrieved from https://www.convergence.finance/resource/state-of-blended-finance-2024-climateedition/view

Cortés Arbués, I., et al. Private investments in climate change adaptation are increasing in Europe, although sectoral differences remain. *Communications Earth & Environment, 6*, 470. (2025, June 17). Retrieved from *https://doi.org/10.1038/s43247-025-02454-3*

Dowding, T. *Unlocking investment in climate adaptation*. *Sustainability Risk Review*. (2025, April 11). Retrieved June 29, 2025, from *https://www.commercialriskonline.com/unlocking-investment-in-climate-adaptation/*

Droste N, Chatterton B, Skovgaard J. *A political economy theory of fossil fuel subsidy reforms in OECD countries.* Nature Communications. 2024 Jun 27;15(1):5452. Retrieved from *https://pmc.ncbi.nlm.nih.gov/articles/PMC11211386/*

European Investment Bank. Joint Report on Multilateral Development Bank's Climate Finance. (2024). European Investment Bank. Retrieved from *https://thedocs.worldbank.org/en/doc/3077331569469f690c6e82b35052766c-0020012024/original/2023-Joint-Report-on-MDB-Climate-Finance.pdf*

Food and Agriculture Organization (FAO). *Climate-smart agriculture investment plans: Review and lessons*. Rome: FAO. (2021). Retrieved from *https://www.fao.org/climate-smartagriculture-sourcebook/*

Fortune Business Insights. *Climate Adaptation Market Size, Share, Trends & Growth Report, 2023–2030*. Fortune Business Insights. (2025). Retrieved from *https://www.fortunebusinessinsights.com/climate-adaptation-market-111804*

Greatrex, H., Hansen, J.W., Garvin, S., Diro, R., Blakeley, S., Le Guen, M., Rao, K.N., & Osgood, D.E. *Scaling up index insurance for smallholder farmers: Recent evidence and insights.* CCAFS Report No. 14. CGIAR. (2015). Retrieved from *https://cgspace.cgiar.org/items/34d65f48-ad14-409b-9e4e-b6da7d28adda*

GIC. *The GIC Climate Signposts: Tracking the transition and physical risks*. Singapore: GIC. (2024). Retrieved from *https://www.gic.com.sg/thinkspace/sustainability/the-gic-climatesignposts/*

GIC. *Annual Report 2024/25*. Singapore: GIC. (2025). Retrieved from *https://report.gic.com.sg/overview.html*

Georgieva, K. The Adaptive Age. IMF Blog. (2019). Retrieved from *https://www.imf.org/en/Blogs/Articles/2019/12/02/blog-the-adaptive-age*

Global Center on Adaptation. (2024). *State and Trends in Climate Adaptation Finance 2024*. Rotterdam: Global Center on Adaptation. Retrieved from *https://gca.org/reports/stateand-trends-in-climate-adaptation-finance-2024/*

Global Commission on Adaptation. *Adapt Now: A Global Call for Leadership on Climate Resilience*. Rotterdam: GCA. (2019). Retrieved from *https://gca.org/reports/adapt-now-a-globalcall-for-leadership-on-climate-resilience/*

Grand View Research. *Climate Adaptation Market Size, Share & Trends Analysis Report, 2023–2030*. Grand View Research. (2023). Retrieved from *https://www.grandviewresearch.com/industry-analysis/climate-adaptation-marketreport*

Hultgren, A., et al. Impacts of climate change on global agriculture accounting for adaptation. *Nature, 642*(8068), 644–652. (2025, June 18). Retrieved from *https://doi.org/10.1038/s41586-025-09085w*

International Finance Corporation (IFC). *Enabling Environment for Private Sector Adaptation: A Framework for Analysis*. Washington, DC: IFC. (2012). Retrieved from *https://www.ifc.org/content/dam/ifc/doc/mgrt/Enabling-Environment-for-Private-Sector-Adaptation-Stenek-Amado-Greenall.pdf*

International Labour Organization (ILO). *Decent Work in Nature-based Solutions 2024*. (2024). International Labour Office. Retrieved from *https://www.ilo.org/publications/decent-work-nature-based-solutions-2024-unlocking-jobs-through-investment*

International Labour Organization (ILO). *Employment-Intensive Infrastructure Programmes: Labour Policies and Practices*. International Labour Office. (1998). Retrieved from *https://www.ilo.org/sites/default/files/2024-06/guide_eiip_labour%20policies-practices_1998_en.pdf*

Investor Group on Climate Change (IGCC). *Activating private capital for climate adaptation*. (2024, November 6). Retrieved June 29, 2025, from *https://igcc.org.au/activating-privatecapital-for-climate-adaptation/*

Khanna, P., & Chidambaram, R. *It's time to invest in climate adaptation*. Harvard Business Review. (2022, August). Retrieved from *https://hbr.org/2022/08/its-time-to-invest-in-climateadaptation*

Kotz, M., Levermann, A. & Wenz, L. *The economic commitment of climate change*. *Nature* 628, 551–557 (2024). *https://doi.org/10.1038/s41586-024-07219-0*

Menéndez, P., Losada, I.J., Torres-Ortega, S. *et al. The Global Flood Protection Benefits of Mangroves*. *Sci Rep* 10, 4404. (2020). Retrieved From *https://doi.org/10.1038/s41598-020-61136-6*

Monteverde C, Quandt A, Gilberto de Souza Ribeiro J, De Sales F. *Changing climates, changing lives: Voices of a Brazilian Amazon farming community in a time of climate crisis*. (2024) PLOS Clim 3(11): e0000522. *https://doi.org/10.1371/journal.pclm.0000522*

Munich Re NatCatSERVICE, *Natural disasters in 2024*. Munich Re. (2025). Retrieved from *https://www.munichre.com/content/dam/munichre/mrwebsitespressreleases/MunichRe-NatCAT-Stats2024-Full-Year-Factsheet.pdf/_jcr_content/renditions/original./MunichRe-NatCAT-Stats2024-Full-Year-Factsheet.pdf*

Naran, B. et al. *Global Landscape of Climate Finance 2025*. Climate Policy Initiative. (2025). Retrieved from *https://www.climatepolicyinitiative.org/publication/global-landscape-ofclimate-finance-2025/*

National Center for Disaster Preparedness, Columbia Climate School. *Climate Finance Vulnerability Index (CliF-VI).* (2025, June 25). Retrieved June 29, 2025, from *https://clifvi.org/*

NatureFinance. *Time to Plan for a World Beyond 1.5C*. (2023). Retrieved from *https://www.naturefinance.net/resources-tools/future-beyond-1-5-degrees/*

Ndaw, M.F. *Private Sector Provision of Water Supply and Sanitation Services in Rural Areas and Small Towns The Role of the Public Sector*. World Bank Group. (2016). Retrieved from *https://documents1.worldbank.org/curated/en/450101468179030315/pdf/104505-WPS-Box394877B-PUBLIC-Add-series-WSP.pdf*

Network for Greening the Financial System Technical document (NGFS). *Integrating adaptation and resilience into transition plans*. (2025). Retrieved from *https://www.ngfs.net/en/publications-and-statistics/publications/ngfs-input-paper-integrating-adaptation-and-resilience-transition-plans*

Network for Greening the Financial System Technical document (NGFS). *Conceptual Note on Adaptation*. (2024). Retrieved from *https://www.ngfs.net/system/files/import/ngfs/medias/documents/ngfs_conceptual_note_on_adaptation.pdf*

Ohling, D. et al. *The Private Equity Opportunity in Climate Adaptation and Resilience*. Boston Consulting Group, Temasek and ecoprosperity. (2025, May 6). Retrieved from *https://webassets.bcg.com/b0/07/11ba848b4ae8a55e19ce9955aa92/the-private-equityopportunity-in-climate-adaptation-and-resilience-may-2025.pdf*

Organisation for Economic Co-operation and Development (OECD). *Scaling finance and investment for climate adaptation: Input paper for the G20 Sustainable Finance Working Group*, OECD Publishing, Paris. (2025). Retrieved from *https://doi.org/10.1787/eeec8b52-en.*

Organisation for Economic Co-operation and Development (OECD). *Climate Adaptation Investment Framework*. OECD Publishing. (2024). Retrieved from *https://www.oecd.org/content/dam/oecd/en/publications/reports/2024/11/climateadaptation-investment-framework_30362f60/8686fc27-en.pdf*

Organisation for Economic Co-operation and Development (OECD). *Climate finance provided and mobilised by developed countries in 2013–2022*. OECD Publishing. (2024, May 29). Retrieved from *https://doi.org/10.1787/19150727-en*

Organisation for Economic Co-operation and Development (OECD). *Scaling Up Adaptation Finance in Developing Countries*. (2023). Retrieved from *https://www.oecd.org/en/publications/scaling-up-adaptation-finance-in-developing-countries_b0878862-en.html*

Papp, A., & Oremus, K. L. (2025, June 19). *Plastic bag bans and fees reduce harmful bag litter on shorelines*. *Science, 384*(6692), 1260–1262. Retrieved from a *https://doi.org/10.1126/science.adp9274*

Ranger, N., et al. (2023, June 29). *Mission Climate Ready: Unleashing finance and investment for a prosperous Climate Ready economy* [Report]. Smith School of Enterprise and the Environment, University of Oxford. Retrieved from *https://www.smithschool.ox.ac.uk/sites/default/files/2023-06/Mission-climate-readyUnleashing-finance-and-investment.pdf*

Read, Robert et al. *Transformative Adaptation: Another World is Still Just Possible.* Permanent Publications. (2025). Retrieved from *https://rupertread.net/books/*

Rickards, L. Transformation is adaptation. Nature Climate Change 3, 690. (2013). *https://doi.org/10.1038/nclimate1933*

Samel, M. *Harnessing the economic benefits of investment in water, sanitation and hygiene in Africa***.** Economist Impact. (2023). Retrieved from *https://impact.economist.com/new-globalisation/harnessing-economic-benefits-investment-water-sanitation-and-hygiene-africa*

Standard Chartered, KPMG, UNDRR, & Resilience Rising**.** *Guide for Adaptation and Resilience Finance*. United Nations Olice for Disaster Risk Reduction. (2024). Retrieved from *https://www.undrr.org/publication/guide-adaptation-and-resilience-finance*

Stenek V. et. al. (2013). *Enabling Environment for Adaptation: An Index Assessment Framework*. International Finance Corporation. Retrieved from *Enabling-Environment-for-Private-Sector-AdaptationStenek-Amado-Greenall.pdf.*

Stoll, P. P., Pauw, W. P., Tohme, F., & Grüning, C. Mobilizing private adaptation finance: Lessons learned from the Green Climate Fund. *Climatic Change, 167*(3–4), 45. (2021, August 20). Retrieved from *https://doi.org/10.1007/s10584-021-03190-1*

Tailwind Climate. *Tailwind Climate Adaptation Playbook*. Tailwind Climate. (2024). Retrieved from *https://www.tailwindclimate.com/playbook/*

Tall, A., et al. *Enabling Private Investment in Climate Adaptation and Resilience: Current Status, Barriers to Investment and Blueprint for Action*. World Bank. (2021). Retrieved From *http://hdl.handle.net/10986/35203*

United Nations Development Programme (UNDP). *Governance for Climate Resilience: Enabling Environment for Adaptation*. New York: UNDP. (2022). Retrieved from *https://www.adaptation-undp.org/publications/governance-climate-resilience*

United Nations Environment Programme (UNEP). Adaptation Gap Report 2023. Retrieved from *https://www.unep.org/resources/adaptation-gap-report-2023*

United Nations Environment Programme (UNEP). Adaptation Gap Report 2023. Retrieved from *https://www.unep.org/resources/adaptation-gap-report-2024*

UNFCCC Standing Committee on Finance. *Sixth Biennial Assessment and Overview of Climate Finance Flows*. (2024). Retrieved from *https://unfccc.int/documents/640759*

UNFCCC. *Defining and understanding transformational adaptation at different spatial scales and sectors, and assessing progress in planning and implementing transformational adaptation approaches at the global level.* (2024). Retrieved from *https://unfccc.int/sites/default/files/resource/tp2024_08.pdf*

UNFCC. Aligning National Adaptation Plans, Nationally Determined Contributions and Adaptation Communications. (2024). Retrieved from *https://unfccc.int/sites/default/files/resource/Policy-brief-NAPs-NDCs-AdComs.pdf*

University of Notre Dame Global Adaptation Initiative (ND-GAIN). (n.d.). ND-GAIN Country Index. Retrieved June 29, 2025, from *https://gain.nd.edu/our-work/country-index/*

van Vuuren, D. P., et al. Exploring pathways for world development within planetary boundaries. *Nature, 641*(910–916). (2025, May 14). Retrieved from *https://doi.org/10.1038/s41586-02508928-w*

Vendramini, A. & Breviglieri, G. *Climate Change Adaptation Financing: From Tracked Flows to Untapped Potential*. The Center for Sustainability Studies at Fundação Getulio Vargas (FGVces). (2025a).

Vendramini, A. & Breviglieri, G. *Fragmented Perspectives, Fragmented Finance: A Case Study on Brazil's Adaptation Challenge*. The Center for Sustainability Studies at Fundação Getulio Vargas (FGVces). (2025b).

Wong, D R and K. Kim. *Sizing the climate adaptation investment opportunity*. GIC. (2025). Retrieved from *https://www.gic.com.sg/thinkspace/sustainability/sizing-the-climate-adaptation-opportunity/*

World Bank Group & GFDRR. *Enabling Private Investment in Climate Adaptation & Resilience: Current Status, Barriers to Investment and Blueprint for Action*. World Bank. (2021). Retrieved from *https://documents1.worldbank.org/curated/en/342451620724931086/pdf/CurrentStatus-Barriers-to-Investment-and-Blueprint-for-Action-Policy-Brief.pdf*

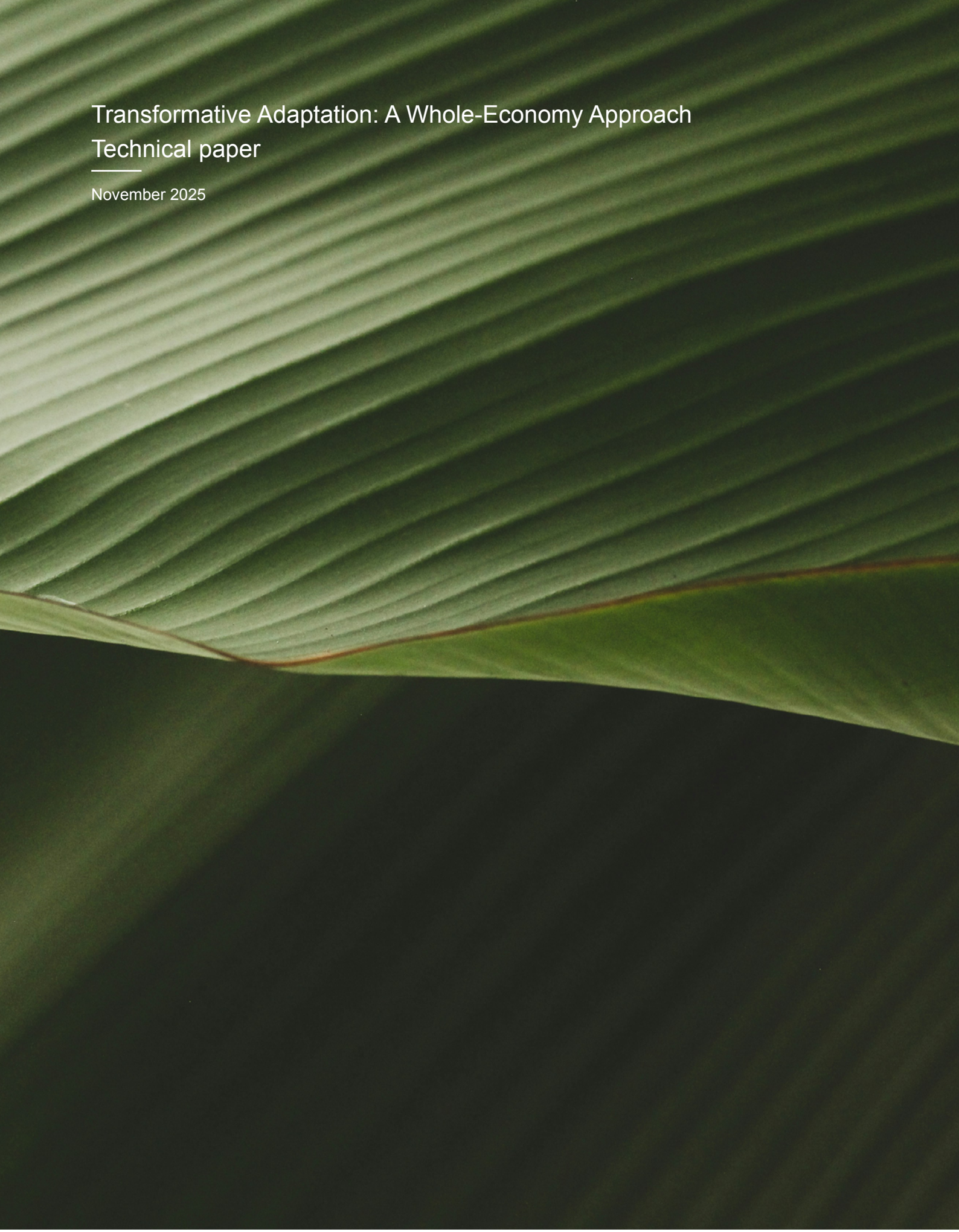
World Bank Group. *Mobilizing private finance for nature*. Washington DC: World Bank. (2020, September). Retrieved from *https://documents1.worldbank.org/curated/en/791251625066253367/pdf/MobilizingPrivate-Finance-for-Nature.pdf*

World Economic Forum. *Climate adaptation: the $2 trillion market the private sector cannot ignore*. World Economic Forum. (2022, November). Retrieved from *https://www.weforum.org/stories/2022/11/climate-change-climate-adaptation-privatesector/*

Zadek, Simon. *Planning for a Future Beyond 1.5C*. Project Syndicate. (2023, November). Retrieved from *https://www.project-syndicate.org/commentary/unrealistic-global-warming-targethinders-climate-action-by-simon-zadek-2023-11*

Transformative Adaptation: A Whole-Economy Approach
Technical paper

November 2025



Produced by

morphosis.

Financial support

INSTITUTO ITAÚSA

Technical partners

FGV EAESP CENTRO DE ESTUDOS EM SUSTENTABILIDADE

PAULSON INSTITUTE

BASILINNA