LEVERAGING PRIVATE SECTOR INVESTMENTS IN ADAPTATION

The evolving role of climate finance in enabling a paradigm shift

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Mekong Delta, Vietnam

Leveraging Private Sector Investments in Adaptation:

The evolving role of climate finance in enabling a paradigm shift

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About the author

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Drought at corn field © Adobestock.com

FOREWORD

I first met Monica in Rotterdam at a C40 Adaptation Finance Academy where we were invited as technical experts to present on adaptation finance at city level. Monica and I got on like a house fire discussing climate finance, equity, and justice. We also discussed barriers for private sector adaptation projects at the Green Climate Fund (GCF) where I serve as Active Private Sector Observer. At the end of three days, our friendship was sealed, bonded in a determination to get more finance flowing into adaptation for climate change.

Thus, it's wonderful to welcome Monica's paper on leveraging private sector investments in adaptation. Given the inherent public good and common resources economic nature of most adaptation projects, it is likely to remain largely an activity under public sector responsibility. However, the private sector remains an untapped source of financing and expertise. The private sector can support governments facing constrained public budgets and rising costs of managing climate change to achieve resilience by leveraging the skills, innovation and financial resources of business and the financial sector.

Monica's research shows a public-private programmatic approach that enables the combination of multiple sectoral finance streams is required, along with non-traditional partnerships that bring the required expertise to effectively de-risk and significantly reduce transaction costs for investments at the watershed scale.

For the private sector, climate change does not only represent a risk, but also an important business opportunity. The IFC estimated that there would be a USD 23 trillion investment potential in climate-smart products and services between 2016 and 2030 (IFC, 2016). Climate finance is a crucial building block in blended finance strategies that can unlock opportunities and drive the shift towards a more regenerative economic model.

The need to intensify climate adaptation action and significantly increase the share of public and private financing for adaptation was the key message during the Climate Adaptation Summit, hosted by the Netherlands, in January 2021. Recently also the G7 nations recognized the fundamental importance of climate finance in addressing the climate crisis.

Climate finance can be a game changer. If we work together, we have a chance to leverage these investments towards green, resilient, and inclusive development that can remove existing systemic barriers to access for private sector and vulnerable communities alike. Only through consistent global-local and public-private cooperation can a truly transformational pipeline of investments that reach the last mile be achieved.

I am delighted to support Monica's work and launch this report together with the Kingdom of the Netherlands on leveraging private sector investments in adaptation.

Yours sincerely,

Margaret-Ann Splawn
Executive Director, Climate Markets & Investment Association
Active Private Sector Observer at Green Climate Fund

Dyke Oostzaan Tuindorp. Netherlands, 1960

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I am indebted to Juan Chang, Drazen Kucan, Neil McFarlane, Alastair Morrison and many others at GCF Secretariat for sharing their evolving insights on GCF's mission to drive a paradigm shift. Special thanks to Shin-Ae Gho Choi, who was crucial in securing the interviews with these experts. I am also greatly indebted to Tony Clamp (Director of the Private Sector Facility), Ania Grobicki (Deputy Director of External Affairs), Lucia Salazar (Portfolio Analyst) and Andreas Lunding (Head of Climate Markets) for their support in updating my analysis of GCF's portfolio and their helpful feedback throughout the process.

The quality of this report benefited from the insights of many experts and practitioners over these last years who generously gave me their time and shared their lessons learned. With the risk of forgetting some of them, I would like to express my gratitude to Henk Ovink (The Netherlands Special Envoy for International Water Affairs), Niels Vlaanderen (Coordinator International Water at the Dutch Ministry of Infrastructure and Water Management), Margaret-Ann Splawn (Executive Director of the Climate Markets & Investment Association), Vladimir Stenek (Climate Change Specialist at IFC), Laurence Carter (Senior Advisor, Infrastructure at IFC), Jason Spensley (Senor Climate Change Specialist at GEF), Aldo Baietti (Green Infrastructure Finance Expert, retired WBG), Amit Singh (Project Development Specialist at NDC Regional Pacific Hub), Tom Panella (Director, Environment, Natural Resources, Agriculture, East Asia, at ADB), Raul Munoz (Climate Change Adaptation Specialist at IADB), Luis Marino Nava (Director Environmental Economics and Finance at Ministry of Environment of Peru), Tom Cummings (Managing Partner, NOW Partners), Diego Rodriguez (Senior Water Resources Management Specialist at WBG), Stephen Hart (Senior Loan Officer Natural Capital Financing Facility at EIB), Belynda Petrie (CEO and co-founder of OneWorld Sustainable Investments), and Sherena Hussain (Lead of the Sustainable Infrastructure Fellowship) and Sara Alvarado (Executive Director of the Institute for Sustainable Finance).

Last but certainly not least, my sincere gratitude goes out to the reviewers of this report, Daouda Ndiaye (Lead Climate Change Expert at the Islamic Development Bank) and Gabor L. Szanto (Senior Advisor of Global Public Goods at the Netherlands Enterprise Agency). Their incisive comments and guidance have benefited the quality of the report.

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Tonlé Sap, Cambodia. Credits Rinus Vis

EXECUTIVE SUMMARY

The UNEP Adaptation Gap Report 2020 found that despite an increase in available financing, enormous gaps remain in finance for developing countries and bringing adaptation projects to the stage where they bring real protection against climate impacts such as droughts, floods and sea-level rise. Global investment in adaptation has increased from USD 22 billion in 2015-16 to USD 30 billion in 2017-18. Nevertheless, to match the needs estimated between USD 140 and USD 300 billion per year by 2030, adaptation funding needs to increase five- to ten-fold to meet the needs in developing countries alone.

The private sector remains an untapped source of finance, expertise and ingenuity. Adaptation attracts only 5% of climate finance (USD 30 billion out of USD 608 billion), and of these, only 1,6% (USD 500 million) are private sector investments. This study assesses the current and potential roles of climate finance in unlocking private sector investments in adaptation.

Private sector engagement in adaptation is crucial, not only to close the implementation gaps of National Adaptation Plans (NAPs) and Nationally Determined Contributions (NDCs), but more importantly to ensure the long-term financial sustainability of adaptation investments. The study focuses on private sector participation in adaptation to tackle the diversity of challenges involved in developing investable adaptation projects. Multiple research methods were combined to carry out a dynamic and holistic analysis of a decade of international climate finance.

In order to draw cross-national lessons on how climate finance can be used to unlock private sector investments in adaptation, we analyzed global climate finance flows and the project portfolios and the evolution of three multilateral climate funds (MCFs) between 2010 and 2020: the Pilot Program for Climate Resilience (PPCR), which is part of the larger Climate Investment Funds (CIF); the Adaptation Fund (AF); and the Green Climate Fund (GCF). We validated our findings through interviews with experts from these funds as well as with international experts on climate finance and adaptation.

To generate further insights, including how to address the finance gap we analyzed many innovative projects and financing mechanisms of multilateral development banks (MDBs) and other impact investors.

An in-depth field research visit of the GCF, hosted by its Private Sector Facility (PSF) was also conducted. In total, three pioneering private sector adaptation projects from MCFs (totaling USD 194 million on investments), and four from MDBs located in Africa, Latin America and Asia are presented in this paper (totaling above USD 40 million in investments and financing facilities above USD 1 billion). Additionally, nine examples of public-private cooperation in flood protection financing programs in the UK, the Netherlands, Australia and Costa Rica are presented, along with an overview of innovative financing mechanisms for adaptation. Four of these nine programs are analyzed and presented in greater detail. The paper therefore presents insight into a) pioneering innovative financial structures and approaches, b) novel governance

structures and implementation arrangements, and c) operational recommendations for key actors in the global climate finance architecture (donors, climate funds, private sector, banks and governments).

Combining multiple research methods (systems thinking, new institutional economics and case study research) at different scales, it offers a dynamic analysis of the past decade of climate finance. This timescale provides a unique opportunity to develop a holistic approach and framework for the evaluation and design of transformational climate finance interventions at the project, country and portfolio levels.

Concretely, we conclude that most private sector investment efforts in MCFs to date have worked with financial intermediaries and have focused on setting up financing facilities that improve access and reduce the cost of capital for adaptation strategies (especially in the agricultural sector). This research shows that although the increasingly complex and fragmented global climate finance landscape theoretically enhances the possibilities to provide funding complementarity, it often translates into prohibitive transaction costs and access barriers for private sector and vulnerable communities alike.

The most important systemic barriers, which go beyond the cost of capital, are yet to be tackled by programmatic approaches. These include:

- Transaction costs that stem from the scale (watershed and/or landscape) needed for effective adaptation investments.
- Transition risks that stem from the innovative nature of many of the adaptation technologies and or solutions required, for example Nature-based Solutions.

One programmatic example analyzed was pioneered by the PPCR at CIF. The program adopts a long-term blended finance strategy and combines country-level public sector-led interventions with targeted and well synchronized private sector instruments aimed directly at real economy private sector players, like companies whose operations affect and depend on a watershed.

The most important conclusions and recommendations of this report are:

First, MCFs, DFIs and donors need to intensify upstream coordination to remove systemic access barriers and reduce the transaction costs and cost of capital faced by local public and private actors. At the same time, they could play a catalytic role downstream by working with national and local governments and NGO's to strengthen local project preparation capacities and exploit the full potential of private sector participation. Cooperation in the design of application and evaluation procedures, as well as in the design of blended finance strategies, is urgently required.

Second, the full potential of private sector financing can be exploited by two main means. The first is to secure participation through innovative public procurement strategies, e.g. performance-based contracting (PBC) and Payment by Results (PbR) models. The second is to enable companies to invest collectively in the management of common resources by developing novel governance arrangements that fit local conditions while exploiting the economics of scale and scope, such as watershed-level collective contractual schemes and/or environmental markets.

All in all, this report provides a summary of the lessons learned over a decade of climate finance along with a holistic framework for the design of effective interventions. The most important conclusions of this research are:

- A public-private programmatic and blended finance approach that enables the combination of multiple (thematic and/or sectoral) finance streams is required;
- The development of novel governance structures for collective investments at watershed level in common pool resources and novel procurement strategies in the public and private sectors can accelerate the creation of new adaptation related markets; and
- There is a need for global and local partnerships that provide the necessary expertise and contribute to the reduction of transaction costs and transition-related risks.
- The next generation of investment vehicles and partnerships require closer collaboration between investors and problem solvers.

Evacuation of people from their homes during a flood in Watersnoodramp Zeeland, 1953

Bushfires below Stacks Bluff, Tasmania, Australia. Credits Matt Palmer, Unspalsh

REPORT STRUCTURE

This report is structured as follows. After the introduction, Chapter 2 presents the global finance landscape and analyses its evolution over the past decade. Chapter 3 elaborates on the current and desired roles of the private sector in the global climate finance architecture, given the strong influence of private entities in the most vulnerable sectors. It looks at the private sector's strengths and its complementarities with the public sector in the delivery of public goods/services and the sustainable management of common resources. The project portfolios and experiences of three multilateral climate funds (PPCR, AF and GCF) in engaging the private sector in adaptation are reviewed, elucidating the lessons learned regarding drivers and barriers, advances and remaining challenges.

Chapter 4 further examines the steps being taken towards the generation of investable and/or bankable climate adaptation projects by multilateral development banks (MDBs) and other impact investors. The chapter also presents the spectrum of public and/or private implementation arrangements and analyses the role these innovative project delivery and finance models – such as performance-based contracting (PBC) and public-private partnerships (PPPs) – can have in engaging the private sector beyond financial intermediaries. Finally, Chapter 5 of this report draws the main conclusions and offers operational recommendations to key actors in the global climate finance architecture (i.e., MCFs, DFIs, local banks and governments) for enhancing the catalytic effect of climate finance to achieve greater private sector investment and impact in adaptation efforts.

Factory Flood, Sunshine, Victoria, 1946. Credits H.V McKay Massey Harris, Unsplash

1. INTRODUCTION

As stated by the UNEP Adaptation Gap Report 2020, despite an increase in available financing, the adaptation finance gap is not closing. There is an urgent need to direct a larger share of climate finance flows toward adaptation instead of mitigation, and the private sector remains an untapped source of finance and expertise. Yet attracting private sector adaptation investments is challenging. This research therefore focuses on elucidating the cross-national lessons learned on how to leverage private sector adaptation investments at the system scale and the role that climate finance can have in this. It aims to generate insights and operational recommendations for key actors in the global climate finance architecture (i.e., donors, MCFs, private sector, financial sector and governments) to enhance the catalytic effect of climate finance in increasing this untapped source of financing and expertise.

Private sector engagement in adaptation efforts is crucial, not only to close the implementation gap of National Adaptation Plans (NAPs) and Nationally Determined Contributions (NDCs), but more importantly to ensure the long-term financial sustainability of adaptation investments. Given the multiple challenges involved in attracting private sector investments in adaptation and the urgent need to direct a larger share of climate finance flows toward adaptation instead of mitigation, the focus of the analysis was on adaptation. To tackle the diversity of challenges involved in developing investable adaptation propositions, multiple research methods were combined to carry out a dynamic and holistic analysis of a decade of international climate finance.

To draw cross-national lessons on how climate finance can be used to unlock private sector investments in adaptation, an analysis of the evolution of the global climate finance architecture over the past decade was undertaken. The purpose was to assess the current role of climate finance and its potential to bring about a paradigm shift and transformative change in developing countries. Creating an enabling environment for private sector engagement and changing the risk/reward ratio of adaptation projects could unlock new opportunities for public-private cooperation and reveal the potential of the private sector as a significant source of adaptation investments.

This paper offers a holistic analysis of a decade of international climate finance and develops a framework for evaluating and designing transformational climate finance interventions at the project, country and portfolio levels.

In this first chapter, we introduce the research approach and the most important definitions for studying the global climate finance architecture.

1.1. BACKGROUND

Climate change is negatively impacting every country on every continent. It is disturbing national economies and affecting lives. It is generating additional costs to communities and countries, and these costs are expected to increase in the future. The Economics of Climate Change working group of the IPCC estimated the annual-

ized damage to GDPs due to climate risk to rise by approximately 7% by 2030 (IPCC, 2014).

To address the challenges brought on by climate change, the international community adopted the Paris Agreement at the COP21 in Paris on December 12, 2015. All countries committed themselves to curtailing their emissions in order to limit global temperature rise to well under 2 degrees Celsius, striving for a maximum of 1.5 degrees Celsius. In this context, developed countries committed to jointly mobilizing USD 100 billion a year in climate finance by 2020 for climate action (both mitigation and adaptation) in developing countries. By February 2020 the total amount pledged to MCFs was USD 40.9 billion, of which USD 28 billion had been deposited (CFU 2020a).

The Green Climate Fund was established at the COP16 held in 2010 in Cancun by the UNFCCC parties. It was designed to be the financial mechanism that would channel a large part of climate finance from developed to developing countries, with the purpose of assisting developing countries in creating and implementing climate change policies.

Climate finance is defined by the UNFCC in their website (accessed January 2021) as "local, national or transnational financing—drawn from public, private and alternative sources of financing—that seeks to support mitigation and adaptation actions that will address climate change". This includes support for policy and technology, capacity building in various sectors, technology transfer and of course the financing of concrete projects. In other words, it broadly refers to the flow of funds toward activities that reduce greenhouse gas emissions (GHG) or help society to adapt to the impacts of climate change.

The term 'climate finance' is used in two ways. In the context of international climate change negotiations, it describes the financial flows from developed to developing countries for funding climate change mitigation and/or adaptation activities (WRI, 2013). In a broader context in can include both public and private funds for adaptation or mitigation, aimed at developing and developed countries alike. Climate finance can take a variety of forms as financing and policy measures, the most important being: a) direct public financing, b) co-financing, c) risk mitigation by the public sector to incentivize private investments, and d) incentives for investing in carbon reduction, such as emissions trading, tax incentives, the removal of negative incentives (subsidies) and regulation to prevent inefficient investments. A graphical representation of these types of financing and policy measures is presented in **Figure 7** in Chapter 3. A definition of the term 'climate finance' is yet to be agreed upon internationally (CFU 2020b).

Multilateral Climate Funds are international institutions funded by several developed countries to distribute climate finance to developing countries. Other distribution channels include bilateral (country-to-country) funds, DFIs and private finance. MCFs have supported climate mitigation and adaptation efforts mainly through grants and loans to governments. Many support the direct financing of public projects. Others offer loans, equity and guarantees to the private sector to support the development

of privately co-financed projects or the development of new climate finance products. For this research we considered both types of finance flows, focusing in both cases on developing countries.

According to the Climate Policy Initiative (CPI, 2020), climate finance flows in their broadest sense reached USD 574 billion per year in 2017-18 (average of the flows over those two years). Mitigation accounted for 92% of climate finance in this period, with 63% of mitigation investments being dedicated to renewable energy generation. Private investments accounted for 48% of total climate finance. CPI's 2018 analysis did not record any private sector funding for adaptation projects. However, it does mention that there might be activity that it cannot track (CPI, 2018).

According to the OECD (2019), in 2017 public climate finance from developed to developing countries was USD 56.7 billion – a 44% increase from the USD 39.5 billion in 2013. Private climate finance mobilized by developed countries' public climate finance (through both bilateral and multilateral channels) amounted to USD 14.5 billion in 2017 – up from USD 10.1 billion in 2016. The combined total of public and private financing was thus USD 71.2 billion in 2017.

As of February 2020, the major contributors to MCFs, as monitored by the Climate Funds Update, were the United Kingdom (USD 7 billion), United States (USD 5.8 billion), Germany (USD 5.3 billion), Japan (USD 4.8 billion), France (USD 3.4 billion) and Norway (USD 3.3 billion).

The Netherlands significantly supports mitigation and adaptation activities in developing countries. During the period 2010-16, Dutch public expenditure on bilateral and multilateral climate-related activities exceeded EUR 1.6 billion. In 2017 the Netherlands spent EUR 394 million of its official development assistance (ODA) funds for climate activities in developing countries (HGIS annual report, 2017). These public funds mobilized a total of EUR 405 million of private investments (Trinomics, 2018). The total amount pledged for 2021 by the Netherlands to MCFs, as reported by the Climate Funds Update website, accessed January, 2021 (CFU, 2020a), was USD 627 million, placing the country in 11th place, right after Spain (USD 673.45 million).

1.2. OBJECTIVES AND METHODOLOGY

This study aimed to carry out a dynamic and holistic analysis of a decade of international climate finance, with the purpose of generating insights about the most effective ways to leverage private sector investments in adaptation at system scale and including an examination of pioneering financial structures and project delivery models. It offers operational recommendations for key actors in the global climate finance architecture.

In this study we analyzed the evolution of the global climate finance architecture over the past decade, along with a literature review of the drivers and barriers in private sector engagement in adaptation. An in-depth analysis was conducted of the project portfolios of the CIF's Pilot Program for Climate Resilience (PPCR), the Adaptation Fund (AF) and the Green Climate Fund (GCF) and their evolution over the past 5 to

10 years, as applicable. The preliminary findings from this analysis were validated and complemented by interviews with project officers. The research included an extended research visit to the GCF, hosted by its Private Sector Facility.

Additionally, we analyzed the roles of MDBs and impact investors and inquired about their experiences and pioneering financial structures and project delivery models.

To tackle the diversity of challenges involved in developing investable and/or bankable adaptation projects and programs, multiple research methods (systems thinking, new institutional economics and case study research) were combined.

The following variables were analyzed for the MCFs studied and/or the experiences of MDBs:

- The potential of these funds for enabling a paradigm shift or transformation, based on a review of project portfolios;
- Private sector participation throughout the history of the MCFs, lessons learned, drivers of and barriers to greater private sector participation, types of projects or market niches where private sector participation is highest or is expected to be in the future;
- MCFs' and MDB's experiences with structuring bankable climate adaptation projects, their ongoing initiatives and lessons learned on leveraging private sector investments in adaptation through climate finance, and their contributions to making adaptation a financially viable concept for developing and emerging economies; and
- The strengthening of local capacities in terms of project preparation and financial structuring. This includes, for example, capacities on how to choose the right implementation arrangement (project delivery and finance mechanism) based on the type of project and institutional environment and/or how to increase the creditworthiness of the implementing entities.

This research made use of both primary and secondary information sources. Research activities included:

- Extensive literature review of previous studies on the global climate finance architecture, global climate finance flows (public and private), and drivers and barriers for private sector engagement and investments in adaptation;
- Research visits to the Green Climate Fund Secretariat: November-December 2017, March 2018, June 2018 and April 2019, followed by remote collaboration to update the analysis of the GCF portfolio throughout 2020;
- Analysis of the project portfolio of three MCFs, including the development of a Climate Investments Monitoring Framework kept updated until 2017, followed by a 2020 update of the analysis based on the database of Climate Funds Update (CFU, 2020a);
- Validation of findings through interviews with experts from the different funds, i.e., the CIF' Pilot Program for Climate Resilience (PPCR), the Adaptation Fund (AF) and the Green Climate Fund; and
- Organization and/or participation in adaptation finance sessions within key climate and water events, including Adaptation Futures 2016 and 2018, Stockholm

World Water Week 2016-2020, a panel discussion on climate finance organized by IGG Climate Team on March 16, 2017, where WRI presented their new report "The Future of Funds", Adaptation Finance Experts meeting organized by GCF in March 2018, and the Climate Adaptation Summit 2021.

The selection of the GCF for an extended research visit was made after a first analysis of the evolution of the international climate finance architecture, which established the GCF as the UNFCCC fund appointed to make investments at the system scale (e.g. by mainstreaming concepts piloted at a smaller scale by other funds such as the Adaptation Fund) and which illustrated the GCF's clear ambition to increase private sector participation through a dedicated window.

1.2.1. Green Climate Fund Research visit

A total of 19 people were interviewed from 5 of the 6 GCF secretariat and management departments. The research followed a snowball sampling approach, whereby first one person from each department was interviewed and then, based on the research objectives and questions that comprised the overall research protocol, they indicated who else should be interviewed.

The researcher was hosted by and received great support from GCF's Private Sector Facility (PSF) division. The 19 interviews were conducted with the following departments:

- General Direction (1);
- Mitigation and Adaptation Division (DMA) (4);
- Country Programming Division (CPD), including the Country Readiness Program (4);
- Private Sector Facility (PSF) (5);
- Portfolio Management and Monitoring Unit (PMU) (2);
- Support Services: Finance (1);
- Government relationships (1); and
- Legal department (1).

To finalize the visit, a brief presentation with preliminary findings was given on Thursday, November 30, 2018, and a workshop on private sector participation was facilitated on March 8, 2018.

1.2.2. Complementary reports and findings

Based on desk research and analysis of the project databases of the most relevant MCFs (PPCR, AF and GCF), as well as what is known about these funds' procurement procedures, our overall research within the Dutch Climate Solutions Program resulted in several products which are complementary to this report:

- Climate Investments Monitoring Framework – A database of all projects funded by the Global Environment Facility (GEF), the Adaptation Fund (AF), Climate

Investment Funds (including the PPCR) and the Green Climate Fund (GCF), which enables analysis per sector (water, energy, food/forest), geographical region and so forth. This database was updated each year until 2017.

- Internal report of the research visit to the Green Climate Fund – "Towards a Climate Resilient Future: The challenge to leverage private sector investments in Adaptation". Dutch Climate Solutions program for The Netherlands: Directorate-General for International Cooperation (DGIS), May 2018.
- Analysis of information from the database – "Trends and opportunities in multilateral climate funds", March 2015. Available here: https://www.ecn.nl/publicaties/PdfFetch.aspx?nr=ECN-E--15-014
- "SME Guide to Multilateral Climate Funds". June 2017. Available at: https://www.ecn.nl/publications/PdfFetch.aspx?nr=ECN-O--17-016.
- "Operationalizing the WEF nexus: Quantifying the trade-offs and synergies between the water, energy and food sectors". Dutch Climate Solutions program for the Netherlands Directorate-General for International Cooperation (DGIS), March 2018. Available at: https://www.deltares.nl/app/uploads/2019/03/Operationalizing-the-WEF-nexus_quantifying-the-trade-offs-and-synergies-between-the-water-energy-food.pdf

Volunteers during the aftermath of Hurricane Mitch, November 1998. Credits Debbie Larson (NWS)

Deforested landscape in Honduras. Credits Esteban Benites, Unspalsh

2. GLOBAL CLIMATE FINANCE LANDSCAPE

This chapter provides a brief description of the global climate finance architecture and its evolution over the past decade. An important objective of this first analysis is to generate insights into how different elements of this landscape have evolved and are expected to change in size and function in the coming decades, along with what practical consequences these changes may have for private sector participation in adaptation.

It seems that there will be significant climate-smart investment opportunities in the coming decades, particularly in emerging markets. An analysis by the International Financial Corporation (IFC), the private sector arm of the World Bank, estimates the investment potential in climate-smart investment opportunities in emerging markets between 2016 and 2030 to be USD 23 trillion (IFC, 2016). Helping to unlock opportunities for private businesses to invest in climate change mitigation and adaptation is a key objective of public sector and concessional finance.

As depicted in Figure 1, the global annual total of climate finance flows (from international and domestic sources, and from both the public and private sectors) reached a peak of USD 472 billion in 2015, then fell to USD 455 billion in 2016 due to falling technology costs and lower capacity additions in some countries. It rose again to a second peak in 2017 of USD 608 billion and fell back to USD 540 billion in 2018. The Climate Policy Initiative (CPI, 2020a) found that climate finance flows had reached USD 574 billion per year in 2018 (averaged over 2017-18) – 24% higher than the average over 2015-16. In their updated view on the global landscape for 2019, climate finance flows were estimated to be between USD 608 and 622 billion, representing a 6 - 8% increase from the 2017-18 average and a continuation of the 2017 record-high levels. Even though there seems to be an increasing trend, volumes are still far lower than what is needed to address climate change and its impacts. Vast investments are required to keep global warming within the 1.5°C scenario and to adapt to the already changing climate. The IPCC (2018) estimated the mitigation investments required for a low-carbon transition to be between USD 1.6 trillion and USD 3.8 trillion annually between 2016 and 2050 (IPCC, 2018). Meanwhile, the Global Commission on Adaptation (GCA, 2019) estimated the adaptation costs to be approximately USD 180 billion annually from 2020 to 2030.

An important channel for climate finance flows are multilateral climate funds (MCFs), which are seemingly becoming increasingly relevant based on recently published data. In 2016, MCFs approved a record of USD 2.45 billion for projects aimed at low-carbon development or climate resilience, a rise of 40% from 2015, and in 2017-18 MCFs were the source of USD 3 billion. The 2016 increase is mainly attributed to commitments by the Green Climate Fund (CPI, 2017), while the 2019 growth was very likely driven by development finance institutions. As reported by CPI (2020a) in their Updated View of the Global Landscape of Climate Finance for 2019, finance flows from DFIs were expected to surpass the record-high 2017 levels, given significant increases from multilateral development banks (MDBs) – USD 43.1 billion in 2018 and USD 61.5 billion in 2019 – and from members of the International Development Finance Club (IDFC).

These amounts are still relatively small compared to total climate finance flows, but they demonstrate a growing trend in funding commitments by MCFs, most significantly by the Green Climate Fund (GCF). MCFs could play an increasingly pivotal role in channeling climate finance from developed to developing countries and thus in unlocking potential opportunities for climate-smart investment by private sector entities.

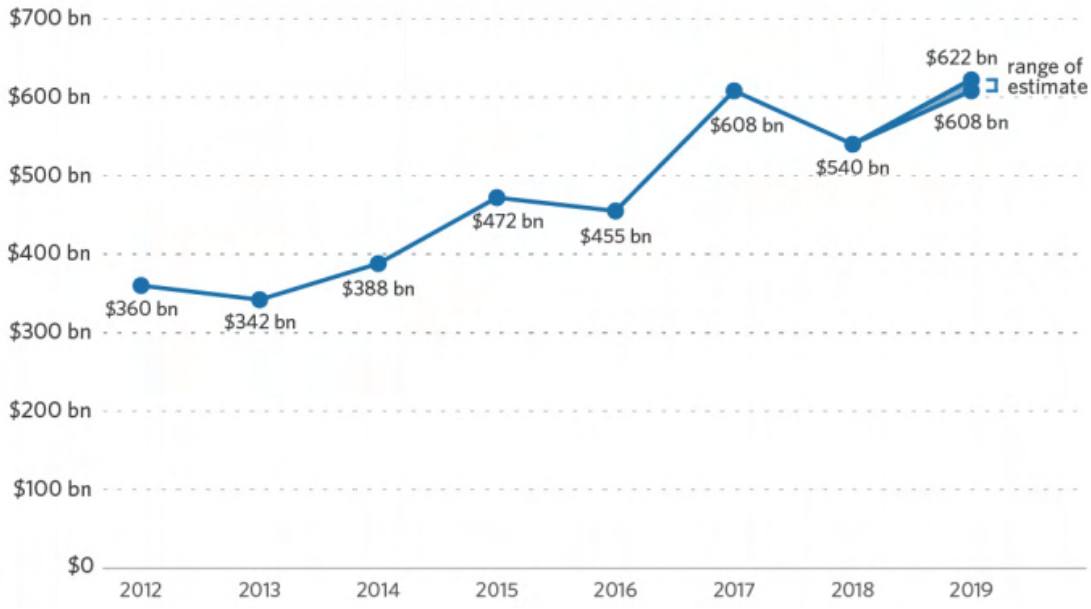


Figure 1. Total global climate finance flows between 2013 and 2018 (Source: CPI, 2019 and CPI, 2020a)

2.1. EMERGING CLIMATE FINANCE ARCHITECTURE

The so-called 'global climate finance architecture' – i.e., the sources, flows and targets of climate finance – is complex and evolving. In a review of the first twenty-five years of adaptation finance under the UNFCCC, Khan et al. (2020) differentiate three eras of adaptation finance: (1) the early years under the UNFCCC (1992-2008); (2) the Copenhagen shift (2009-2015); and (3) the post-Paris era (2016-2018).

In the first phase the concepts of carbon debt, climate debt and ecological debt were introduced, together driving the emergence of a climate debt framework. At COP13 in Bali in 2007, the Bali Action Plan was adopted, positioning adaptation as one of four building blocks which include mitigation, adaptation, technology transfer and financing. In this context, the Adaptation Fund was created, with the GEF serving as trustee. The second phase was characterized by the Copenhagen Accord and the 2010 Cancun Agreements, which promised developing countries USD 30 billion in short-term 'fast-start finance' for the period 2010 to 2012 and a 'scaling up' to USD 100 billion per year by 2020. Finally, the Paris agreement introduced an important shift in the climate finance agenda, as it stimulated momentum towards more balanced funding for climate adaptation versus mitigation and emphasized the need to stimulate

more private investment to close the finance gap through public-private partnerships.

Recent assessments of climate finance volumes highlight the complexity of the landscape, with multiple sources and intermediaries providing various forms of climate finance through several instruments and approaches. Two initiatives that are tracking global climate finance flows and mapping the evolving architecture are:

- The Climate Policy Initiative (CPI), whose flagship analysis, "The Global Landscape of Climate Finance" (https://www.climatepolicyinitiative.org/) provides the most comprehensive overview of global climate-related primary investments available since 2012. This landscape aims to comprehensively track domestic and international investments from both the public and the private sectors for adaptation and mitigation activities.
- The Climate Funds Update, which aims to track the intricate architecture of public climate finance (http://www.climatefundsupdate.org). Climate Funds Update tracks the operating entities of the UNFCCC, large MCFs that feature prominently in reporting to the UNFCCC and funds that have had a significant demonstration role. The Climate Funds Update is maintained by the Heinrich-Böll-Stiftung in Washington, D.C. and by the Overseas Development Institute (ODI).

The overall complex public and private landscape for the period 2017-18 is presented in Figure 2, where it can be seen that funds flowed from a mix of public and private sources through bilateral and multilateral channels, and in some recipient countries through national climate change funds.

In 2016 the public sector provided approximately 49% (USD 224 billion) of total climate finance, and the private sector approximately 51% (CPI, 2018). Meanwhile, in the global landscape analysis of 2017-18 (CPI, 2020a) – in which changes in the database were made in order to facilitate the identification of flows from state-owned enterprises (SOEs), state-owned financial institutions (SOFIs) and public funds – private sources amounted to approximately 48% (USD 274 billion) per year of total climate finance, and public sources covered close to 44% (USD 251 billion). Additionally, state-owned institutions invested an equivalent of 4% each, with USD 24.5 billion per year invested by SOEs and USD 23.8 billion by SOFIs. Domestic public finance, which includes the finance sourced from state-owned entities as well as public budgets, reached an average annual total of USD 63 billion. With a total of USD 155 billion per year in 2017-18, private corporations remained the actors responsible for the largest share of private climate finance. Households and individuals were the second largest, with an average of USD 53 billion.

Most climate finance was directed towards mitigation activities in 2015-16 (USD 436 billion, equivalent to 94 %) and 2017-18 (USD 532, equivalent to 92%). In the period 2017-18 only USD 30 billion (equivalent to 5%) was invested in adaptation projects and USD 12 billion (equivalent to 2%) in projects with dual benefits.

The types of climate finance instruments available include grants and concessional loans, guarantees and private equity. Figure 2 provides an overview of the sources, intermediaries and instruments, as well as the recipients and uses of climate finance, and the amount of financial flows attributed to these globally in the period 2017-18.

Findings reported by CPI (2019) in their analysis of the 2017-18 global climate finance landscape that are particularly relevant for our analysis on how to leverage private sector investments in adaptation are:

- Adaptation finance gained momentum in 2017-18, increasing 35% from 2015-16 to an annual average of USD 30 billion. Nevertheless, adaptation still accounts for just 5% of tracked climate finance based on available data.
- The global greening of financial markets is creating a greater role for institutional investors and funds. Even if small compared to their secondary transactions, annual project-level climate finance flows from institutional investors averaged USD 9 billion in 2017-18, a volume more than three times greater than in 2015-16. Venture capital, private equity and infrastructure funds more than doubled their investment, to USD 5 billion, over the same period.
- Most of this finance from institutional investors and funds flowed to renewable energy generation, indicating that renewable markets are increasingly perceived as more mature and less risky.
- The market for green bonds is growing very rapidly. Annual issuances of labeled bonds reached an annual average of USD 165 billion in 2017-18, compared to USD 62 billion in 2015-16 (CBI, 2017, 2019).
- Grants represent a larger share than ever before, even though the new development financing philosophy -presented in the Addis Ababa Action Agenda- promotes a shift from grants only towards a more blended finance approach (UN, 2015). Annual grant finance averaged USD 29 billion (5% of total flows) in 2017-18 compared to USD 18 billion (4%) in 2015-16 and USD 13 billion (3%) in 2013-14. This increase might be explained by enhanced efforts by public actors in building strong enabling environments and undertaking demonstration projects for sustainable and resilient development across a range of sectors. The increase also reflects the need for public flows to reach more challenging sectors and geographies. Almost three-fifths of tracked 2017-18 grants were made internationally, and two-fifths domestically.
- There is increasing use of risk management instruments to leverage private investments. Although risk management instruments such as guarantees and insurance are excluded from the flows reported in the aggregate Global Landscape figures, to avoid risk of over-estimation, these are increasingly being used, particularly in the form of direct foreign investment (DFI). Annual commitments related to these instruments represented USD 1.5 billion per year averaged over 2017-18, compared to USD 970 million in 2015-16. Even though they are primarily used for the deployment of renewables (53% in 2017-18), predominantly in the form of political risk insurance, off-taker guarantees or first-loss coverage, they are increasingly being offered in other sectors, including energy efficiency, land use and transport. Risk management instruments are important tools for leveraging the private sector. The OECD (2019) reports that guarantees and insurance were linked to 39% of USD 38.2 billion in private financing reportedly mobilized by DFIs in 2017, of which over a third was in the energy sector.
- There are concerns regarding the crowding out of private finance. Public institutions provided 66% of project-level market-rate debt in 2017-18, with MDBs and national DFIs being the major providers. Such a high percentage creates reason for concern, especially in markets where proven private sector business models exist, such as large-scale renewable energy projects. As there is an increasing

use of blended finance strategies, with possible unintended side effects, a systematic and thorough analysis is required to understand what the most effective mandate for DFIs is in different types of markets (CPI, 2019; IFC, 2021).

All in all, adaptation finance continues to fall significantly short of the required global adaptation financing need of USD 180 billion annually for the period 2020-30 (GCA, 2019) or the annual adaptation gap reported by the UNEP Adaptation Report, currently estimated to be in the range of USD 70 billion, and which might reach USD 140–300 billion in 2030 and USD 280–500 billion in 2050.

To help clarify the meanings of these flows of money and related volumes, it is important to highlight the difference between funding and financing. Funding generally does not have to be repaid. It can come from three generic sources: taxes, tariffs and transfers. Most climate finance from developed to developing countries channeled through multilateral funds take the form of grants and therefore fall under the category of transfers. Financing, on the other hand, is income that does need to be repaid over time, meaning that the recipient must eventually muster up the resources needed to repay the money received up-front. Financing could make use of a variety of instruments such as loans, bonds and others. A growing percentage of climate finance is being offered to countries in the form of concessional loans, which are a blend of a grant (transfer) and a loan. The receiver therefore needs to consider how to repay the loan section, either via taxes or tariffs.

Funding and financing mechanisms can be public, private, or a combination of the two, depending on whether the entity providing the funding or financing and the one requesting it is a public or a private entity. The new blended finance approach brings the option to mix and blend all of these different options. Blended finance, defined by the OECD (2018) as "the strategic use of development finance and philanthropic funds to mobilize private capital flows to emerging and frontier markets," can help to mobilize private financing for climate adaptation.

In addition to the overview presented in Figure 2, Figure 3 presents the global climate finance architecture, focusing particularly on public climate finance mechanisms and their subsequent flows from developed to developing countries, as well as developing countries' own domestic revenue sources. As represented in Figure 2, there are several channels through which climate finance flows. First, there are multilateral climate funds, dedicated to addressing climate change. Some of these were established under the UN Framework Convention on Climate Change (UNFCCC) – referred to as UNFCCC Financial Mechanisms – and others not. Additionally, several countries have established their own national climate finance initiatives or funds (e.g. the Philippines People's Survival Fund) and/or have set regional risk pool mechanisms in place (e.g. Caribbean Catastrophe Risk Insurance Facility).

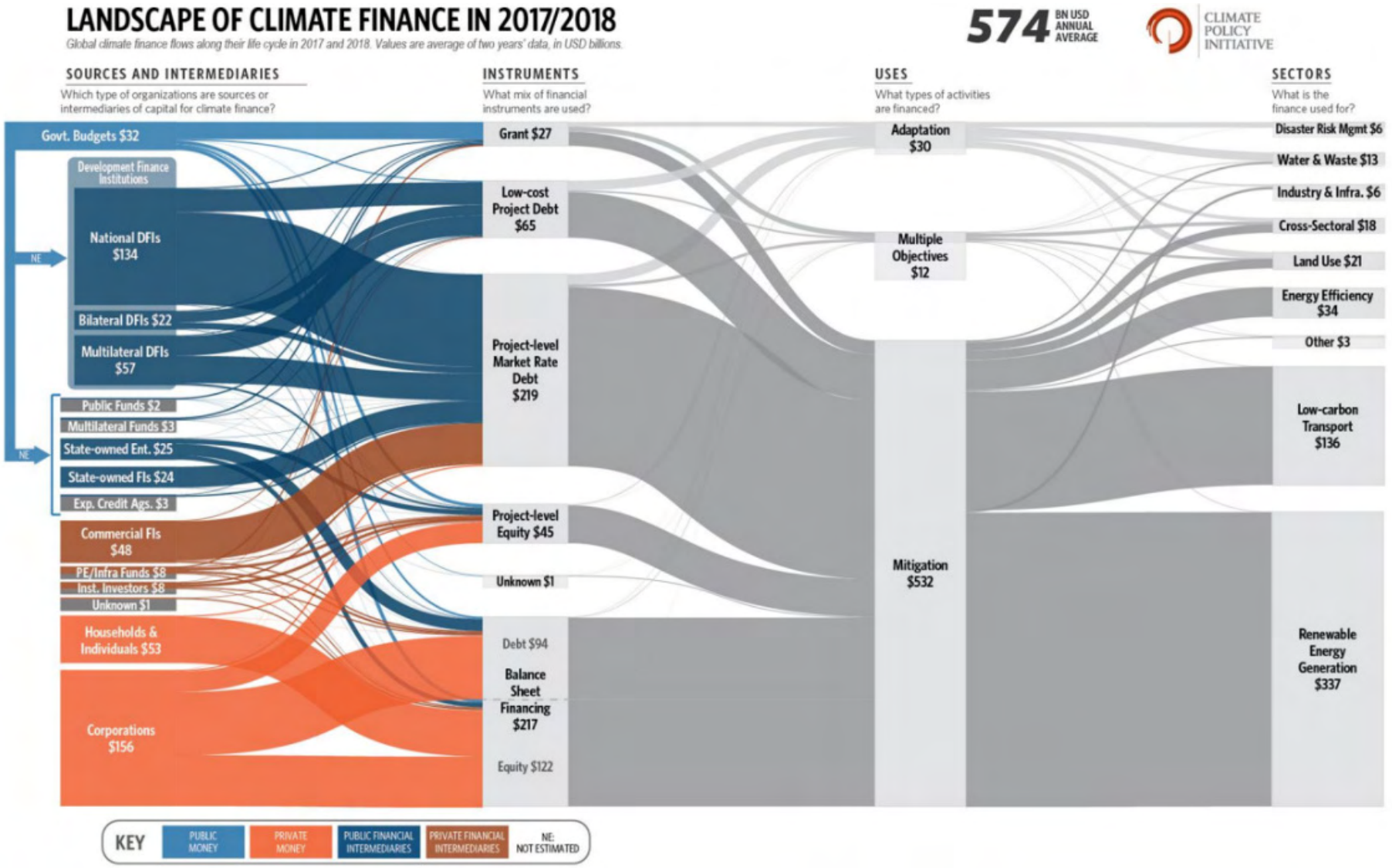


Figure 2. Global Landscape of Climate Finance in 2017/2018. Source: CPI 2020a, Updated View on the Global Landscape of Climate Finance 2019

2.1.1. The Kyoto Protocol and related market-based mechanisms

The Kyoto Protocol was adopted on December 11, 1997. Yet given the complex ratification process, it only entered into force on February 2005 and currently (April 2021) includes 192 parties. The Kyoto Protocol operationalizes the United Nations Framework Convention on Climate Change (UNFCC) by committing industrialized countries and economies in transition to limiting and reducing greenhouse gases (GHG) emissions following agreed upon individual targets. The Convention itself only asks the countries to adopt mitigation policies and measures and to periodically report their progress (UNFCC website, accessed December 2020). Parties report by submitting annual emission inventories and national reports under the Protocol at regular intervals.

The Kyoto Protocol, like the Convention (UNFCCC), is also designed to support countries in adapting to climate change impacts. Accordingly, it aims to facilitate the development and deployment of technologies that increase resilience. Article 11 of the Kyoto Protocol defines the need for a financial mechanism to fund activities by developing country parties to the UNFCCC. At COP 16, the Standing Committee on Finance was established under the UNFCCC to assist the COP in meeting the objectives of the Financial Mechanism of the Convention. As an oversight mechanism, the Standing Committee on Finance has been tasked with, among other things, preparing a biennial assessment of climate finance flows, the fourth of which was published in 2020 and which detailed flows from 2017-18 (CFU, 2020b).

As shown in Figure 3, there are 4 non-market UNFCCC funds: the Green Climate Fund (GCF), the Adaptation Fund (AF), the Least Developed Countries Fund (LDCF) and the Special Climate Change Fund (SCCF). The Global Environment Facility (GEF) serves as Secretariaat for all the non-market UNFCCC funds, except for the GCF.

Besides these multilateral financial mechanisms, an important building block of the Kyoto Protocol is flexible market mechanisms, based on the trade of emissions permits. Even though countries must meet their targets primarily through national measures, the Protocol offers them additional means through these mechanisms. The three market-based mechanisms offered are:

- **International Emissions Trading**, which allows countries that have unused allowable emissions to sell this excess capacity to countries that are over their targets.
- **The Clean Development Mechanism** (CDM), defined in Article 12 of the Protocol, allows a country with an emissions reduction or emissions limitation commitment to implement an emissions reduction project in one or more developing countries. These projects can earn saleable Certified Emissions Reduction (CER) credits, each equivalent to one metric ton of CO2, which then can be counted towards meeting the Kyoto targets.
- Joint Implementation (JI), defined in Article 6, allows a country with an emissions reduction or limitation commitment to earn Emissions Reduction Units (ERUs) from an emissions reduction or emissions removal project in another Annex B party (emissions-capped industrialized countries), each equivalent to one metric ton of CO2 that can be counted towards its Kyoto targets.

2.1.2. Multilateral climate funds

As explained earlier, one way of channeling climate finance, from public sources, is through multilateral climate funds (MCFs). MCFs traditionally involve a transfer of resources from developed countries (called contributors) to developing countries. These funds usually have a finite lifetime, are aimed at a specific sector and have a regional focus. They can support projects directly but typically work through other organizations, such as Multilateral Development Banks (MDBs) or United Nations (UN) organizations to fund and implement actions in host countries (called Implementing Agencies and Institutions).

MCFs differ from the contributor-dominated governance structures that are typical in the development finance landscape (CFU, 2020b). The governance of MCFs has been designed to give developing country governments greater voice and representation in decision-making. This includes inclusion and accountability standards as well as giving a role to non-governmental stakeholders as observers at fund meetings.

In total, support pledged to MCFs as of February 2020 was in the order of USD 11.2 billion for mitigation, USD 4.4 billion for adaptation and USD 25.3 billion for projects that aim at both adaptation and mitigation (see Table 1). The projects approved by the different funds total 567 mitigation projects, 669 adaptation projects and 1,299 multiple foci projects.

Table 1. Climate Finance pledges as of February 2020 (Calculated by authors based on database from Climate Funds Update website, accessed 4 January 2021)

	Pledged USD billion	Deposited USD billion	Approved USD billion	Disbursed USD billion	Projects Approved
Mitigation	11.2	10.3	8.3	3.2	567
Adaptation	4.4	4.2	3.5	1.8	669
Multiple foci	25.3	13.5	9	2.6	1,299
Total	40.9	28	21	7.6	2,532

Most pledges are made by national governments; however, by December 2019 two of these global climate funds – GCF and AF – had received pledges from three sub-national governments (Brussels, Wallonia and Flanders) and Quebec and Paris cities (CFU, 2020b).

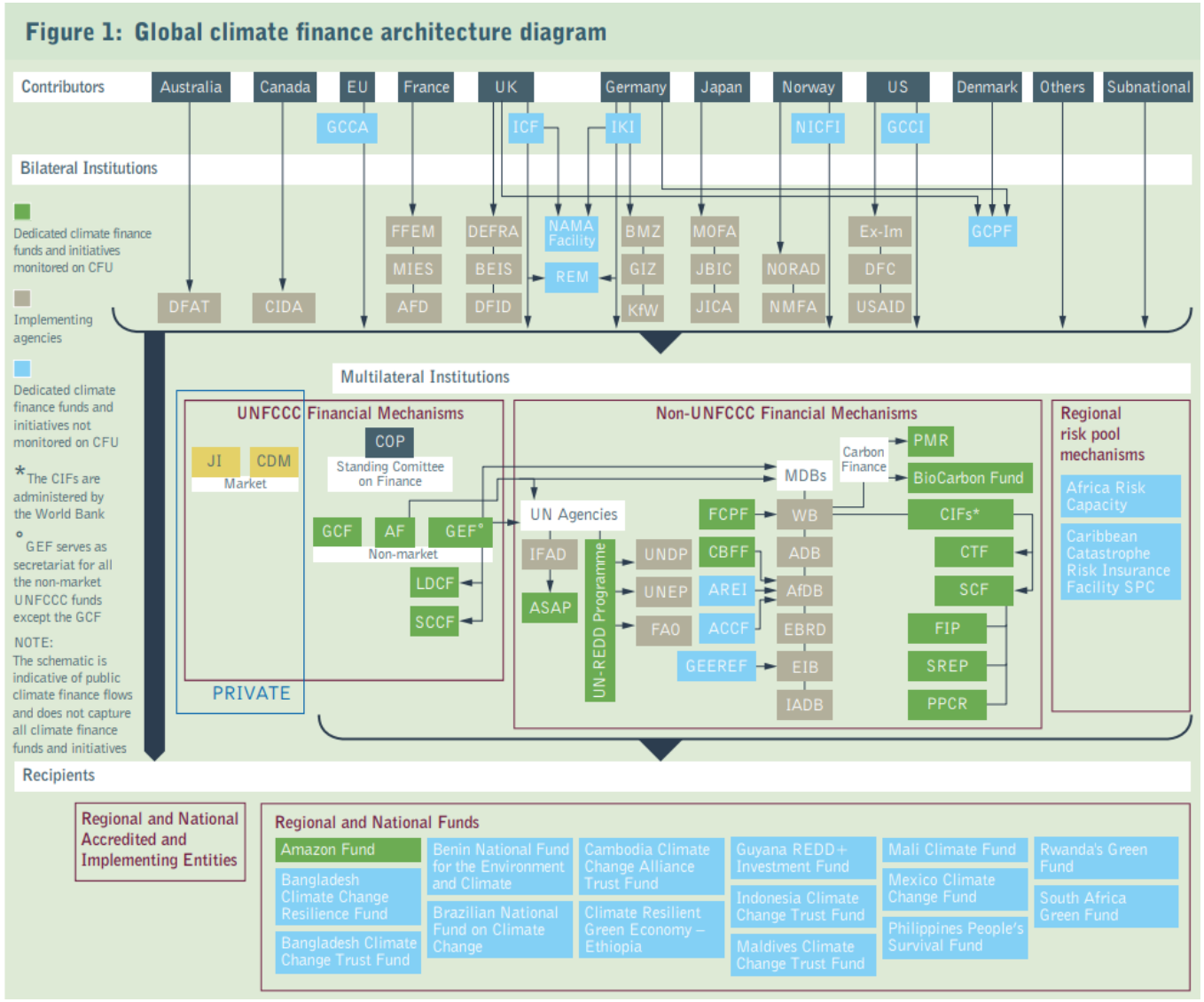


Figure 3. Global climate finance architecture, focusing particularly on public climate finance mechanisms (Source: CFU, 2020b, p.2)

In terms of volumes, the two main multilateral facilities established under the United Nations Framework Convention on Climate Change (UNFCCC) are the GEF and GCF.

2.1.3. The Global Environment Facility (GEF)

Established in 1991, the GEF has a long track record in environmental funding and serves as financial mechanisms for other conventions such as biodiversity and desertification.

GEF resources are allocated in multiple focal areas, including climate change. Amounts are determined by the estimated impact of dollars spent on the desired environmental outcomes, while safeguarding that all developing countries receive a share of the funding.

The fund has been replenished multiple times, the most recent ones being:

- **4th replenishment (GEF 4, 2006 -2010):** 31 countries pledged just over USD 1 billion for the climate change focal area of the facility.
- **5th replenishment (GEF 5, 2011 – 2014):** 40 countries have deposited USD 777 million to the climate change focal area.
- **6th replenishment (GEF 6, 2014-2018):** 30 donor countries pledged USD 4.43 billion over all focal areas, of which USD 1.26 billion supported the climate change focal area. GEF 6 shifted the focus of the Facility's programming to target multiple focal areas including climate change, in thematic areas such as sustainable cities and land use and forests (CFU, 2020b).
- **7th replenishment (GEF 7, 2019-2022):** nearly 30 countries pledged USD 4.1 billion for all five focal areas, with an increase in funding for biodiversity and land degradation, but with a reduction in funding for climate change to USD 654 million, reflecting the evolving role of the GCF.

As of December 2019, through the fourth, fifth, six and seventh Trust Fund, the GEF had approved over 750 projects in the focal area of climate change, amounting to USD 2.8 billion.

As previously mentioned, the GEF also administers the **Least Developed Countries Fund** (LDCF) and the **Special Climate Change Fund** (SCCF), under the guidance of the UNFCCC Conference of Parties (COP). These two funds support the development and implementation of national adaptation plans, though mostly through smaller-scale projects. The country ceiling for funding is USD 20 million. Between their inception in 2001 and December 2019, the LDCF had made cash transfers of USD 534 million to projects, and the SCCF had made cash transfers of USD 181 million, benefiting close to 100 countries (CFU, 2020b).

Finally, the **Adaptation Fund** (AF) was established under the Kyoto Protocol of the UNFCCC in 2008 and is financed through a 2% levy on the sale of emissions credits from CDM. A new carbon mechanism to be developed under the Paris Agreement is now under consideration. Given the current low carbon prices, the AF increasingly depends on grant contributions from developed countries.

In operation since 2009, as of February 2020 the fund had received USD 957 million

in pledges and USD 891 in deposits, had approved projects totaling USD 720 million and had made a total of USD 362 million in cash transfers to projects (CFU, 2020a). As reported by the AF on their website (accessed January 2021), coinciding with the 5th Anniversary of the Paris Agreement and the Climate Ambition Summit 2020, new pledges and contributions to the fund were confirmed in December 2020, totaling an equivalent of nearly USD 116 million.

The AF pioneered fully operational direct access to climate financing. **Direct Access** to climate finance is given to developing countries through accredited **National Implementing Entities** that meet agreed fiduciary as well as environmental, social and gender standards, as opposed to working solely through UN agencies or Multilateral Development Banks (MDBs) as previous funds did. Through direct access, National Implementing Entities can directly access financing and manage all aspects of climate adaptation and resilience projects, from design through implementation to monitoring and evaluation. The GEF hosts the AF Secretariat, which has enabled the AF to learn from the experiences of the GEF while evolving into a separate entity.

2.1.4. The Green Climate Fund (GCF)

The GCF was agreed at COP17 in Durban in 2011 and became fully operational when the first projects were approved at the end of 2015. Like the GEF, it serves as an operating entity of the financial mechanism of the UNFCCC and the Paris Agreement and receives guidance from the COP. It is projected to become the primary channel through which international public climate finance will flow over time and is envisioned to fund the paradigm shift toward climate-resilient and low-carbon development in developing countries. It is expected to achieve this positioning by following its established principles, adopting a country-driven approach, promoting direct access by developing countries and emerging economies, developing a private sector facility and committing to a 50:50 balanced allocation of finance to adaptation and mitigation.

Developing countries can access the GCF through international access entities (MDBs, international commercial banks and UN agencies), as well as directly through accredited national, regional and sub-national implementing entities. By December 2019 the implementing partner network of the GCF had grown to 95 Accredited Entities.

The initial resource mobilization process for the GCF in 2014 raised USD 10.3 billion. However, the failure by the United States to fulfill USD 2 billion of its USD 3 billion contribution agreement, in addition to exchange rate fluctuations, meant that only USD 7.1 billion was ultimately available (CFU, 2020b). GCF's first replenishment (GCF-1, 2020-2023) resulted in pledges made by 31 contributors, totaling the equivalent of USD 9.9 billion (GCF website, accessed January 2021). Based on a first analysis of the GCF portfolio, by the end of 2017 the GCF had 19 projects under implementation, totaling USD 633 million in GCF resources, and had approved funding for 96 projects in total (GCF website, accessed October 2018). Based on an updated analysis of the GCF portfolio undertaken in 2020, by July 2020 the GCF had 102 projects under im-

plementation, worth USD 4,363 million of GCF funding (GCF portfolio analysis) and had approved a total of 128 projects totaling USD 5,316 million. By January 2021 the GCF had approved a total of 159 projects, with USD 7.3 billion in GCF funding commitments for approved projects (GCF website accessed January, 2021), with a 62% share of funds going to the public sector and 38% to the private sector.

2.1.5. The Climate Investment Funds

A significant volume of climate finance has been channeled through institutions that are not directly under the guidance of the UNFCCC COP, such as the Climate Investment Funds (CIF). The Climate Investment Funds (CIF) is currently the largest and most prominent of these, with a total pledge of USD 8 billion as of January 2021. Although the CIF had a sunset clause that would come into effect when a global architecture was in place, commonly understood to be the operationalization of the Green Climate Fund (GCF), this clause was once again revisited in 2019 and this time indefinitely postponed, opening the door to a possible recapitalization of the CIF (CFU, 2020b).

The Climate Investment Fund (CIF), established in 2008, is administered by the World Bank Group and aims to initiate transformational change to facilitate low-carbon and climate-resilient development. The finance of the CIF is channeled through the World Bank Group, including the International Financial Corporation (IFC), International Bank for Reconstruction and Development (IBRD), African Development Bank (AfDB), Asian Development Bank (ADB), European Bank for Reconstruction and Development (EBRD) and the Inter-American Development Bank (IADB). The programmatic approach and interventions of the CIF aim to improve countries' understanding of how public finance can best be deployed at scale to assist the transformation of development trajectories.

As mentioned previously, the CIF have a total pledge of USD 8 billion, contributed by 14 countries. This includes two main funds and a variety of programs. These are:

The Clean Technology Fund (CTF), which supports activities related to renewable energy, energy efficiency and clean transport. As of January 2021 (CIF website accessed January, 2021), it had USD 5.4 billion in contributions, had approved over USD 4 billion for implementation spread over 19 countries and 1 regional program, and had made USD 1.65 billion in cash transfers to projects. This financing is expected to leverage another USD 47 billion in co-financing from other sources. CTF is by far the largest of the CIF programs.

The Strategic Climate Fund (SCF) – As of December 2019 the SCF had received USD 2.61 billion in contributions and had made USD 818 million in cash transfers to projects. The SCF serves as an overarching framework to support three targeted programs, with dedicated funding to pilot new approaches with the potential for scaled-up, transformational action aimed at a specific climate change challenge or sectoral response. Targeted programs under the SCF include:

- **The Pilot Program for Climate Resilience (PPCR)** approved in November 2008, was the first program under the SCF to become operational. Its objective is to pi-

lot and demonstrate ways to integrate climate risk and resilience into core development planning, while complementing other ongoing activities. As explained in further detail in Chapter 3, section 3.5, the PPCR has two main mechanisms. First, the PPCR assists governments in integrating climate resilience into strategic development planning across sectors and stakeholder groups. Second, it provides concessional and grant funding to put the plans into action and pilot innovative public and private sector solutions. As of September 30, 2018 (CIF, 2019) the total cumulative funding received under the PPCR was USD 1.16 billion, and cumulative funding commitments had reached USD 1.13 billion. As of January 2021 (CIF Website accessed January 2021), the PPCR had invested in some of the world's most vulnerable countries, including small island developing states (SIDS), covering a total of 28 countries and including 2 regional programs.

- **The Scaling Up Renewable Energy Program (SREP),** approved in May 2009, aims to demonstrate the social, economic and environmental viability of low-carbon development pathways in the energy sector. It also has as an objective to create new economic opportunities and increase energy access through the production and use of renewable energy. As of January 2021, funding pledged was USD 720 million.
- **The Forest Investment Program (FIP)**, approved in May 2009, aims to support developing countries' efforts to reduce emissions from deforestation and forest degradation. It does so by providing scaled-up financing for readiness reforms and public and private investments. It supports developing countries in managing natural resources in a way that achieves the triple win of being good for forests, good for development and good for the climate. The FIP finance programmatic efforts address the underlying causes of deforestation and forest degradation and aim to overcome barriers that have hindered past efforts to do so. FIP grants and low-interest loans enable governments, communities and private sector companies to work together towards achieving sustainable solutions which support the people and economies that rely on forests, while maintaining the important environmental services that forests provide. As of January 2021 (CIF website, accessed January, 2021), the FIP has invested in a total of 23 countries. The program includes a USD 80 million Dedicated Grant Mechanism (DGM) for indigenous and local communities as well as private sector-set aid projects that total 13 projects and USD 106 million.

The programmatic approach of the CIF works as follows. First, the recipient country, in cooperation with MDBs, develops an investment plan which outlines several proposed projects, the envisioned impacts and the related costs. The investment plan also describes the country-specific challenges and development needs. Second, the investment plan and its request for funds are presented to a Trust Fund Committee of the CIF for approval. If approved, again with support of an MDB, detailed project proposals are developed for each project in the investment plan. These specific proposals are again submitted to the CIF and then to the implementing MDB for approval before the release of funds.

Altogether, the resources of the CIF have been committed to 72 developing and middle-income countries. By 2016 projects equivalent to USD 5.7 billion had been approved, and by January 2021 (CIF website, accessed January 2021), 79% of the USD 8 billion, or approximately USD 7.3 billion, was under implementation. To date, approximately 57% of CIF financing has been allocated to the public sector and 43% to the private sector.

2.1.6. Multilateral Development Banks (MDBs)

Most public climate finance, predominantly from developed country governments, is channeled through intermediaries, principally development finance institutions (DFIs). DFIs can be national, bilateral or multilateral institutions, such as multilateral development banks (MDBs). According to the Global Landscape of Climate Finance 2015-16 (CPI, 2018), DFIs provided US 194 billion annually in for those years, which accounted for 90 percent of total public climate finance and 33 percent of overall global climate finance. MDBs accounted for almost a quarter of the DFI total (equivalent to USD 46 billion). Meanwhile, for the period 2017-18, as reported in the Global Landscape of Climate Finance 2017-18 (CPI, 2020a), DFIs provided US 213 billion annually, which accounted for 71 percent of total public climate finance and 37 percent of overall global climate finance. MDBs accounted for a bit more than a quarter of the DFI total (equivalent to USD 57 billion).

In 2019 climate financing by seven of the world's largest multilateral development banks (MDBs) accounted for USD 61.6 billion, of which USD 41.5 billion (67%) was in low- and middle-income economies, according to the 2019 Joint Report on Multilateral Development Banks' Climate Finance (MDBs, 2020). In terms of adaptation versus mitigation, the 2019 report states that USD 46.6 billion, or 76% of total financing for the year, was devoted to climate change mitigation investments, with 59% of these investments going to low- and middle-income economies. The remaining USD 15 billion, or 24%, was invested in adaptation efforts to help countries build resilience to the mounting impacts of climate change, including worsening droughts, extreme flooding and rising sea levels; 93% of this finance was directed at low- and middle-income economies.

Comparing these volumes with those reported in previous MDB joint climate finance reports (e.g. the 2016 report accounts for USD 27.4 billion provided by MDBs for climate change-related activities, 77% invested in mitigation versus a 13% for adaptation), there is a clear increase in the volumes and an improvement in the adaptation to mitigation ratio. While the increase from 13 to 24% of funds going to adaptation is a positive signal, there is still much to be done to achieve the balance between adaptation and mitigation called for in Article 9 of the Paris Agreement.

MDBs' mandate in general is to provide financial assistance to developing countries to promote economic and social development. They primarily fund large infrastructure and other development projects and, increasingly, provide loans tied to government policy reforms. MDBs provide non-concessional financial assistance to middle-income countries and some creditworthy low-income countries on market-based terms. They also provide concessional assistance, including grants and loans at below-market-rate interest rates, to low-income countries. MDBs effectively obtain funds from three main sources: direct bilateral contributions from countries, contributions from different types of climate funds (which may have certain sector or region restrictions), and international capital markets through bond issuance. The first two sources are used for concessional support, while the latter is used for non-concessional lending by the MDBs. As a result, MDBs are not only a direct channel of climate finance from donors to countries, but also play a significant role in the disbursement of climate finance and the implementation of projects for many climate funds.

2.2. TRENDS AND OPPORTUNITIES

The global climate finance architecture includes a large variety of governance structures, financing modalities and objectives. The total number of public and private channels is well over 90(NDC Partnership, 2008). Already in 2015, the OECD reported 91 climate funds in their Climate Fund Inventory (OECD, 2015). This multitude of funding channels increases the options for recipient countries and, theoretically, the possibilities to provide funding complementarity (CFU, 2020b), while introducing considerable fragmentation in climate finance delivery. This fragmentation increases the complexity of the global landscape and may result in difficulty with tracking funds transparently. Additionally, and more importantly, it results in vast transaction costs. These are faced both upstream, by contributors, who may be duplicating efforts; as well as downstream, by governments, civil society and the private sector in developing countries, for whom limitations in project preparation capacity may translate transaction costs into to barriers to access (Robinson and Dornan, 2017; Robinson and Gilfillan, 2017).

As mentioned earlier, there is a significant finance gap between the investment needs and current financial flows to developing countries, and between the allocation of funds to mitigation versus adaptation projects. In response to these challenges, the Paris Agreement introduced an important shift in the climate finance agenda: it stimulated momentum towards a more balanced funding for climate adaptation versus mitigation and emphasized the need to stimulate more private investment to close the finance gap, by means of private-public partnerships.

Even though the percentage of climate finance slated for adaptation versus mitigation has increased between 2015 and 2020 (e.g. from 13 to 24% in the case of MDBs), investments in adaptation, especially those involving the private sector, as still dwarfed by mitigation investments. There is still much to be done to achieve the balance between adaptation and mitigation called for in Article 9 of the Paris Agreement. Despite an increase in finance available for adaptation in the last five years, the adaptation finance gap is not closing (UNEP 2021).

Climate finance remains central to achieving low-carbon, climate-resilient development (CFU, 2020b, p.1). The crucial challenge will be to scale up climate finance and efficiently blend commitments and contributions to match local needs and countries' plans.

Summarizing two important trends identified in 2016 which remain valid as of 2021 are: (a) an increasing share of climate funds will be allocated to adaptation projects, and (b) climate funds will increasingly make use of a blended finance approach. The latter is in line with the new financing for development paradigm introduced by the Addis Ababa Action Agenda in 2015. In operational terms, this means that unless strictly necessary, climate funds will opt for a combination of concessional loans, equity investments and guarantees instead of grants only. An increasing variety and complexity of instruments aimed at improving the leverage factor of public and concessional funds and reducing concessional levels have been deployed since 2015 and will increasingly be deployed by climate funds and official development assistance (ODA) in general.

While the first trend creates opportunities for private sector companies interested in the adaptation market and in providing climate-smart solutions and climate services, the second is an opportunity and a challenge at the same time. Given this new blended finance approach, making use of the potential of climate finance requires companies to gain additional expertise and experience with a variety of innovative financial mechanisms. It probably also requires them to take different roles than those they have traditionally been used to. This new way of financing projects opens up significant opportunities, particularly for private sector parties that are willing to: a) take on the role of project developers and service providers, or b) take the role of financiers. Experience with assuming these roles and taking such risks in developing countries may vary per sector. In this regard strategic partnerships between parties with specialized knowledge on water, energy and food systems and impact investors with experience working overseas (e.g. impact investment funds) may be necessary for the private sector to take advantage of these strategies.

Finally, for developing countries, while the second trend has the important objective of ensuring the financial sustainability of climate investments in the long term, it may pose additional access challenges in the short term. The increasing fragmentation in climate finance delivery, in combination with the increasingly common requirement by climate funds for recipients to demonstrate co-financing or an ability to match climate funds with other funds, poses nearly insurmountable challenges in terms of the required capacity and transaction costs. Developing countries are being tasked with shaping investment projects and programs that need to access multiple sources of finance and which therefore must comply with multiple criteria and procedures, and for which separate monitoring and evaluation efforts also need to be undertaken.

2.3. COVID-19 NEAR-TERM IMPACTS AND STIMULUS PACKAGES TRANSFORMATIONAL POTENTIAL

While the impacts of COVID-19 on climate finance are expected to differ significantly over time and across regions, some of the most important projected near-term impacts are:

- Domestic climate finance: World GDP suffered a 4.3% contraction in 2020, which was slightly less severe than projected in 2020 but still deep (World Bank, 2021). The ascent of this calamity is likely to be long, uneven and highly uncertain. While advanced economies experienced shallower contractions than originally expected, in middle- and low-income countries the impact was more acute than expected, resulting in declining domestic resource mobilization as economic activity diminished (CPI, 2020a, World Bank 2021). For example, in Peru, tax revenue decreased by 40% year-on-year in April 2020 and in Jordan by 49% (OECD, 2020).
- External private investment: The global economic fallout has led to a flight to safety; the magnitude of this short-term reaction is unprecedented (OECD, 2020). In March 2020 alone, the IIF Capital Flows Tracker (IIF, 2020) observed USD 83.3 billion of non-resident portfolio outflows from emerging markets. This is twice as high as the non-resident portfolio outflows after the 2008 Global Financial Crisis and more than the cumulative non-resident portfolio inflows to emerging mar-

kets in 2019 (OECD, 2020). Changes in Official Development Assistance (ODA) levels will not be felt until 2021 (OECD, 2020).

- Investments in renewable energies (RE) are expected to fall by 10% year-on-year, varying significantly with the stringency of national lock-downs. Accordingly, while investors in the U.S. were confident that 2020 RE investments targets could be met, Latin America is forecast to experience a 21% year-on-year fall in PV and wind capacity additions (BNEF, 2020).

At the same time, there are reasons for hope. First, the way the COVID-19 crisis has evolved worldwide has created an unprecedented global understanding of the impact of the systemic risks in our economies and to our well-being at large. As the effects of this systemic crisis are more and more experienced and understood, an opportunity for systemic innovation and change is also opening. This opportunity for systemic innovation is confirmed by BlackRock's Global Client Sustainable Investing Survey (BlackRock, 2020), which concluded that COVID-19 and related health and economic challenges have not slowed investor demand or the outlook for sustainable investing, but on the contrary seem to have contributed to what they call a "tectonic shift". This shift seems to be the result of a convergence of political and regulatory pressures, public perceptions, technology developments and client preferences (driven by raising awareness of performance benefits and board and management oversight) that altogether have "pushed sustainability into the mainstream of investing," said Marc Mark McCombe, Chief Client Officer at BlackRock.

Second, in the medium- to long-term, fiscal stimuli packages being put in place by various governments could set in motion the required transformation and shift in economic development models, provided they are properly designed and implemented. In early October 2020 green recovery packages around the world were still relatively small, amounting to USD 178 billion, while stimulus funding of carbon-intensive sectors and companies reached USD 866 billion. Approximately 56% of the latter investments took place in Asia (CPI, 2020a).

For green recovery measures to gain traction against other investment priorities, job creation must be prioritized (CPI, 2020a). The projected increase in unemployment levels in all traditional sectors could be an opportunity to enable a switch to a new green economy base, provided that the next generation of climate investment projects embody a longer-term focus on developing human capital and are successful in developing new business models that make these green economy activities financially sustainable and attractive, also for private sector players.

To effectively exploit this opportunity for change and ensure the highest possible resilience dividends of the COVID-19 recovery packages, as urged by the Global Commission on Adaptation (2019), three simultaneous revolutions are urgent: a revolution in understanding, a revolution in planning and a revolution in finance.

The outlook for climate finance over the coming years will depend more than before on successful public-private collaboration. In this context, the role of Development Finance Institutions (DFIs) and MDBs will be crucial in driving a green recovery. They have a unique role to play in shaping this recovery through country-led policy dialogues and collaboration with the private sector (CPI, 2020a). A summit of DFIs en-

titled 'Finance in Common' that took place between 9-12 November 2020, called for "linking short-term needs with long-term transformations". Public financial institutions seem to be accelerating efforts to embed sustainability into their lending activities.

Summarizing, COVID-19 is a stark reminder that a shift in our economic development paradigm is urgent. This shift requires collaboration between global and local actors in the development finance arena and beyond, not as one-offs but consistently throughout the next decade. As stated by the OECD (2020), no single source of financing will be enough to close the COVID-19 financing gap. Only by working together across sectors, blending diverse finance thematic streams – climate, water, transport, energy, agriculture – and taking a systemic approach can they set in motion a green and transformational recovery.

Jatiluwih Rice Terrace in Bali, Indonesia. Unspalsh

Agricultural fieldin Honduras. Credits Esteban Benites, Unsplash

3. PRIVATE SECTOR PARTICIPATION IN ADAPTATION: CLIMATE FUNDS EXPERIENCES

In this chapter we analyze in depth the private sector's current role in the global climate finance architecture and how a more active engagement of the private sector – either as a financer or as a provider of climate services – could bridge the significant gaps in the financing and implementation of climate goals. We start the chapter by introducing important dilemmas regarding private sector participation through discussing the why and how of private sector participation in adaptation. After clarifying the context, we present the private sector adaptation finance landscape. We continue by analyzing private sector participation in the three largest and/or most relevant MCFs for adaptation: the AF, CIF-PPCR and GCF. We conclude by presenting an overview of the most important drivers and barriers for private sector adaptation and the most important lessons learned to date by MCFs in their endeavors to engage the private sector in adaptation investments.

As the title indicates, special attention has been given in this research to adaptation versus mitigation, as this is the area where it has proven to be more challenging to engage the private sector.

3.1. WHY PRIVATE SECTOR ENGAGEMENT IN ADAPTATION?

There is an urgent need to scale up climate adaptation efforts, and increasingly hopes are being placed on private sector action. Previous studies have estimated the costs of adaptation in developing countries to be around USD 140-300 billion a year by 2030. The Global Commission on Adaptation (GCA, 2019), for example, estimated adaptation costs at approximately USD 180 billion annually from 2020 to 2030. Meanwhile, the reported annual adaptation flows within the same countries were estimated as of 2016 to be between USD 20-25 billion (CIF, 2016).

However, adaptation projects that involve system-scale interventions often have public good and/or common resource profiles (e.g. water management, ecosystems management, public infrastructure networks) in terms of types of economic goods. This means that purely privately initiated and funded projects are challenging to realize and that private initiatives without consistent public sector oversight may even be non-desirable. In most cases, the implementation of these measures requires public funding or at least intervention by a public body as a regulator and/or coordinator of collective actions.

Additionally, many adaptation projects, such as flood protection measures, have intrinsic characteristics that make them little attractive to the private sector (e.g. capital-intensive, asset specificity, delayed and dispersed benefits, high-risk profiles, non-guaranteed and non-financial benefits, and limited autonomous earning power).

Against these odds for private participation in adaptation projects and services, the significant financing gap in adaptation and the efficiency gains private sector participation can bring drive us to look for alternative strategies to increase their share in

funding and financing, and their level of participation in project and service delivery. Although the private sector is certainly important as a source of capital to improve the financial sustainability of adaptation projects and overall sustainability in the delivery of climate adaptation services, their role needs to be broadened. Going beyond the role of financers, they need to be considered as strategic partners in the successful delivery of adaptation projects and services. The expertise and strengths that they bring to the table complement those found in the public sector, and this is particularly important in ensuring sustainability in service delivery.

3.1.1. Adaptation financing gaps per sector and region

An analysis undertaken by CIF (2016) estimates the gap between international adaptation spending (public and private) and the investments required for adaptation. This gap is illustrated in Figures 4 and Figure 5.

First, in Figure 4, the gap per sector is shown, where the largest adaptation gaps are to be found in: a) infrastructure, energy and other built environment sectors, and b) coastal protection. Both of these sectors show annual shortfalls of approximately USD 26 billion. These are followed by waste and wastewater management (USD 8.9 to 11.6 billion), disaster risk management (USD 5.5 to 5.7 billion) and agriculture, forestry and land use (USD 4.9 to 5.2 billion).

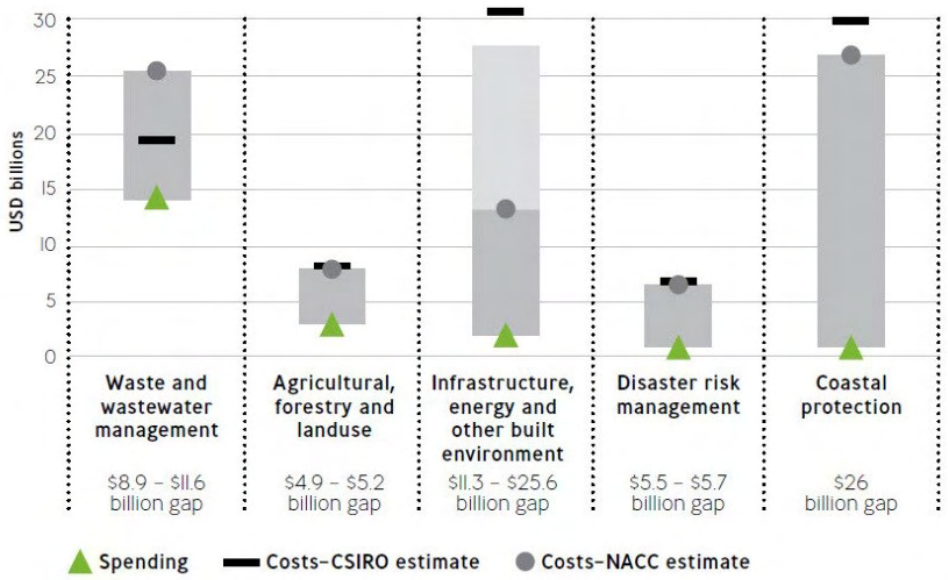


Figure 4. Adaptation finance shortfalls in absolute terms per sector. Source: Vivid Economics, CIF, 2016

Second, Figure 5 shows the gap per region. Of the regions for which geographic spending data could be accessed, Latin America and the Caribbean (USD 14.7 - 18.1 billion) and South Asia (USD 14.9 - 16.5 billion) were the two regions that face the biggest absolute shortfall in adaptation finance. When converting the costs and spending estimates into percentage of GDP for 2014, the most severe adaptation gaps are encountered in Sub-Saharan Africa with a shortfall of financing equivalent to 0.71 to 0.75% of GDP. These gaps can be considered as challenges as well as market opportunities for the private sector active in the delivery of climate-smart solutions.

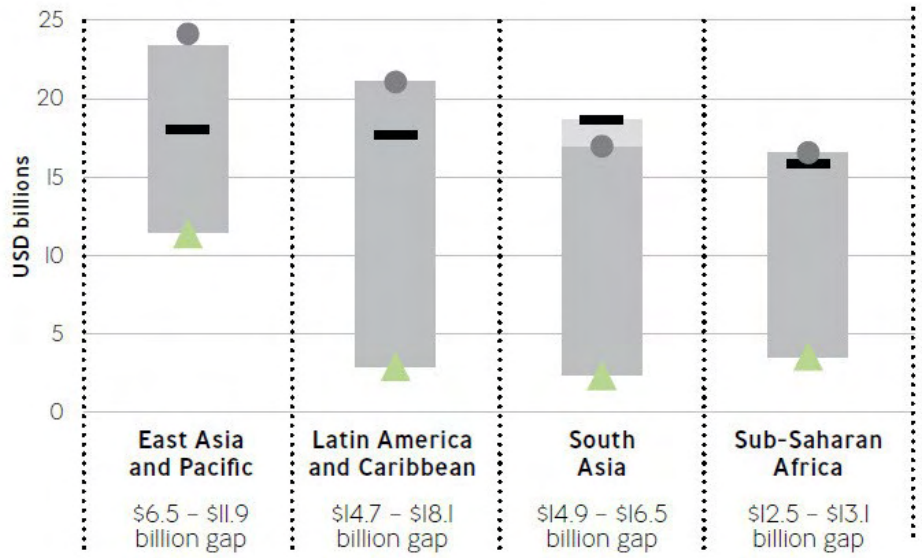


Figure 5. Adaptation Finance absolute shortfalls per region. Source: Vivid Economics, CIF, 2016

Note: 'Spending' means the amount of international public adaptation finance in 2014 that was directed to both public and private sectors, as defined in Buchner et al. (2015). 'Costs estimates' refer to the average annual cost of adaptation for each year from 2010-2050 for the seven sectors and 144 low- and middle-income countries, as estimated by the World Bank (2010). Estimates cover varying climate scenarios: dry global climate projections (cost estimate by CSIRO, year) and wet global climate projections (costs estimate by NACC, year).

3.2. WHY PUBLIC-PRIVATE COOPERATION FOR ADAPTATION?

As will be explained in the following sections, close public-private collaboration in the provision of adaptation projects and services is required, due to the public good or common resources economic nature of most adaptation projects and the need for a minimum geographic scale in the planning of effective interventions.

3.2.1. The private sector as strategic partners of public sector efforts

Especially in developing countries, private companies are seen as the actors best placed to implement adaptation measures and lead the climate-proofing of the assets they already own and/or operate (Biagini & Miller, 2013). First, there are significant gaps in public funding and financing for adaptation, and second, the private sector is clearly dominant in key industries that are in serious need of adaptation (e.g. the infrastructure and agriculture sectors), as well as in the industries that could provide adaptation goods and services (e.g. weather-related services).

The limited availability of domestic public finance, as well as the high debt levels of many developing countries, also places the private sector in a better position to finance future assets in the sectors which need to be made climate-resilient (CIF, 2016).

To conclude, although it cannot be expected that privately founded and financed initiatives will make up 100% of adaptation efforts at a system scale, the private sector is a critical partner in adaptation, and public-private cooperation will be crucial in closing existing financing and implementation gaps in adaptation

Concluding, although 100% of privately initiated and financed initiatives may not be expected in adaptation efforts at a system scale, the private sector is a critical partner in adaptation and Public-Private cooperation will be key for closing existing financing and implementation gaps in adaptation.

Table 2. Public and private sectors' strengths in the delivery of public services

Public sector strengths	Private sector strengths
Authorities are better able to: ▪ identify needs, align economic and infrastructure strategies, ▪ set up reliable commitments for infrastructure financing, ▪ impose and manage market externalities such as permitting and environmental protection, and ▪ provide a fair competitive environment for contractors participating in the sector.	Private infrastructure producers are considered best at: ▪ contributing efficient (technical) competencies, sharpened through their participation in competitive markets, ▪ providing independent checks of the technical and economic viability of projects, and ▪ providing alternative sources of financing for potentially self-sufficient projects.

The cooperation and partnerships to be developed need to consider the complementary strengths of these two sectors in the delivery of public services such as infrastructure networks (presented in Table 2) and in the sustainable management of natural resources, i.e., common pool resources. In addition to the strengths presented here, in general the private sector has a stronger intrinsic motivation than the private sector to ensure sustainability in service delivery, as its purpose is to stay in business and generate revenues. This intrinsic driver to generate profit is the key advantage of the private sector, and at the same time it is the key concern when delegating to private entities the management of public services.

Even though a conflict of interests may be expected between the public sector and the private sector, as is always the case in a principal-agent relationship, this should not stop the international community from endeavoring to increase private sector participation in adaptation. Solving this conflict of interest is at the heart of the theory and practice of **Public-Private Partnerships** (PPPs) and P**erformance-Based Contracts** (PBCs) for the delivery of public infrastructures (Sultana et al., 2013; Altamirano, 2010), where significant advances have been made in the past decades in developing and developed countries alike.

3.2.2. Public sector as orchestrator and enabler of private sector initiatives

While the previous section explains why the public sector needs the private sector, in this section we explain why the private sector needs the public sector to undertake action.

As was reported by the World Economic Forum (2016), the Climate Disclosure Project (2015) and C2es (2015), already in 2016 the global corporate community recognized

extreme weather and climate change as significant risks for future businesses. For example, in 2014, 91% of companies in the S&P Global 100 Index reported extreme weather and climate change impacts as current or future risks to their business (C2es, 2015).

New and positive developments took place in 2020. According to BlackRock's Global Client Sustainable Investing Survey (BlackRock, 2020), COVID-19 and its related health and economic challenges did not slow investor demand or the outlook for sustainable investing. On the contrary, they have accelerated a 'tectonic shift' that has pushed sustainability into the mainstream of investing. Private investors recognize the primacy of climate risks, 88% of the respondents placed climate-related risks at the top of their portfolio of concerns to date. The results of this survey indicate that a sustainable transition seems to be occurring all around the world and that we might just be witnessing the beginning of a sustained shift for at least the next five years, as survey respondents are planning to double their Environmental, Social and Governance (ESG) assets under management by 2025.

As defined by a representative of the insurance sector to the technical expert workshop on climate adaptation finance organized by the GCF (GCF, 2018), adaptation is no more and no less than "taking cost-effective measures following diligent risk assessment." In other words, adapting to climate change makes business sense. So why aren't more companies investing in adaptation? The answer might be, as reported by companies, that it is still difficult for them to assess the impacts and act independently.

Besides the issue of in-house technical capacity to estimate the risks and opportunities, the high transaction costs of engaging in large-scale and therefore collective adaptation action remain prohibitive for many companies.

As a result, when companies do engage in adaptation to mitigate their direct risks, they often use methods and design measures limited by the scale that is under their direct scope of influence. Without enough attention to preventing the displacement of impacts, and without support from authorities in calculating the system-level impacts of these private interventions, private sector measures may have limited-term effectiveness for themselves and may even increase the risks faced by others. Cases that exemplify this challenge of scale have been observed in many countries. For example, regarding flood risks, there are cases from banana growers in Central America to owners of coastal properties in Cape Town. In Costa Rica, banana growers aiming to protect their farms used to take actions that increased the risks of flooding in local communities. Only recently have the banana growers, through their industry corporation (CORBANA), created a common Flood Risk Fund (FEPI, Fondo Especial de Prevención de Inundaciones). This fund is used to match government Disaster Risk Management (DRM) funds and sets a firm first step towards the collective action of banana growers. This approach to the design and implementation of flood protection measures is more systemic and effective in the long term (RVO, 2016b).

Following this example, we can conclude by stating that while private investments in adaptation have the potential to create public benefits, the private sector is not accountable for them (UNEP, 2016). The public sector role as regulator and coordinator

of large-scale adaptation investments is more critical now than ever. Private sector companies willing to engage in adaptation need public sector support to overcome key barriers. The public sector is better positioned to create an enabling environment for effective private investments at a system scale (Stenek et al., 2013 and Fayolle et al., 2019).

Accordingly, public sector investments in adaptation should be directed toward increasing the accountability of private sector efforts in adaptation, creating the enabling conditions that incentivize the right kind of private sector investments and facilitating collective investments at the right scale. All in all, public sector efforts should be aimed at reducing transaction costs and improving the risk profile of collective adaptation investments.

Summarizing, in bridging the adaptation implementation gap, efforts need to go beyond monitoring investment flows. Special attention should be paid to the design and evaluation of investment programs, their transformational potential and their impact in creating an enabling environment for private sector participation in adaptation. The public sector role is crucial in creating the conditions and incentives for:

- Effective public-private collaboration in the delivery of large-scale climate adaptation projects (e.g. flood barriers) and services (e.g. climate services information systems and hydrometeorological services), for example through the use of public-private partnerships, concessions and other innovative contracts commonly used in infrastructure sectors; and
- Sustained collective action and effective cooperation between private sector and communities in Ecosystem-based Adaptation (EbA) measures and watershed conservation projects (e.g. wetlands restoration).

Either way, more efforts and funds need to be invested in the development of innovative programmatic public-private engagement models and approaches that focus in their planning, design and implementation on leveraging greater private sector participation, not only from financial intermediaries but also from private enterprises in the real economy. These programmatic approaches are needed to accelerate the creation of new markets for adaptation and environmental services. This can be achieved through a blended finance approach and the strategic timing of financial and institutional development mechanisms targeting both the public and private sectors simultaneously.

Only by effectively using the strengths of both the public and private sectors and exploiting their synergies can the effective delivery of adaptation interventions at the required scale be achieved. Effective private sector participation may also guarantee the long-term sustainability of their effectiveness in terms of risk reduction, resilience and the adaptive capacity of communities.

3.3. THE PRIVATE ADAPTATION FINANCE LANDSCAPE

Private sector adaptation finance and its net contribution to resilience are difficult to account for (UNEP, 2016). It includes a large variety of funding flows, and only some

of these can be estimated. Private sector actors invest in adaptation by making use of either internally generated resources or finance they can access from public or private bodies such as banks, equity providers and MDBs. As stated by a recent study of the Climate Investment Funds (CIF, 2016), the easiest flows to account for are those of international public adaptation finance directed to the private sector. The landscape created by these flows of funds is presented in Figure 8.

As depicted in Figure 6, according to Buchner et al. (2015) the total of international public adaptation finance flowing towards the private sector in 2014 was only 5.6% of all adaptation funds (USD 25 billion), accounting for approximately USD 1.4 billion. The largest providers of these funds were multilateral development finance institutions (DFIs), directing USD 0.6 billion to NGOs and other private sector parties. According to the CIF study (2016), within the DFIs MDBs are the most active providers. The remaining USD 0.8 billion was provided by bilateral climate-related development finance from governments and their aid agencies (USD 0.5 billion), National Development Finance Institutions (USD 0.3 billion) and bilateral DFIs (USD 15 million).

CPI's 2018 analysis did not record any private sector funding for adaptation projects. However, it does mention that there might be activity that it cannot track, and that this could indicate a high burden for the private sector to voluntarily report adaptation investments, particularly when adaptation activities are being financed in the same way as other activities within a larger overall investment project (CPI, 2018). In 2019 MDBs reported a total of USD 14,937 million in commitments for climate change adaptation finance, of which 93 percent was committed to low-income and middle-income countries and approximately 8% to the private sector. Approximately 5% of this total, equivalent to 847 USD million, supported private sector adaptation efforts, which is more than double the amount reported in 2016 (USD 342).

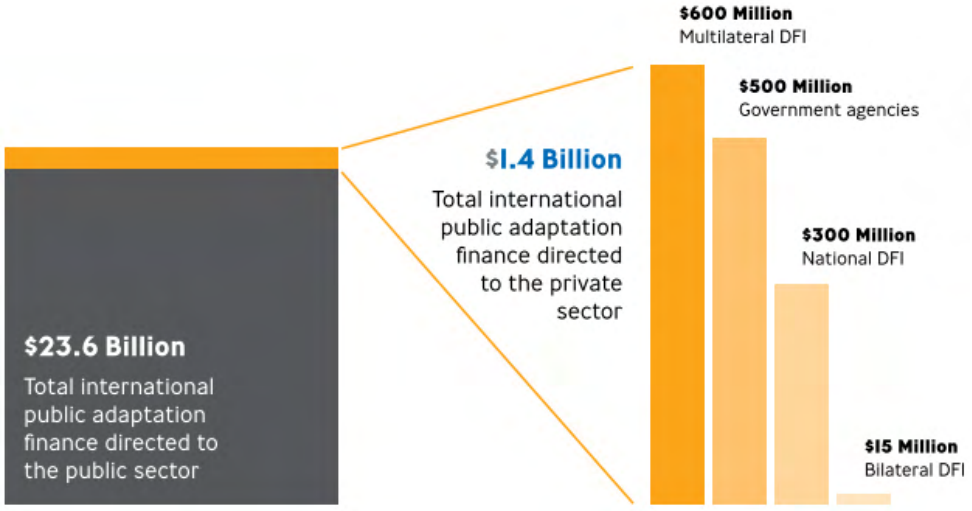


Figure 6. Global public adaptation finance directed towards the private sector in 2014 (Source: CIF, 2016)

As stated earlier, this is only one part of the funding going towards adaptation. As seen in Figure 7, international public finance directed towards the private sector is a limited share of all adaptation financing flows. This share is circled and titled as

'public co-financing.' Although nearly impossible to monitor and account for, there are many other financial flows that could be a significant source of adaptation investment, originating either in the domestic public domain (quadrant III) or the international (quadrant II) and domestic private domains (quadrant IV).

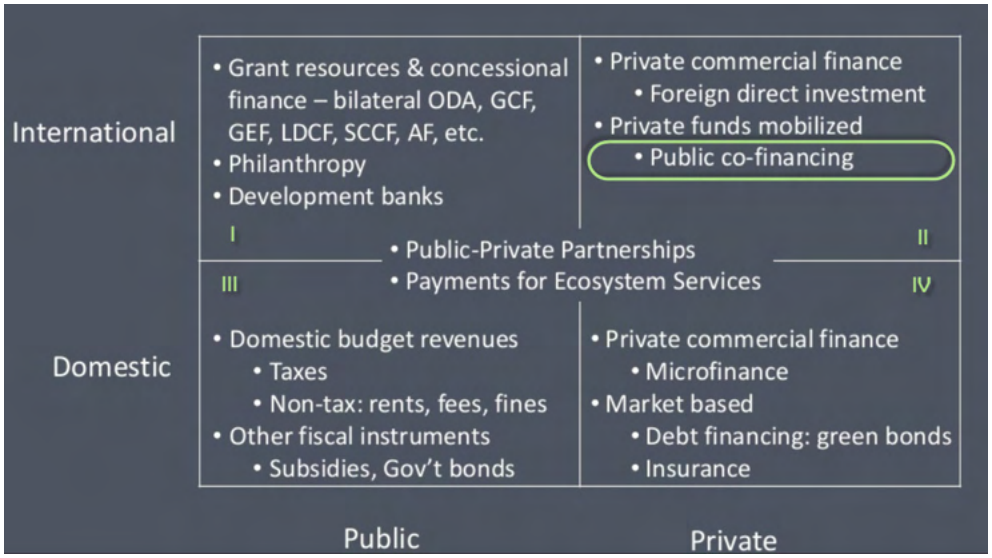


Figure 7. Sources of financing for adaptation (Source: Adapted from Introductory presentation by A. Hammil and H. Price-Kelly, 2016. Financing National Adaptation Plans (NAPs): Options for Implementation. Targeted Topics Forum Report 2. International Institute for Sustainable Development. Winnipeg, Canada)

A recent CPI study that presents the most recent overview of global adaptation investments confirms that data gaps in private and domestic public sector finance limit the ability to hold public and private actors accountable (CPI, 2020b, p.14).

Within this landscape, innovative implementation arrangements inspired by either infrastructure finance or environmental finance are being pioneered around the world. These hold great potential to enable and accelerate the share of private sector participation and investment in adaptation. They include innovative public procurement practices for public goods such as public-private partnerships (PPPs) and integrated Performance-Based Contracts (PBCs) in a more general sense, as well as environmental markets and other models driving environmental stewardship from private actors. They latter are often related to economics instruments and are widely referred to as Payment for Ecosystem Services (PES) – a term that comes from the field of common-pool resources management.

These two families of implementation arrangements – combining specific governance structures, funding and financing mechanisms – are complementary and allow for the blending of public and private as well as domestic and international sources of funding.

The handbook for the implementation of NbS for water security (Altamirano et al., 2021) presents four types of implementation arrangements for Nature-Based Solutions (NBS) for adaptation and water security. These are: (1) public procurement contracts,

(2) privately driven water stewardship investments, (3) collective investment vehicles, and (4) environmental and/or ecosystem markets. This handbook presents detailed guidelines for the design of fit for purpose implementation arrangements for large-scale Ecosystem-Based Adaptation measures as well as pioneering examples from around the world of these four types of implementation arrangements.

Additionally, financing mechanisms under rapid development at the domestic level are market-based mechanisms and debt instruments, such as green and climate bonds and parametric insurance schemes, as well as private commercial finance in the form of microfinance, presented in quadrant IV of Figure 7. An overview of these financing instruments is presented in Chapter 4.

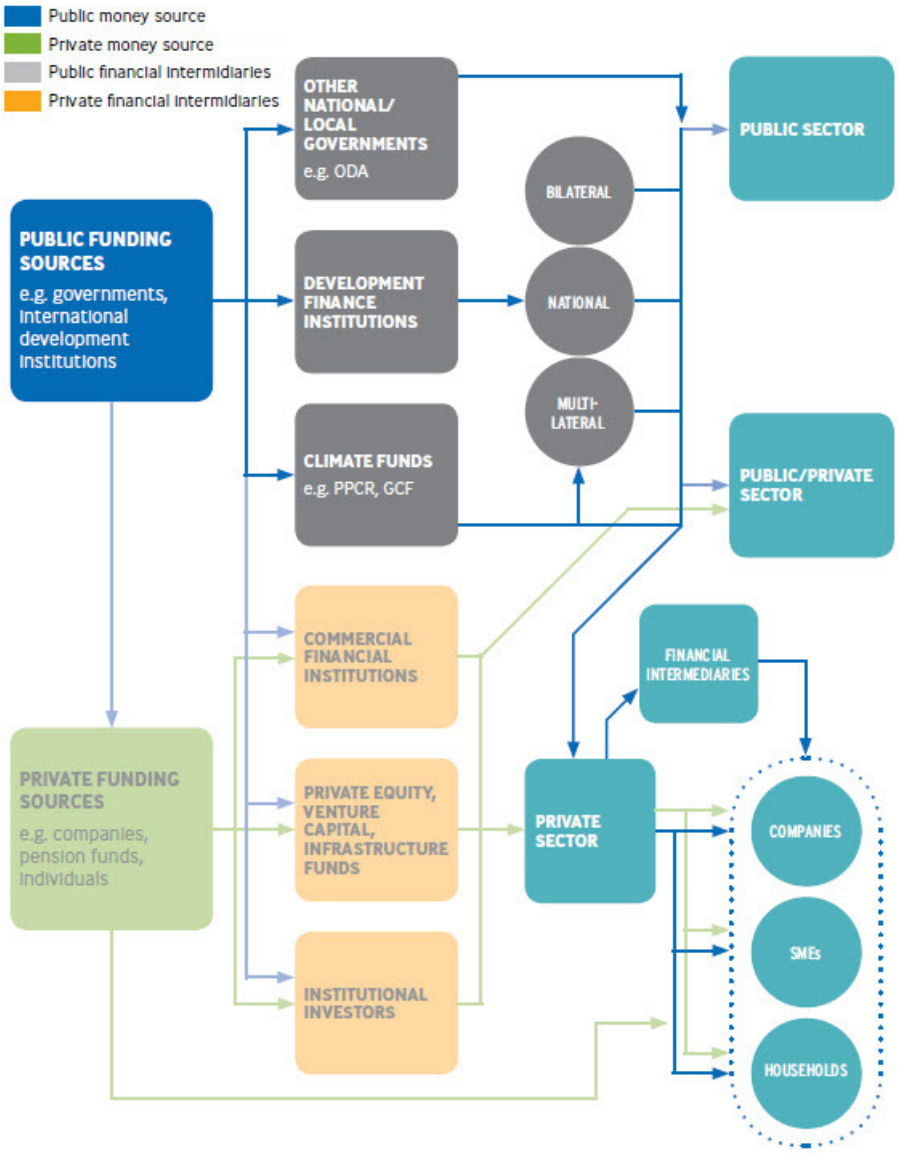


Figure 8. Landscape of international public adaptation finance directed to the private sector (Source: CIF, 2016, Figure I, adapted from Buchner et al., 2015)

In the following sections, private participation in adaptation in the context of MCFs will be reviewed. These include the Adaptation Fund (AF), the Pilot Program for Climate Resilience (PPCR, part of the CIF) and the Green Climate Fund (GCF). As explained earlier, most of the data collected and the most thorough analysis undertaken was for the GCF.

3.4. THE ADAPTATION FUND EXPERIENCE WITH PRIVATE SECTOR

The Adaptation Fund (AF) was established by the UNFCCC to finance concrete adaptation projects in developing countries that are particularly vulnerable to climate change. Initiatives are based on country needs, views and priorities. The Adaptation Fund was the first climate fund to implement a Direct Access modality, which gives developing countries the opportunity to build their adaptation capacity by receiving funding and designing projects directly through accredited National Implementing Entities (NIEs). The AF has since increased the number of its NIEs to 32 (as of January 2021, Adaptation Fund website, accessed January 2021). Its Direct Access model is being emulated by other climate funds, which allow its NIEs to attract additional needed funds.

Regarding the Adaptation Fund, Trujillo & Nahooda (2013) reported that mobilizing private investments has generally not been a particular focus of the fund. Accordingly, applicants are not required to demonstrate that they are mobilizing co-finance or private sector in-kind contributions. Nonetheless, several AF projects have been successful in engaging the private sector. In this respect programs which deal with flood risks in coastal areas that attract substantial tourism seem to be the hotspot for private sector engagement. Adaptation Fund programs in these cases have acknowledged and managed to actively engage the private sector in their implementation. Examples can be found in coastal management and flood risk reduction projects in Mauritius, Tanzania and Papua New Guinea (Adaptation Fund website, interview and email exchanges with AF officer, 2017).

To illustrate how private sector participation takes place, let's take the case of the 'Climate Change Adaptation Program in the Coastal Zone of Mauritius'. This program aims to demonstrate how new technologies for coastal restoration can be incorporated into the design of already planned private investments projects. The project is supporting the uptake of these technologies by the private sector by developing a handbook of improved engineering techniques for coastal restoration. The information makes it easier for companies to consider these techniques when detailing their risk mitigation plans.

This is an example of how international climate finance can contribute to removing important barriers to effective private sector investments in adaptation – in this case by providing state of the art expertise for the private sector to be able to assess the opportunities of alternative coastal restoration techniques and design effective measures that reduce the risk of private sector maladaptation.

Other examples are the DRR strategy development training being offered in Jamaica to private sector tourism and hospitality companies in the region of Negril under

the program 'Enhancing the Resilience of the Agricultural Sector and Coastal Areas to Protect Livelihoods and Improve Food Security' and the training of Regulatory Agency Services for Water and Sanitation (ERSAPs in Spanish) in Honduras under the program 'Ecosystem-Based Adaptation at Communities of the Central Forest Corridor in Tegucigalpa'. ERSAPs is a central governing body responsible for training service providers on ecosystem valuation and incorporation of climate risk considerations in water pricing regulation. The objective is to ensure that in the long term water prices become more cost-reflective, ultimately creating an incentive for the private sector to invest in adaptation efforts to increase resilience against droughts.

The AF's latest Medium-Term Strategy (MTS), approved in 2018, introduced new activities for readiness and capacity building under the readiness program, which includes country field exchanges and micro-grants for project scale-up (Adaptation Fund, 2019). Project scale-up grants seem to be a promising development for leveraging greater private sector participation and supporting countries in operationalizing a blended finance approach.

Project scale-up grants are available for national implementing entities up to a maximum of USD 200,000 per year (from July 2018 until 2023). Their objective is to provide readiness funding to support planning, assessment and capacity enhancement (individual, organization and institutional) for designing and scaling up pathways for AF projects and programs (whether under implementation, nearing completion or completed) that include other climate funds but also other finance channels, including the private sector.

The first proposal for a project scale-up grant was submitted by Senegal during the Fiscal Year 2019 (July 2018 through 30 June 2019). The scope of this grant for USD 99,837 was **to develop a scaling-up pathway for the AF-funded project 'Adaptation to Coastal Erosion in Vulnerable Areas', completed in November 2014. "The proponent intends to develop the scaling-up pathway by undertaking an assessment of the project's scalability, consulting public and private stakeholders and engaging them in capacity building activities"** (Adaptation Fund, 2019, p.21).

These grants, plus the additional objective of building complementarity and coherence with the other climate finance delivery channels they embody, is another promising development for developing countries in the context of an increasingly complex and fragmented global climate finance landscape.

By offering these grants and the technical cooperation and capacity development required to draft strategic investment pathways, the AF seems to be evolving into an expert broker. As in many cases, **activities related to scaling up innovations and other adaptation actions essentially take place in the context of various sources of funding. In some cases the AF offers the opportunity of replicating or scaling up activities by others with relatively fewer resources, while in others it offers its own experiences to other funds that may scale up activities piloted by the AF** (Adaptation Fund, 2019, p.20).

This synergetic way of working is already taking place with other climate funds, especially the GCF. In its 2019 Annual Performance Report, the AF presents a non-exhaus-

tive list of seven of its projects that are scaling up with GCF funding; three of these are presented in Table 3.

Table 3. Examples of Adaptation Fund projects being scaled up by GCF (Source: Adaptation Fund, 2019 Annual Performance Report).

Agency	Adaptation Fund Project	Scaling up by GCF
Maldives (UNDP)	'Support of Vulnerable Communities in Maldives to Manage Climate Change-Induced Water Shortages' AF funding amount: USD 9 million	FP007 'Support of Vulnerable Communities in Maldives to Manage Climate Change-Induced Water Shortages' GCF funding amount: USD 23.6 million
Colombia (UNDP)	'Reducing Risk and Vulnerability to Climate Change in the Region of La Depresion Momposina in Colombia' AF funding amount: USD 8.5 million	FP056 'Scaling Up Climate Resilient Water Management Practices for Vulnerable Communities in La Mojana' GCF funding amount: USD 38.5 million
India (NABARD/ UNDP)	'Conservation and Management of Coastal Resources as a Potential Adaptation Strategy for Sea Level Rise' (NABARD) 2015–2019 AF funding amount: USD 0.7 million	FP084: 'Enhancing climate resilience of India's coastal communities' (UNDP). The AF project was one of the four baseline projects for the scaled-up GCF investment. GCF funding amount: USD 43.4 million

3.5. THE PILOT PROGRAM FOR CLIMATE RESILIENCE EXPERIENCE WITH PRIVATE SECTOR

The Pilot Program for Climate Resilience (PPCR) is a funding window of the Strategic Climate Fund (SCF) within the Climate Investment Funds (CIF) framework. The PPCR is characterized by a two-phase programmatic approach: first, helping national governments integrate climate resilience into their development plans across sectors and stakeholders, which results in a Strategic Program for Climate Resilience (SPCR); and second, providing additional funding to implement the program and to pilot innovative solutions for climate-related risks with the public and the private sectors.

The PPCR was the first climate fund to pay particular attention to the issue of how to support private sector adaptation, having started already by 2012 with a special window set aside for the private sector. By 2016 six multilateral funds had a focus on adaptation – the Least Developed Countries Fund (LDCF), Adaptation Fund (AF), Adaptation for Smallholder Agricultural Program (ASAP)[1], the Special Climate Change Fund (SCCF), the GCF and the PPCR. Yet of all of them only the PPCR had approved funding for investments in the private sector. Therefore, is not surprising that the PPCR has played the leading role in engaging the private sector in adaptation (CIF, 2016). MDBs stated that by strategically applying to PPCR concessional finance

1 The Adaptation for Smallholder Agriculture Programme (ASAP) is IFAD's (International Fund for Agricultural Development) flagship programme for channeling climate and environmental finance to smallholder farmers. The fund has received USD 300 million in contributions from 10 donors. The ASAP fund allows IFAD country programs to design projects from a climate-informed perspective and leverage resources for technical assistance. (IFAD website accessed January 2021)

and technical advisory services, they could enhance the support they offered to their private sector clients regarding adaptation.

The two mechanisms by which the PPCR engages with the private sector are:

- Endorsed SPCRs that specify project(s) that need to be undertaken by the private sector; and
- The PPCR Private Sector Set Aside (PSSA), a competitive mechanism established in November 2012 that can grant financing to either private sector adaptation projects or to public sector projects that are specifically targeted at enabling private sector adaptation.

These private sectors set-asides (i.e., funds reserved for allocation to the private sector) were developed to counterbalance the share of public sector projects in PPCR and other CIF funding windows. Private sector parties are eligible for the set-asides when their investments comply with the objectives of a country's SPCR. Investment activities need to provide quantifiable results and preferably incorporate innovative business models, technologies and/or financing mechanisms.

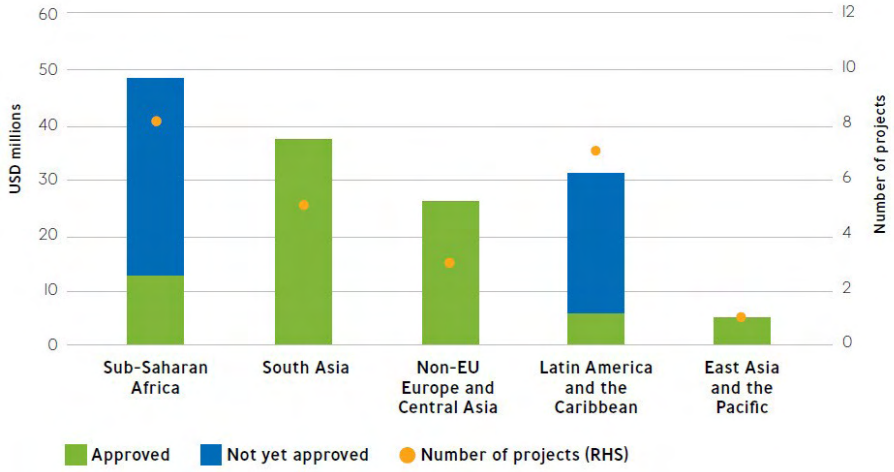


Figure 9. PPCR private sector proposals per region (Source: Vivid Economics, CIF, 2016, Figure 15, page 32)

By 2016 the PPCR had 23 private sector-focused projects in its pipeline, of which 11 (7 under the SPCRs and 4 under PSSA) had already received final MDB approval to implement and which totaled USD 51.3 million. As shown in Figure 9, the region with the most private sector proposals submitted to PPCR is Sub-Saharan Africa, followed by Latin America and the Caribbean and then by South Asia. However, in terms of projects approved, South Asia has received the most PPCR funding, with USD 36.9 million approved for 5 projects.

The number of projects not yet approved by 2016 (7 in LAC and 5 in Sub-Saharan Africa), as well as estimates provided by MDBs to the CIF (CIF, 2016) about the future pipeline of private adaptation opportunities, show that there is an important pipeline of projects in need of funding. MDBs reported having a pipeline of 38 projects with private sector adaptation components located in eligible CIF countries. Of these projects, 21 provided project finance details, indicating a total estimated need of USD 1.1

billion in MDB financing and an additional USD 500 million in PPCR financing. Projects types mentioned by MDBs include the climate-proofing of hydropower plants, investments in climate-resilient buildings, and water efficiency and agribusiness.

In response to these needs, by 2017 the GCF had also set up a dedicated facility to promote private sector investments, called the Private Sector Facility (PSF). As presented in further detail in the next section, GCF's first adaptation project in the agriculture sector to be requested by the private sector was approved in March 2018.

The pioneering position of the PPCR in engaging with the private sector is still reflected in its having the highest share of funds among all CIF and GCF funds allocated to the public versus the private sector. By January 2021 the portfolio dashboard of the CIF reflected a 57:43 public/private allocation ratio, and that of the GCF was 62:38. More specifically, in terms of private finance for adaptation projects, in its current portfolio, the GCF reports 2 projects totalling USD 84 million and supporting 11 countries (4 countries in Africa and 7 in Central America, GCF website, accessed January, 2021). The CIF reported USD 35.6 million allocated to PSSA as of June 30, 2018 (CIF, 2019), supporting 6 projects in Latin American and the Caribbean (LAC), Africa and Central Asia.

According to a 2016 study that analyzed private sector investments in climate adaptation in developing countries (CIF, 2016), important ingredients for the success of the PPCR approach to engaging the private sector are:

- The combination of PPCR's public sector support with a dedicated private sector window, which helps to make use of public-private synergies;
- The role of MDBs as implementing agencies, as the private sector already has experience with them;
- A flexible approval model;
- Multiple funding channels that allow for experimentation;
- The offering of a platform that allows for partnership across MDBs; and
- Its experience in financing at scale.

Two of these pioneering programs are the CLIMADAPT program in Tajikistan and the Zambia Strategic Pilot Program for Climate Resilience (SPCR).

CLIMADAPT is a climate resilience facility pioneered with funding from EBRD and PPCR it offers loans to private businesses, farmers and households via local Financial Institutions (FIs.) The program facilitates and accelerates the adoption of technologies and practices that reduce soil erosion and pressure on water and energy resources. More details on this project can be found in Chapter 4.

The Zambia SPCR was approved in 2011. Upon this approval, the Government of the Republic of Zambia, with its Ministry of Finance as the executing agency, received USD 2 million as a Project Preparation Grant (PPG). The PPG served as the transitional link between Phase I and Phase II of the program, allowing for both phases to overlap and assisting the government of Zambia with preparing a consistent document for the three investment projects of Phase II, presented in Table 4. Zambia's

final proposal was endorsed in 2011 by the PPCR Sub-Committee for a total of USD 86 million, USD 50 million in grants and USD 35 million in other concessionary resources (CIF, 2011).

Phase 1 of the SPCR ('PPCR Phase I') included a feasibility study on the engagement of the private sector in enhancing climate resilience in the agriculture sector and the natural capital of priority sub-basins. It looked at the Kafue and Barotse sub-basins of the Zambezi River, areas which are inhabited by vulnerable communities and are prone to floods and droughts. Along with climate-proofing and capacity development, a main objective of this first PPCR project in Zambia right from its beginnings was private sector engagement. The consequent investment projects that have resulted from this programmatic effort (see Table 4) make up the Zambia Strengthening Climate Resilience Program (PPCR Phase II).

This PPCR program in Zambia is a pioneering and illustrative example of a blended finance approach that makes strategic use of public and concessional funds to gradually build capacity and awareness in both the public and private sectors, creating the enabling environment to increase private sector participation through the adoption of public-private partnerships and the uptake of innovative business models (e.g. parametric insurances and micro-insurance products) that increase the long-term financially sustainability of climate adaptation investments. Accordingly, the program proposed several activities that created strong synergies between public and private sector efforts along the entire length of the program, summarized in Table 4. The theory of change behind the public-private engagement philosophy applied in this program can be best summarized as follows:

"To effectively contribute to and engage in programs related to building climate resilience, both public and private sector actors need to be part of climate resilience. The project aims to ensure that both the public and private sector have the knowledge, capacity and financial incentives necessary to embark on appropriate and timely climate resilience building interventions. The eventual outcome will lead to sustaining the country's economic and social prosperity. Zambia has a robust private sector (including finance and insurance companies, ICT companies and companies involved in the agri-business and industrial sectors within Zambia) that is poised to help underpin and implement a private sector led approach to climate resilience projects in line with the Zambia SPCR." (Excerpt from Project Note, World Bank, 2017a, p.7).

Below is a brief recount of the main events and results that have characterized this PPCR programmatic approach in Zambia. The three projects of Phase II are described.

Project 1, the parent project, 'Strengthening Climate Resilience in Zambia and the Barotse Sub-Basin' (PPCR Phase II, P127254) was approved on February 27, 2013, and included a PPCR investment plan of USD 36 million (USD 31 million in grants and a concessional loan of USD 5 million). The project started on September 12, 2013 with an envisioned duration of 6 years. It was initially piloted in 14 districts of the Barotse sub-basin. The project effectively supported national and decentralized institutional strengthening for decision making on climate risk investment planning and implementation of community, ward and district level sub-grant funded micro-projects.

From the lens of private sector participation in adaptation, **Project 3, Private Sector Support to Climate Resilience**, implemented by IFC, is particularly interesting. Building on a private sector approach, it is linked to one of the original SPCR goals: to explore the private sector strengths and tested the assumption that private sector development is a key contributor to a country's economic growth and stability. **Project 2** aims at strengthening climate resilience Kafue sub-basin of the Zambezi basin through two mutually reinforcing components: participatory adaptation and climate resilient infrastructure.

Project 3 aims to develop innovative approaches to better integrate smallholder farmers with the private sector. It provides a platform for the development of robust and resilient value chains and for the sustainable growth of smallholder agricultural economy that minimizes dependence on external assistance. The USD 14.6 million to be invested is intended to enable leapfrogging by bringing ongoing investment to the next level. It catalyzes the private sector through incentive payments and small grants, and by providing climate information to promote resilience in the private sector and its associated market-based mechanisms. Following extensive stakeholder consultations at the national and regional levels, Zambia decided to proceed with private sector investment using a public-private partnership (PPP) approach.

Table 4. Example of PPCR programmatic approach in Zambia, public and private sector driven investment projects within the PPCR Phase II project (Source: authors with information from CIF 2011 and 2019)

Project	Administered by	Objective and main components
Project 1: Strengthening Climate Resilience in Zambia and Barotse Sub-Basin (Parent project PPCR Phase II, P127254)	IBRD (WBG) USD 36 million, 31 million grant and 5 million loan Duration: 6 years, 2013-2019	Provides strategic support to Zambia's Climate Change Program to develop an investment plan while implementing participatory adaptation and climate-resilient infrastructure in the Barotse sub-basin of the Zambezi basin. It has two major components and four sub-components, with these specific objectives: (i) to strengthen the institutional structure, strategic planning, coordination and awareness for climate resilience in Zambia; and (ii) to strengthen the adaptive capacity of vulnerable rural communities. A. Strategic Support to Zambia's Climate Change Program (USD 13 million grant) B. Participatory Adaptation (USD 10 million grant) C. Climate Resilient Infrastructure (USD 11 million, of which USD 6 million grant and USD 5 million concessionary credit, with the grant amount dedicated to community organization and policy support)
Project 2: Strengthening Climate Resilience in the Kafue River sub-basin	AfDB USD 38 million, 20.5 million grant and 17.5 million loan	Strengthens climate resilience Kafue sub-basin of the Zambezi basin through two mutually reinforcing components: participatory adaptation (USD 19.5 million grant) and climate resilient infrastructure (USD 17.5 concessionary credit). Specific objectives are: i) to strengthen the adaptive capacity of vulnerable rural communities; and ii) to respond to climate change and variability in priority areas of the Kafue River Basin.

Project	Administered by	Objective and main components
Project 3: Private Sector Support to Climate Resilience	IFC (WBG) Approved amount: USD 14.6 million (April 2018), 1.1 million grant and 13.5 million loan Duration: 3 years, ending in 2022.	Focuses on priority private sector support to the two sub-basins, in the areas of micro-finance, weather-indexed insurance and information (ICT) support. Specific objectives are: (i) to improve the capacity of the private sector to use risk modeling to assess climate change risk within all the SPCR projects and sub-basins; ii) to increase the resilience of the agricultural private sector to climate change via weather index-based insurance products; (iii) to incentivize the private sector to invest in climate resilience building through the development of new financial mechanisms; and (iv) to identify and initiate private sector investments in alignment with the three SPCR platforms.

As mentioned previously, and in line with the program theory of change, the SPCR program involves several activities that have created strong synergies between the public (Projects 1 and 2) and the private sector-led (Project 3) efforts throughout the program, as summarized in Table 5.

Table 5. Public-Private synergies in the Zambia PPCR Programme

Project activity	Public-Private synergies
Strengthening the capacity of the private sector to build climate resilience in agribusiness, establish access to market and value chain, in water resource and natural capital use/ management.	This activity is linked to the parent project (Project 1) activities: (A) Strategic Support to Zambia's Climate Change Program (a USD 13 million grant) and (B) Participatory Adaptation (a USD 10 million grant) and enriches them by: including a private sector-led institutional framework approach and increasing awareness on available private sector driven climate resilience support. All in all, it contributes to the effective mainstreaming of climate resilience by providing targeted, technical assistance in private sector climate resilience to the most vulnerable economic sectors.
Providing incentive payments and small grants to support livelihood diversification, e.g. farming, fisheries, etc.	Contributions to the parent project: Providing grants to farmers, making it possible for farmers to effectively participate in the process of shaping adaptation investments in a participatory way (Activity B of the parent project). Exploring practicable means of delivering finance to smallholder farmers to adopt climate-resilient cropping systems and practices.
Developing a platform to facilitate the dissemination of market, and climate information to farmers.	This activity strengthens the parent project (Project 1) in two ways: First, it helps to create an enabling environment for private investments by creating access to market linkages and enabling cooperation between commercial farmers, private firms and smallholder producers, through small grants in the form of processing equipment or technical cooperation. Second, it contributes to developing institutional capacity for implementing and supporting public-private sector partnerships that build climate resilience in the smallholder agriculture sector, by (a) providing a platform to catalyze private sector engagement for sustained benefits at scale, and (b) supporting project preparation to enable the delivery through public-private partnerships of selected climate services (i.e., private sector designed and managed information as well as technology packages for smallholder farmers) identified as suitable for use by PPPs.

Summarizing, under the PPCR program Zambia is requesting USD 50 million in grant and USD 60 million in concessional financing to help fund its transformation to a more climate resilient economy. These funds are expected to leverage USD 317 million in government and partners financing and by inserting the SPCR firmly within its National Climate Change Program, the project main principles and building blocks would be sustained and upscaled, ensuring long-term impact (Kaluba, 2015).

All in all, more than 40 different institutions and partners are involved. The program focuses heavily on innovation and transformation approaches generating lessons learned of great value to other developing countries.

A graphical representation of six key characteristics and success factors for the PPCR approach to private sector engagement are shown in Figure 10. An evaluation and evidence synthesis of transformational change in the CIF was published in January 2019. An excerpt with the main findings is presented in Text Box 1.

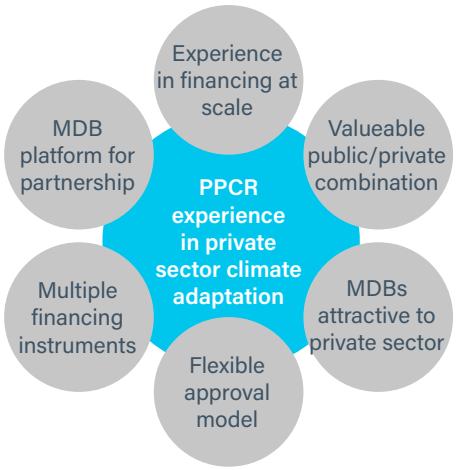


Figure 10. PPCR's private sector engagement approach

Textbox 1. Main findings of the evaluation of CIF programmatic approach. Source: CIF 2019

Evaluation of the CIF Programmatic Approach – and PPCR results

The evaluation of the CIF programmatic approach (CIF, 2019) assessed the outcomes of the programmatic approach as it was applied in various CIF programs. The report concluded that the programmatic business model has significant advantages over a project-by-project approach and generally yields investment plans that link to national priorities and address transformational change concepts of relevance, systemic change, scale and sustainability.

The evaluation of the PPCR found that the programmatic approach supported the establishment of a common multi-sectoral vision for climate resilience that is consistent with national development priorities in pilot countries. Also, with the predictability of available finance from planning to investment, the approach led to some first mover and coordinated projects that reflected programmatic objectives, taking both horizontal and vertical approaches to mainstreaming climate resilience. Resources provided by the PPCR to the SPCR planning phase supported institutional readiness and policy change in some countries, including the integration of climate resilience objectives into national development and sector plans.

3.6. THE GREEN CLIMATE FUND EXPERIENCE WITH THE PRIVATE SECTOR

The GCF has a dedicated facility for promoting private sector investments, called the Private Sector Facility (PSF). The PSF finances private sector projects relating to mitigation and adaptation activities at all levels. It makes use of flexible financial instruments, including debt, equity and guarantees, structured on a concessional basis. The facility promotes private sector investments in climate adaptation and mitigation by:

- De-risking investments, including foreign exchange and investor default;
- Bundling small projects into portfolios, providing scale and making them attractive to institutional investors;
- Supporting capacity building among different groups and local institutions;
- Helping develop public-private partnerships for infrastructure resilience projects; and
- Encouraging innovation, for example by overcoming scale problems and fragmentation within the supply chain.

By July 2020 the GCF had approved 128 projects/programs requesting USD 5.3 billion in GCF funding, more than doubling its portfolio since November 2017 (which then totaled 54 projects and USD 2.7 billion in GCF funding). In terms of regions, Africa has received the largest portion with 40.3%, followed by Asia-Pacific with 36.5%, LAC with 18.5% and Eastern Europe with only 4.5%. Twenty-five percent of this funding has gone to cross-regional programs.

In terms of portfolio composition by instrument, of this USD 5.3 billion, 50% has been assigned in the form of grants, 40% as loans, 4% as equity and only 2% in the form of guarantees. By September 2020 the approximately USD 2.2 billion dollars disbursed by the GCF for private sector projects had leveraged an additional USD 7.5 billion in co-financing and had generated an estimated impact of 1.1 BtCO2eq in mitigation impacts and 45.8 million beneficiaries in terms of adaptation.

There is a great variety of entities accredited to the GCF. Nevertheless, the vast majority (approximately 85%) of GCF funding has been channeled through international access as opposed to direct access entities. Of the 85% channeled through international access entities, 55% has been channeled through MDBs and 45% through UN agencies. The 15% channeled through direct access has been distributed in nearly equal parts between national Accredited Entities (AEs) and regional AEs. This distribution may change as countries' National Designated Authorities (NDAs) are strengthened and more countries count with national direct access entities, an objective the GCF Country Programming Department has as part of its readiness support program.

3.6.1. Public-Private financing and synergies

The GCF's public sector projects are managed by its Department of Mitigation and

Adaptation (DMA); its private sector projects are run by its Private Sector Facility (PSF). As observed in the distribution (grants versus loans) of the portfolio managed by these departments, DMA manages mainly grants, while PSF manages loans and equity.

In our research and analysis of the GCF portfolio, we found that none of the projects approved involve the combination of both departments and funding windows, where concessional funding is used to support both the public and private sides of the equation at the same time. As explained by the GCF secretariat, in the first years of the fund there has been a focus on developing the guidelines for public versus private projects and the financing instruments that best fits them. The rationale of how to assign the right combination of grant, loans and equity and how to incentivize and allocate funding to projects initiated by the private sector or as part of a public-private initiative is under development.

This split in entities taking care of public versus private sector-initiated projects mirrors the setup in most MDBs, including the Asian Development Bank, the Interamerican Development Bank and the World Bank. Within the World Bank Group, the International Bank for Reconstruction and Development (IBRD) and the International Development Association (IDA) work in coordination with the International Finance Corporation (IFC) and the Multilateral Investment Guarantee Agency (MIGA) to leverage greater impact. The former two attend to the needs of the public sector, while the latter two focus on those of the private sector. Within the GCF this coordination is ensured per project through the process of interdivisional review, where for all PSF projects there is at least one technical reviewer from DMA and vice versa.

The need for a public-private approach to climate investments as well as a private sector methodology for climate resilience and adaptation has been identified. This was a focus of the GCF secretariat and UNFCCC at large in 2018 and will be for the years to come. As will be explained later, this development is urgently needed to achieve the adaptation goals set by COP22 and the envisioned paradigm shift.

An important obstacle to the development of public-private financing proposals, as well as to getting National Designated Authorities (NDAs) to appoint private sector entities as direct access entities, is the expectation by countries that in the future a cap per country may be implemented. They believe that the funding requested by private entities may then negatively affect their access to grants and other instruments required by the public sector. Clear guidelines and reassurance on how the funding per country and of grants versus loans will be accounted for may help to reduce this barrier.

3.6.2. Private sector participation in the GCF portfolio

The Private Sector Facility's portfolio of projects includes 9 cross-cutting (mitigation and adaptation) projects and only two privately initiated projects that aim purely at adaptation. The two private sector adaptation projects are 'Funding Proposal (FP) 078: Acumen Resilient Adaptation Fund (ARAF)', initiated by Acumen Fund, a US-based impact investment fund; and 'FP097: Productive Investment for Adaptation to Climate Change (CAMBio II)', initiated by the Central American Bank for Economic Integration.

The review of the PSF's portfolio of projects and the Accredited Entities (AEs) it works with points out that as of November 2020 private sector participation in the GCF was predominantly in mitigation projects. Additionally, it can be observed that private finance was primarily requested by financial intermediaries and that the private sector entities accredited were mainly financial institutions. Based on the list of private projects approved by the board by mid-2020, the composition of AEs that had submitted projects through the PSF were 15 MDBs, 2 regional banks, 1 local bank and 1 impact investor. Most of the mitigation proposals with private sector participation were renewable energy projects.

As of November 2017, the private sector project with the most significant adaptation component was 'FP026: Sustainable Landscapes in Eastern Madagascar', nonetheless classified as a cross-cutting project. The GCF Secretariat actively works with partners to incentivize the private sector to develop new finance products that will enable farmers in developing countries to address climate change. These efforts have resulted in two new private sector 100% adaptation projects having been approved since 2018. During board meeting number 19 (B.19) in March 2018, the first agriculture adaptation project requested by the private sector, ARAF, was approved. The full title of this project, as mentioned above, is 'FP078: Acumen Resilient Agriculture Fund.' As it can be seen in Text Box 2, the project involves affordable credit and insurance that lower the costs of production and provide downside protection against climate-related shocks, as well as climate-resilient inputs which are made available to farmers.

Later in the year, during B.21 (October 2018), the project 'FP097: CAMBio II' was approved. FP097 goes beyond increasing the resilience of individual farmers by actively promoting Ecosystem-based Adaptation (EbA) measures that will increase the systemic resilience of agricultural value chains in Central America. As can be seen in Text Box 3, the project is unique in developing risk-sharing arrangements and microfinance services that will allow micro, small and medium-sized farmers to invest in new adaptation practices and technologies that contribute to ecosystem sustainability, while improving their income and resilience towards climate change. Both projects are under implementation and have a long-time span; ARAF will continue until 2031 and CAMbio II until 2024.

Textbox 2. Project FP078, Acumen Resilient Agriculture Fund (ARAF)

Project FP078, Acumen Resilient Agriculture Fund (ARAF)

GCF funding: The project requested USD 26 million from the GCF, 23 million in equity and only 3 million in the form of grants. The project has a total value of USD 56 million, and the remaining 53.6% of co-financing is provided in the form of equity by Acumen Fund (2 M) and other investors (25 M), as well as USD 3 million in grants provided by the capital providers to co-finance the activities to be undertaken by the Technical Assistance Facility.

Project objective: The Acumen Resilient Agriculture Fund (ARAF) will improve climate resilience to ensure long-term sustainable increases in agriculture productivity and incomes for smallholder farmers. It will shift the pattern of investment in climate change adaptation activities in Africa from grants to a long-term capital approach, enabling smallholder farmers to respond to climate change more efficiently and effectively. It will support innovative private social entrepreneurs in micro, small and medium-sized enterprises (MSMEs) by providing aggregator and digital platforms and innovative financial services to smallholder farmers. The project has a lifespan of 12 years.

Adaptation impact: Acumen reports that based on their past experience of investing in companies that offer fairer prices, and support greater and higher-value farm outputs, they anticipate that approximately 10 million farmers will become more resilient and:

+ Improve their farm productivity

+ Increase their net farm incomes

+ Improve their overall wellbeing and quality of life.

Additionally, the project will develop climate adaptation impact measurement tools, which will serve other investors and drive them to include climate adaptation considerations within their investment criteria.

Planned Adaptation Measures: ARAF intends to identify and support market-based solutions that provide smallholders access to one or more of the following:

- Climate resilient inputs for resilient productivity;
- Affordable credit and insurance to lower cost of production and provide downside protection against climate related shocks;
- Climate extension (training and capacity building) to enhance yields and improve resilience in the face of weather shocks;
- Formal off-take markets for better prices.

Mitigation impact: not applicable.

Full project documentation can be found here: https://www.greenclimate.fund/-/acumen-resilient-agriculture-fund-araf-

Textbox 3. Project FP097, Productive Investment Initiative for Adaptation to Climate Change

Productive Investment Initiative for Adaptation to Climate Change (CAMBio II)

Risk Sharing Facility (Component 1) Project Size: 28 Million Loan: 25 Million (12.5 from GCF and 12.5 from CABEI) Grant: 3 Million	**Financial** a) Reduced the level of risk of MSMEs b) Access to credit for adaptation activities

Project objective: The Programme will help MSMEs to adopt good quality adaptation projects as well as credit behavior. The financial instruments proposed in the Programme will help reduce the obstacles to investment in adaptation actions in a sector that has currently insufficient access to credit, and a significant lack of knowledge on the impacts on climate change as well as the potential solutions for increasing resilience of the productive systems. In addition, the programme aims to create an environment that enables catalyzes resilient investments in micro-small and medium-sized enterprises.

Adaptation Impact: The Programme is expected to benefit about 5,000 MSMEs, that is to say, 69,720 beneficiaries, distributed between 17,430 direct beneficiaries and 52,290 indirect beneficiaries that will benefit from the adoption of diversified, climate resilient livelihood options. By the adoption of ecosystem-based adaptation measures, the Programme is expected to reach 63,776 hectares of agricultural land made more resilient; and 60,478 hectares of strengthened ecosystems in response to climate variability and change.

Planned Adaptation Measures: The adaptation technologies and practices proposed in this Programme are adapted to the reality of MSMEs, constructed from local knowledge, strengthening production systems in the long term, catalyzing new business and job creation.

Programme components	Expected outcomes / Barriers for private sector investments	Amount
1. Innovative financial mechanisms	Financial: a) Reduce: cost of capital for smallholders b) Reduce: risk to invest by intermediary financial institutions (IFIs) in MSMEs and adaptation activities	Risk Sharing Facility: USD 12.5 million Senior Loan by GCF USD 12.5 million in investments by CABEI
2. Capacity Building for the Development of Production Models	**Technical**: capacity development for project development and during implementation – contributing to: Vulnerability awareness of MSMEs Effectiveness of the (technological) options being considered by MSMEs and IFIs Reward (perceived and real) of IFI's and risk and reward of MSMEs	USD 1.84 million grant by GCF
3. Incentive scheme to promote adaptation measures to be implemented by MSMEs (AdaptAward)	**Financial** Cost of capital (based on performance up to 20% of the loan could be refunded) **Institutional/ Adapt awards contribute to:** Institutional environment–creation of incentives for investments of MSMEs as well as for the provision of credit for adaptation activities to small holders by CMNFI's & for performance	USD 0.73 million grant by GCF

This Programme will contribute to scale up and replicate an innovative financial model that has never been used before for adaptation to climate change purposes where MSMEs will manage credit, build capacity and adopt replicable adaptation technologies and practices. At the same time, IFI's will implement a financial product that responds adequately to MSMEs' needs and to reduce their perception of MSMEs as a high risk. This Programme will contribute to scale up and replicate an innovative financial model that has never been used before for adaptation to climate change purposes where MSMEs will manage credit, build capacity and adopt replicable adaptation technologies and practices. At the same time, IFI's will implement a financial product that responds adequately to MSMEs' needs and to reduce their perception of MSMEs as a high risk.

Reduced risks associated with climate events in production activities:

▪ Small-scale water harvesting, drainage and efficient irrigation systems ▪ Rainwater catchment in small-scale cisterns connected with agricultural production ▪ Promotion of local seed banks and varieties resilient to droughts, pests, and diseases ▪ Greenhouses ▪ Diversification of production units and staggered planting of crops with the purpose of mitigating the risk associated with prices, climate seasonality and risk of losses ▪ High-density planting ▪ Establishing agro-forestry systems, and agro-silvopastoral (pastures and fodder) systems▪ Crop rotation ▪ Soil conservation (zero tillage, coverage) ▪ Preparation and use of organic fertilizers ▪ Integrated pest management ▪ Production and processing certification ▪ Shade houses for a protected agricultural production ▪ Storage structures (silos, warehouses, stockpiling centers) ▪ Protection against hurricanes, floods, sea level rise.

Reduced the pressure on the ecosystems and conservation of natural resources:

▪ Sustainable forestry management and design of forest management plans. ▪ Use of firewood-saving stoves. ▪ Firebreaks. ▪ Reforestation with native species. ▪ Conversion of land use through species for medicinal and edible use (fruit trees and others). ▪ Use of forest by-products. ▪ Certification for forest plantations and natural woodlands, among others.

Improving social and economic resilience of the populations:

▪ Family and community vegetable gardens. ▪ Ecotourism and sustainable tourism ▪ Beekeeping ▪ Fish farming.

In total, accounting for USD 0.14 million dollars for project management, 15.5 million were requested by CABEI, USD 12.5 million dollars as Senior Loan and USD 3 million dollars in the form of grants.

Program components and subcomponents:

1. Innovative financial mechanisms for Ecosystem based Adaptation measures. Loans provided under this component will entirely go towards the implementation of the possible adaptation measures - based on International Development Finance Club Common Principles on Adaptation Finance Tracking - listed in the following table (non-exhaustive):

Support to MSMEs	Support for IFIs
For project development: Assessments that can be provided under this activity are: adaptation projects' final designs, environmental assessments/ analysis, financial assessments and accompaniment to the final design of Business Plan to obtain credit. **During Implementation, training on:** Adaptation technologies, organizational capacities (e.g. to prioritize climate actions), gender issues and climate change and financial services.	**For project selection:** Training in gender issues, design of financial products ad-hoc to attend adaptation to climate change related investments, analysis of investment criteria to identify adaptation measures, identification and eligibility of investments and monitoring and Evaluation of investments. **During implementation:** Adaptation to Climate Change and environmental and social risk assessment

2. Capacity Building for the Development of Production Models Resilient to Climate Change. The specific objectives of this Component are (i) To ensure that and MSMEs are aware of climate change threats and projected impacts (ii) To ensure that IFIs and MSMEs are aware of the best available options to face these threats (iii) To make an optimal identification of projects (iv) To ensure that IFIs have the capacity to implement adaptation projects (v) To ensure that the MSMEs plan and implement their projects so to have real adaptation results. (vi) To promote visibility and learning throughout the project.

Subcomponent 2.1 Generation of local capacity on adaptation to climate change and project identification both for IFIs and MSMEs.

Subcomponent 2.2 Technical Assistance for IFIs and MSMEs to support implementation of projects, from their design phase to their implementation and monitoring phase.

Subcomponent 2.3 Advocacy and knowledge Management.

3. Incentive schemes to promote adaptation measures to be implemented by MSMEs (AdaptAward). MSMEs and CMNFIs (Cooperative, Micro-Finance and Non-Bank institutions) will receive incentive for adopting a scheme that promotes adaptation measures to be implemented by MSMEs (1,340 projects will be granted Adapt-awards). This incentive is to be awarded only after the adaptation measures have been successfully implemented and monitored.

On the one hand, this incentive would motivate the IFI to reduce the level of risk of MSMEs and to promote credit mechanisms focused on adaptation to climate change. On the other hand, this incentive acts as a boost towards increased spread for the IFI. Adapt-awards constitute grants for their recipients and creates incentives for investments of MSMEs as well as for the provision of credit for adaptation activities to small holders by CMNFI's.

	Percentage of the credit granted		
	MSMEs	CMNFI	Total
Women-led	15%	5%	20%
Men-led	8%	4%	12%

Program Management

A Program Management Unit (PMU) will be established with the monitoring and evaluation activities (covered by CABEI as the Accredited Entity) to ensure that all expected results will be achieved on time and within budget.

Paradigm shift potential: This program will contribute to scaling up and replicating an innovative financial model that has never been used before for purposes of adaptation to climate change. The proposed intermediary scheme is a novelty in adaptation to climate change strategies. The success of this initiative can be adopted by other regional or multilateral agencies so that they, too, can effectively enable adaptation solutions by reducing barriers to financing from rural MSMEs, whose productive activities are among the region's most vulnerable to climate change.

Mitigation Impact: Not applicable.

Full project documentation can be found here: https://www.greenclimate.fund/project/fp097

3.6.3. Request for Proposals: Mobilizing Funds at Scale

In 2017 the GCF Board allocated up to USD 500 million for the Mobilizing Funds at Scale Pilot Program to identify innovative, high-impact projects and programs that mobilize private sector investment in climate change projects and/or services.

The Request for Proposals (RfP) effectively drew the attention of the private sector towards climate investments. With 350 submissions in total, the RfP was oversubscribed by a factor of 36, with bids totaling more than USD 43 billion for the 258 concept notes that passed the preliminary review. The investment amount requested from GCF in those 258 notes was USD 18 billion. Following a rigorous review according to the criteria set out in the RfP, 30 proposals were short-listed.

Based on interviews with the PSF, the RfP was successful in terms of generating a broad range of proposals and innovative concepts for scaling up private sector financing for climate action. Three hundred fifty proposals were received, and more than 90% were submitted by private sector entities. Of these private sector entities, only 20% were already private sector Accredited Entities. These results may translate into a higher number of private sector entities being accredited in the future.

The proposals included some very innovative concepts, and nearly one-third aimed at adaptation, which is a promising sign of increasing interest in adaptation from the private sector.

Two recently approved projects originating in this pipeline are: a) FP115: Espejo de Tarapacá, approved at B.23 in July 2019, and b) FP128: Arbaro Fund- Sustainable Forestry Fund, approved at B.25 in March 2020.

FP115: Espejo de Tarapacá in Chile is a cross-cutting project, with MUFG Bank as the Accredited Entity and the Ministry of Finance of Chile as the NDA. GCF financing is only 5.5% of the USD 1.1 billion total, in the form of a USD 60 million equity investment. It comprises two commercially integrated power plants: (1) a 300 MW pumped storage hydroelectric plant using the Pacific Ocean as its lower reservoir, and (2) a 561 MW photovoltaic solar plant. With these investments, the project will set a precedent by providing a renewable base-load solution at a competitive price. The project will also contribute to climate change adaptation by providing a stable water supply from its desalinization plant to vulnerable local communities. The GCF's USD 60 million anchor equity investment will help to attract additional private sector debt and equity investors, which will fund the remaining investment of USD 1.1 billion. The project is estimated to result in the avoidance of 35 million metric tons of emissions, with 550 people in vulnerable local communities directly benefiting from water security and economic diversification, and Chile's population of 17.6 million inhabitants indirectly benefiting from increased resilience of the energy system against climate variability.

FP128: Arbaro Fund- Sustainable Forestry Fund is an adapted version of the original Arbaro Fund proposal submitted in 2017, this time with MUFG Bank as the AE, where GCF financing is but 12.5% of the total project sum of USD 200 million, in the

form of USD 25 million in equity investment. MUFG Bank is Japan's largest bank and one of the world's largest, with offices throughout Japan and in 40 other countries. The program will provide direct mitigation benefits (20 million metric tons of emissions avoided) through investing in sustainable plantation forestry projects in the emerging forestry markets of Latin America (Peru, Ecuador and Paraguay) and Sub-Saharan Africa (Ethiopia, Ghana, Sierra Leone and Uganda). It will also bring adaptation co-benefits, thanks to watershed conservation investments and land use changes. It will achieve these results by providing developing countries and their rural communities with the solution of increasing carbon sinks by sustainably producing wood and conserving natural forests, while contributing to the reduction of illegal logging.

Although it is classified as a mitigation project, in terms of adaptation benefits (not claimed by the proponents) creating sustainable forest plantations will result in the conservation of any existing natural forests or areas with otherwise high conservation value, such as wetlands, which are part of the overall project area. On average this will mean that 20% of the overall project area is conserved, with the responsibility of maintaining the integrity of these areas being placed on the project entity. Conservation of forest and wetland ecosystems has significant climate adaptation effects, as these ecosystems act as buffers against extreme climatic events and are expected to significantly reduce systemic risk levels for climate and water risks such as floods and droughts. Within the project the plantation area and the conserved natural areas together increase the resilience of the overall landscape against climate change impacts.

3.6.4. GCF experience in engaging with the private sector

Summarizing, the review of the GCF portfolio up to B.22 in July 2020 revealed a clear divide in the composition of PSF and DMA portfolios, as public sector-driven projects require a very different type of financial support than projects driven by the private sector. All adaptation projects managed by the GCF Department of Mitigation and Adaptation (DMA) are initiated by the public sector. Often these are NDAs supported by UN organizations and/or MDBs and envision a direct finance strategy from public funds complemented with GCF Funds. Accordingly, all of these project initiators, except for 2 that requested senior loans, have requested grants from the GCF. However, DMA mitigation projects often request loans instead of grants, yet they still consider their implementation and financing to hold only a limited role for the private sector.

In contrast, the project portfolio managed by PSF is characterized by privately driven mitigation and/or cross-cutting initiatives that request a limited share of grants, focusing mainly on senior loans, equity and guarantees, and whose private initiators are primarily financing institutions. These projects often aim to lower the cost of capital[2] and risk levels for companies and individuals to invest in energy efficiency mea-

2 Cost of capital is the required return necessary to make a capital budgeting project, such as building a new factory, worthwhile. When analysts and investors discuss the cost of capital, they typically mean the weighted average of a firm's cost of debt and cost of equity blended together. The cost of capital metric is used by companies internally to judge whether a capital project is worth the expenditure of resources, and by investors who use it to determine whether an investment is worth the risk compared to the return. The cost of capital depends on the mode of financing used. It refers to the cost of equity if the business is financed solely through equity, or to the cost of debt if it is financed solely through debt.

sures and/or the deployment of renewable energy. Only two of the privately initiated projects are adaptation projects: ARAF and CAmbio II, both aimed at the agricultural sector.

Also interesting to note, as shown in Table 6, is that all senior loans and reimbursable grants in the DMA's public sector portfolio are requested by MDBs, and that with the exception of 2 senior loans requested by IFAD, all four Results-Based Payments are mitigation projects proposed by UN agencies – UNDP, UNEP and FAO.

Table 6. GCF Portfolio as of July 2020 up to B.22 (* All Senior Loans are requested by MDBS (WB, ADB, IDB, AfDB and BOAD), except two through IFAD)

Theme	Instrument	GCF Funding (USD)	Number of Projects	Public Sector	Private Sector
Adaptation (59 projects, ,2 PSF, 57 DMA)	Equity	23.000.000	1	0	1
	Grants	1.405.390.607	59	57	2
	Senior Loans	41.414.800	3	2* (EBRD & IFAD)	1 (CABEI)
Cross-cutting (34 projects, 9 PSF,25 DMA)	Equity	91.000.000	3	0	3
	Grants	797.731.821	32	24	8
	Guarantees	1.500.000	1	0	1
	Senior Loans	981.722.349	12	8*	4
	Subordinated Loans	63.400.000	2	0	2
Mitigation (35 projects, 15 PSF, 20 DMA)	Equity	103.400.000	2	0	2
	Grants	246.293.208	24	16	8
	Guarantees	78.181.818	2	2	0
	Reimbursable Grants	206.000.000	3	2 (WB and IDB)	1 (FMO)
	Results-Based Payment	228.631.546	4	4 (UN agencies)	0
	Senior Loans	949.033.544	19	8*	11
	Subordinated Loans	100.000.000	1	0	1

Of the GCF funding committed by July 2020, 27.6% of the funding has gone to 59 adaptation projects, 36% to 35 mitigation projects and 36.4% to 34 cross-cutting projects. This represents an increase of 7% in the number of cross-cutting projects as compared to the portfolio composition in November 2017. Of the 57 adaptation projects requested by the public sector, only two have requested a loan, and all of them have requested grants.

The first adaptation project initiated by the public sector that requested a significant share in the form of a loan was the project 'FP054: Implementation Project of the Integral Plan of the Lujan River Basin in Argentina', approved in B.18 (October 2020) and which lapsed as of June 2019 and is therefore not reflected Table 6. This project was developed by CAF, the Development Bank of Latin America. The entire project involved an investment of USD 315.3 million, of which USD 57 million was requested to GCF in the form of a senior loan and USD 1.6 M as a grant. The co-financing came from a CAF loan to the government of Argentina (USD 165 M) and a grant from the Province of Buenos Aires (USD 91.9 M).

The following two adaptation projects within the current GCF portfolio have requested senior loans: a) 'FP040 Tajikistan: Scaling Up Hydro-power Sector Climate Resilience', implemented by EBRD and approved at B.16 (April 2017) before FP054 and b) 'FP101 Resilient Rural Belize (Be-Resilient)', implemented by IFAD and approved at B.19 (February 2019) after FP054. They have requested a higher share of grants – 54% and 24%, respectively – than the FP054 project in Argentina, with only 2% of the requested amount being grants.

This increase in projects that request financing at least partially in the form of a loan (instead of only a grant) may signal a slow process of adoption of the concept of incremental costs due to climate change.

No joint projects or initiatives financed by both DMA and PSF in the same country or region were identified, neither in adaptation nor in mitigation. No projects or programs which combined public and private finance were identified, nor any in which efforts from readiness activities or grants for public sector investments in adaptation and/or mitigation were synchronized or aligned with privately driven investments.

A more synergetic public-private cooperation strategy might enable the GCF to go beyond the climate proofing of public (infrastructure) assets or private business activities towards the climate proofing of entire value chains and infrastructure networks. Guiding National Designated Authorities (NDAs) and Accredited Entities (AEs) in the development of National Adaptation Plans, and in this way shifting towards higher potential adaptation projects in close collaboration with the private sector, was a priority of the Fund in 2018.

However as reported more recently by a private sector observer to the GCF, B.28 taking place March 2021 raises reasons for concern about the share of private sector proposals and most importantly the governance of the fund which ultimately may affect private sector engagement with the fund in the future. As stated by Splawn (2021):

"Only one of the 15 funding proposals at B.28 was from the private sector. That's just 11% and represents an ever-reducing share of private sector focused projects and equity, or "skin in the game" of climate finance in developing countries.

The board seemed to be moving in the right direction at B.24 when it approved streamlined, 4-year workplan designed to implement an efficient policy cycle based on learning, evaluation and improved policies... closing the policy gaps highlighted in the workplan would help increase the impact and efficiency of funding for developing countries, including by attracting more private sector engagement locally.

The Results Management Framework (RMF) and Performance Measurement Framework (PMF) were cobbled together before the GCF actually got projects off the ground and is no longer fit for purpose. Any private sector fund manager would have been promptly sacked for refusing to update critical internal systems for seven years. Yet, the board negligently, again, refused at B.28 to approve a new Integrated Results Management Framework (IRMF). Such policies are critical for private sector buy-in, would streamline the fund's work, create greater efficiency, and attract private sector interest at scale."

Moestuintjes, Tienrendji, Niger, Author V. van Zeijst

3.7. A SYSTEMIC VIEW ON DRIVERS AND BARRIERS FOR PRIVATE SECTOR ENGAGEMENT IN ADAPTATION

According to previous studies (IFC, 2013; CIF, 2016) and our review of the project pipelines of the AF, PPCR and the GCF there seems to be increasing interest from the private sector in investing in adaptation. Nevertheless, the investments materializing even with the support of climate funds are not yet up to the levels required to achieve the agreed upon climate goals. Therefore, a more in depth and systemic analysis of the drivers and barriers for private sector participation in climate adaptation is required. The design and implementation of an effective private sector engagement strategy and a blended finance strategy that prevents unintended side effects like crowding out private sector investments, requires in-depth understanding of the mechanisms that drive or prevent investments in adaptation within specific contexts and sectors.

This section is a first attempt to address this. The main barriers and drivers for private sector participation, as well as the potential role of the private sector in bringing about a paradigm shift in developing countries, are all presented in Figure 11 by a Causal Loop Diagram (CLD). Text Box 5 explains the meaning of a CLD and the way in which it is read. The following paragraph briefly reviews the findings of previous studies.

As mentioned earlier, adaptation to climate change makes business sense. Private sector reasons to invest in adaptation are twofold: to mitigate direct and indirect risks and/or to exploit business opportunities. Based on the work of Fayolle et al. (2019), an overview of these risks and/or opportunities that drive enterprises in the real economy to invest in adaptation is presented in Text Box 4. Financiers can also experience the effects of climate change, but in an indirect way. However, their impact can be equally significant. For example, commercial banks can experience the domino effect of climate change impacts on their borrowers' revenues, costs and property values, through changes in the probability of default and Loan-to-Value (LTV) ratios (Acclimatise, 2018). For this reason, there is a growing trend for financing institutions to perform stress testing of their portfolios for important systemic risks such a as droughts and floods.

Textbox 4. Drivers for private sector to invest in climate change adaptation (Source: adapted from Fayole et al. 2019, p. 6)

Direct and indirect risks of climate change

- Physical risks
- Reduced operational performance
- Disruption of supply chain
- Contractual risks
- Changing market demand
- Reduced financial performance
- Reputational risks
- Regulatory and legal risks
- Environmental, Social and Governance (ESG) risks

Business opportunities

- Development of new products and services
- New markets or market expansion for products and services
- Securing supply chains
- Improved financial performance
- Improved reputation and brand value

Nevertheless, companies in developing countries face significant barriers to making such investments. Factors that play a role are:

- Limited awareness of the risks and opportunities, constrained by the availability of technical expertise, information and capacity available to the company (Trabacchi & Mazza, 2015).
- Adaptation investments are often cost-saving and have a limited revenue-generating potential, given existing regulatory frameworks. This makes these investments less attractive than revenue-generating ones (UNEP, 2016).
- Benefits manifest in the long term, while the private sector works with very high discount rates – higher in developing countries, where access to capital is limited (CIF, 2016).
- Funding constraints and high up-front additional costs, for example, to consider climate risks may add 25% to the average costs of the Environmental Impact Analysis (Trabachi & Mazza, 2015).
- Generic investment barriers of a regulatory, political and institutional nature (CIF, 2016).
- As stated in UNEP (2016), these barriers are often the result of three mechanisms:
- Positive externalities – A great share of benefits generated by an adaptation investment are of a societal nature and do not generate directly additional financial returns or cash-flows to the party that makes the investment;
- Imperfect capital markets – This is especially the case in developing countries, where most loans and financial products offered have a term too short to fit the longer term required to pay back adaptation investments; and
- Incomplete information – Information is missing about the expected impacts of climate change in the required level of granularity and/or the specific sector.

The barriers and drivers and their relative weights vary for mitigation versus adaptation efforts and even per sector or type of adaptation investment. For example, large flood protection infrastructure projects (e.g. seawalls) are very capital-intensive, the required investments have high asset specificity, the benefits are delayed and dispersed, and the benefits are non-guaranteed and often non-financial. Accordingly, they have limited autonomous earning power, a poor cash flow profile and a high-risk profile.

Summarizing, three generic barriers desincentivizing private sector investments are: risks (real and perceived), transaction costs (which, especially for adaptation mea-

sures, are nearly prohibitive, as there are no market or governance structures yet in place that remove the coordination burden from the private sector), and misalignment in time horizons (CIF, 2016).

The International Financial Corporation (IFC) conducted a comprehensive analysis of the necessary conditions of private sector investments in adaptation, resulting in an Index Assessment Framework (Stenek et al., 2013) to evaluate the enabling environment for private sector adaptation. A literature review, complemented with IFC's field observations of private sector needs and motivations and consultations with six companies, informed the definition of sixteen indicators and measures.

Table 7. IFC Index Assessment Framework to evaluate the Enabling Environment for Private Sector Adaptation (Source: Stenek et al., 2013, page 5)

(1) Data and information	**(4) Economic incentives**
1. Climate and hydrological projections	11. Government incentives
2. Direct and indirect impacts	12. Finance
3. Adaptation measures, costs and benefits	13. Full-cost accounting for water and energy
4. Community vulnerability, risk, adaptation	14. Environmental trading markets
(2) Institutional arrangements	**(5) Communication, technology, knowledge**
5. Institutions and forums	15. Information and communication technologies
(3) Policies	16. Technology and knowledge
6. Building standards and/or codes	
7. Public infrastructure	
8. Local zoning rules	
9. Permitting and impact assessments	
10. Investor relations and/or stakeholder management	

IFC concluded that five areas need to be considered in an integrated manner to successfully enhance private sector adaptation, namely: 1) data and information, 2) institutional arrangements, 3) policies, 4) economic incentives and 5) communication, technology and knowledge. Table 7 presents the main elements under each of these five areas. This framework could be applied by national governments as well as by climate funds to assess current gaps and define priority investments and capacity development activities.

Textbox 5. How to read a Causal Loop Diagram (CLD) (Source: Wikipedia, accessed February 2021)

Causal Loop Diagram

A causal loop diagram (CLD) is a causal diagram that aids in visualizing how different variables in a system are interrelated. The diagram consists of a set of nodes and edges. Nodes represent the variables and edges, or arrows are the links that represent a connection or a relation between the two variables. The direction of the arrow indicates the direction of the causality. A link marked positive indicates a positive relation and a link marked negative indicates a negative relation. A positive causal link means the two nodes change in the same direction, i.e. if the node in which the link decreases, the other node also decreases. Similarly, if the node in which the link starts increases, the other node increases as well. A negative causal link means the two nodes change in opposite directions, i.e. if the node in which the link increases, the other node decreases and vice versa.

Closed cycles in the diagram are very important features of the CLDs and are called feedback loops. They could be either reinforcing or balancing feedback loops. A reinforcing loop is a cycle in which the effect of a variation in any variable propagates through the loop and returns to the variable reinforcing the initial deviation i.e. if a variable increase in a reinforcing loop the effect through the cycle will return an increase to the same variable and vice versa. A balancing loop is a cycle in which the effect of a variation in any variable propagates through the loop and returns to the variable a deviation opposite to the initial one i.e. if a variable increases in a balancing loop the effect through the cycle will return a decrease to the same variable and vice versa. If a variable varies in a reinforcing loop the effect of the change reinforces the initial variation. The effect of the variation will then create another reinforcing effect. Without breaking the loop, the system will be caught in a vicious cycle of circular chain reactions. For this reason, closed loops are critical features in the CLDs.

A private sector actor could contribute to closing the implementation gap of adaptation projects, either as an investor by directly investing in its own adaptation funds (private sector investments in adaptation), or as a service provider and/or provider of expertise by actively participating in the delivery of climate projects and services (private sector participation in service delivery), both shown in light green in Figure 11.

As service provider, the private sector can play a significant role in increasing the impact of adaptation investments by ensuring sustainability in service delivery and by reducing life cycle costs (LCC) of adaptation projects through efficiency gains they can deliver thanks to economies of scale and/or scope. The probability that these benefits will materialize depends on whether the contracts used to outsource these services are well designed, granting the private sector enough design freedom to enable optimization in the delivery and create strong incentives for performance.

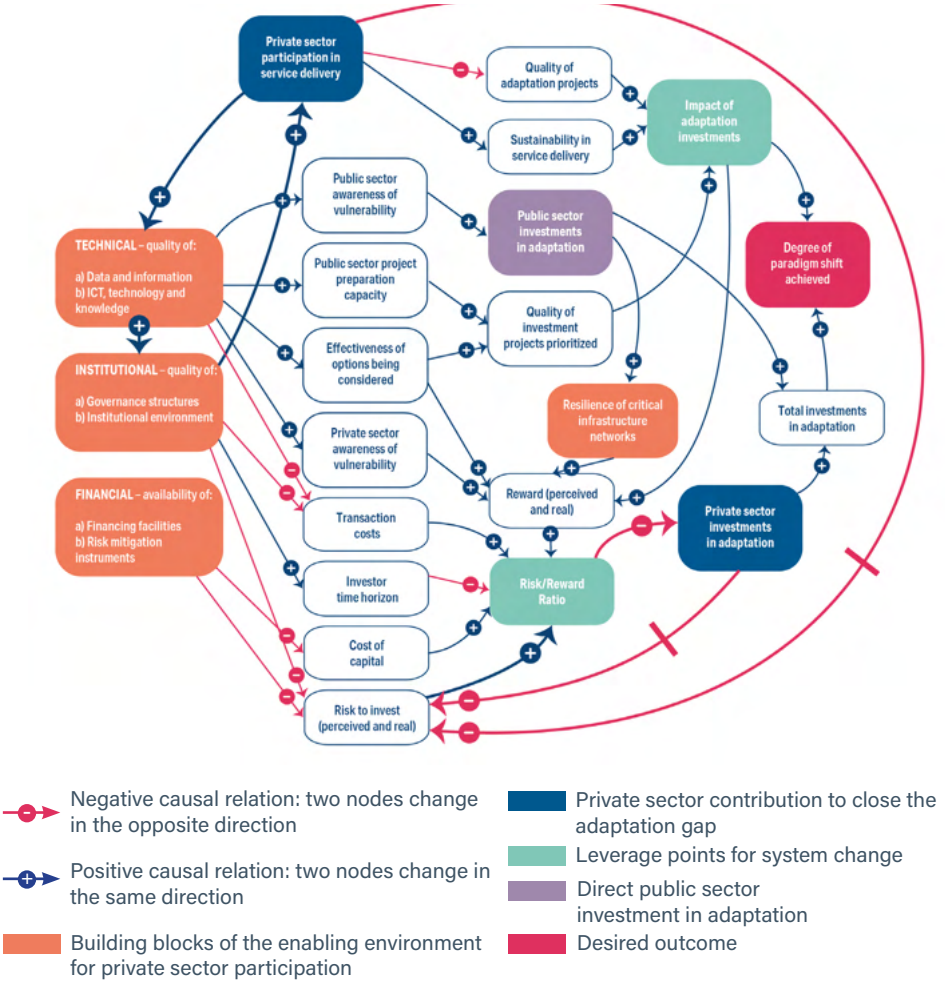


Figure 11. Enabling environment for effective private sector participation in adaptation

A key variable driving private sector interest in adaptation projects is the **Risk/Reward Ratio**[3] of adaptation projects (shown in light yellow in Figure 11). When making investment decisions the private sector considers all the following factors:

- **Transaction costs**, defined as all costs involved in making the investment possible, including data collection and coordination efforts;
- **Investor time horizon**: the longer the time horizon applied by the investor, the more favorable the ratio, as the investment will have a much longer period to pay itself back;
- **Cost of capital**, which for investments in developing countries can be very high and significantly influence project costs;
- **Reward** (perceived and real): the rewards of an adaptation investment, real or perceived, depend to a great degree on the **private sector awareness of vulnerability** (risks to own business continuity), **the effectiveness of options being considered**, as well as the impact of adaptation investments made by the public sector in the past.

3 The risk/reward ratio is used to assess the profit potential (reward) of a deal relative to its potential loss (risk). The risk/reward ratio is the relationship between these two numbers: the risk divided by the reward. If the ratio is great than 1.0, the potential risk is greater than the potential reward on the deal or transaction. If the ratio is less than 1.0, the potential profit is greater than the potential loss.

- Given the systemic nature of climate risks, the reward the private sector perceives for investing in adaptation and resilience also largely depends on the level of **resilience of the critical infrastructure networks**. In assessing the benefits regarding their own business continuity, private actors will factor in the highest level of resilience they can achieve, given the weakest link in the complete value chain.
- **Risk of investment (perceived and real)**, defined to a great degree by the quality of the institutional environment, the quality of governance structures, contracts and/or investment vehicles possible in a particular country, and the availability or lack of effective risk mitigation instruments and financing conditions. Another important factor informing the assessment of investment risk is how much private adaptation investment is already taking place in a given country or region and whether risks have materialized or not in the past (private sector investments in adaptation).

All in all, as depicted in the CLD, the key components of an enabling environment for effective private sector participation and/or investment in adaptation are of a **technical, institutional and financial nature.** These three elements need to be in place to improve the **Risk/Reward Ratio** of adaptation projects as perceived by the private sector, increase **private sector participation in service delivery**, and increase investment volumes and the overall **impact of adaptation investments**, both public and private. The three elements are shown in light grey in Figure 11, and their impact on creating an enabling environment and on closing the implementation gap of adaptation at a system level is presented in Table 8.

As explained earlier, in addition to these three key building blocks, the current condition of critical infrastructure networks (**resilience of critical infrastructure networks**) is also a determining factor in whether private sector investments in adaptation are incentivized or desincentivized.

Table 8. Technical, Institutional and Financial building blocks of an enabling environment for private sector investments in adaptation

Enabling environment component	Explanation of causal mechanisms
TECHNICAL quality of (a) Data and Information (b) ICT, technology and knowledge	An increase in the quality of data and information (e.g. free and easy to access hydrometeorological information or information about the costs and benefits of climate change adaptation actions that are sector-specific), as well as in communication, technology and knowledge (e.g. effective climate change adaptation technologies, Early Warning Systems and effective knowledge transfer and sharing of best practices initiatives) allow for climate risks to be properly identified, managed and mitigated by both public and private sectors. Consequently, it is expected to result in an increase in: (1) **Public sector awareness of vulnerability** (key sectors in the economy) (2) **Public sector project preparation capacity,** capacity to prepare and structure investable adaptation propositions (3) **Effectiveness of options being considered** (4) **Private sector awareness of vulnerability** (risks to own business continuity)

Enabling environment component	Explanation of causal mechanisms
INSTITUTIONAL quality of (a) Governance structures (b) Institutional environment	A favorable institutional environment (e.g. polices and economic incentives in place that enable good governance of water and common pool resources and/or incentivize the adoption of higher resilience standards), strong institutions that guarantee enforcement of formal rules and well-designed governance structures (e.g. public procurement contracts, or environmental markets) are expected to: (1) Enable greater **private sector participation in service delivery**; (2) Increase **public sector capacity to prepare investable adaptation proposition** (i.e., higher quality investment projects); (3) Reduce **transaction costs**; (4) Attract investors with a **longer-term horizon**; (5) Reduce **investment risk (perceived and real)**; and (6) Allow for collective investments in adaptation and the sustainable management of common pool resources (e.g. environmental trading markets).
FINANCIAL availability of (a) Financing facilities, and (b) Risk mitigation instruments	This financial building block relates to the strength of local capital markets and how financing facilities – set up with the support of MCFs, bilateral donors or own domestic resources and with a variety of risk mitigation instruments – could improve local financing conditions and reduce the Risk/Reward Ratio of adaptation investments by reducing: (1) **Cost of capital** and the availability of facilities improve access to finance (2) **Risk to invest (perceived and real)** as the financing conditions and/or variety of risk mitigation instruments offered by these facilities make it less risky for private actors (local or international) to invest in adaptation and new related technologies and/or market segments.

As depicted in Figure 11, there are important synergies between the technical, institutional and financial elements of the enabling environment that need to be taken into account by strategies for leveraging greater private sector investments in adaptation. Three important mechanisms that are important to consider are presented in the CLD with bolder arrows. The first two are reinforcing cycles. Whether these cycles are virtuous or vicious depends on the starting conditions of the system (e.g. initial levels of private sector participation and investments) and the effective change in these parameters achieved through different interventions.

First, higher quality institutional environment and governance structures (e.g. public procurement strategies) are expected to result in greater private sector participation in service delivery. At the same time, more active participation by the private sector in the delivery of services (e.g. as providers of hydrometeorological information or a wide variety of climate services, or as operators of critical infrastructure networks) is expected to result in improvements in the technical elements of the enabling environment (e.g. quality of climate services available, data for adaptation planning and monitoring systems). These will enable existing institutions to do a better job (e.g. enforcing existing regulation regarding groundwater withdrawals) and support the implementation of novel governance structures (e.g. environmental markets) and contracts (e.g. Performance-based Contracts and/or PPPs for the procurement of public adaptation services). This, in turn, is expected to drive a further increase in private sector participation in adaptation.

Second, the lower the investment risk (perceived and real), the higher the Reward-to-Risk ratio and the higher the expected private sector investments in adaptation. As the number of successful private sector experiences with adaptation investments in a country grows, the perceived risk is expected to diminish over time, driving additional private sector investments in adaptation.

Finally, while most efforts seem to focus on directly increasing private sector investments in adaptation, often a more effective strategy to increase private sector interest and familiarity with (innovative) adaptation technologies and services is to simply start involving the private sector more actively in service delivery. In the medium to long term this will increase private sector investments in these sectors. Private sector participation in service delivery can be catalyzed through innovative public procurement strategies (e.g. pre-commercial procurement, alliance delivery models, Performance-based Contracts and others). By participating as service providers, private sector companies can gain familiarity with innovative technologies, gain a first-hand understanding of the costs and benefits of different adaptation measures, and learn how to manage and mitigate different risks with relatively low-risk exposure. Their overall sense of control of these new technologies and/or services will increase after they have actively participated in their delivery. Over time, this leads to three important direct and indirect benefits:

- The investment risk initially perceived by these companies is expected to significantly decrease, so that in the future they might be willing to take more risks and become project developers of adaptation projects and directly invest;
- They can assess the rewards more directly, which might drive these companies to invest in similar technologies/services for their own use; and
- The more trustworthy private sector suppliers of adaptation services and technologies there are, the lower the investment risk (perceived and real) will become for third parties (e.g. investors or financiers). They will then be willing to invest in adaptation projects, as a crucial factor for financers of large infrastructure projects in determining the risk profile of a project is the track record of the implementing party or consortium.

The specific initial conditions of a country and/or region will help define which efforts to prioritize and how to time and complement efforts in each of these three pillars in the long term. It is important to have an understanding of these interdependencies and to identify the most effective leverage points in a given context and/or adaptation market segment when prioritizing and/or deciding on the share of efforts and funding to be invested in the development of a more favorable institutional environment (e.g. the development of building standards and the strengthening of institutions to enforce these), the introduction of new governance structures (e.g. financing the development of river basin committees that lead the development of water security strategies) or the setting up of financing facilities (e.g. offering loans for farmers and/or real estate developers that incentivize the adoption of new climate-smart technologies)[4] (Meadows, 1997). As taught by Jay Forrester and presented in Text Box 6,

4 Leverage points are known in systems analysis as the places within a complex system (a corporation, an economy, a city or ecosystem) where a small shift in one thing can produce big changes in everything. These are places to intervene in a system where a relatively small effort will create significant improvements in system performance.

people intuitively know where leverage points are, but they often push them in the wrong direction. Therefore, a sound diagnosis and system analysis are essential first steps in designing an effective blended finance strategy.

Textbox 6. Jay Forrester cautionary tale on economic growth (Source: Meadows 1997, page 1)

A cautionary tale on economic growth

Asked by the Club of Rome to show how major global problems -poverty and hunger, environmental destruction, resource depletion, urban deterioration, unemployment- are related and how they might be solved, Forrester made a computer model and came out with a clear leverage point: Growth. Not only population growth, but economic growth. Growth has costs as well as benefits, and we typically don't count the costs- among which are poverty and hunger, environmental destruction, etc- the whole list of problems we are trying to solve with growth! What is needed is much slower growth, much different kinds of growth, and in some cases no growth or negative growth.

The world's leaders are correctly fixated on economic growth as the answer to virtually all problems, but they're pushing with all their might in the wrong direction.

Along with these barriers and drivers related to the presence or absence of an enabling environment, there are intrinsic characteristics of adaptation projects and the ways that they are currently structured that makes them of little interest to the private sector. Innovations in the ways these projects are structured that might enhance private sector participation are presented in Chapter 4.

To finalize, it is important to add that a significant share of adaptation measures require investments in the conservation and restoration of ecosystems, referred to as Ecosystem-based Adaptation (EbA) and involving different types of Nature-based Solutions (NbS). Text Box 7 presents the additional barriers and drivers for private sector investments in EbA versus traditional gray infrastructure adaptation measures.

Textbox 7. Barriers and drivers for investments in Ecosystem-based Adaptation

Private investments in Ecosystem-based Adaptation

Ecosystem-based adaptation ('EbA) encompasses a broad set of approaches to adapt to climate change. They all involve the management of ecosystems and their services to reduce the vulnerability of human communities to the impacts of climate change. The Convention on Biological Diversity defines EbA as "the use of biodiversity and ecosystem services as part of an overall adaptation strategy to help people to adapt to the adverse effects of climate change" (CBD 2009).

Nature-based Solutions (NbS) are defined by the International Union for Conservation of Nature (IUCN) as "actions to protect, sustainably manage, and restore natural or modified ecosystems, that address societal challenges effectively and adaptively, simultaneously providing human well-being and biodiversity benefits".

Public investment processes and project delivery and finance mechanisms in general, are geared towards the traditional grey infrastructure project. Accordingly NbS given their innovative and distinct characteristics versus traditional grey infrastructure solutions, pose additional challenges for private sector involvement and investments in their delivery. A new technology could be a significant source of delays during

"construction" and poor operational performance over time, threatening the viability of a project projected cash flows. In addition, the lack of standardization across green infrastructure projects poses an additional investment barrier (Altamirano 2019). According to the Coalition for Private Investment in Conservation (CPIC) attracting private capital towards conservation requires three main things: a) consistent policy signals that give certainty and direction to investors, b) a solid pipeline of investable projects and c) proven investments models and financial innovation.

To tackle these three points, CPIC with financial support from the Global Environment Facility has been **working on investment models for investors to get behind, conservation finance blueprints that could provide a basis for replicating proven investments and allow financial institutions to more comfortably step in and provide financing** (CPIC 2021).

3.8. A REVIEW OF CLIMATE FUNDS ROLE ON LEVERAGING PRIVATE SECTOR INVESTMENTS

Taking into account all the elements of an enabling environment for private sector engagement in adaptation presented in Figure 11, a review was made of the interventions, financing instruments and investment projects and programs funded by the three MCFs reviewed (AF, PPCR and GCF). An overview is presented in Table 9. The terms in bold correspond to the typology of adaptation activities financed by climate funds that was developed by Biagini et al. (2014).

Table 9. Drivers and barriers tackled by multilateral climate funds

Climate Fund/ Instrument	Targeted impact
GCF/ support to the development of National Adaptation Plans (NAPs) PPCR/ Strategic Programs for Climate Resilience (SPCR)	**Capacity development** and **management and planning** adaptation activities, aimed at improving the institutional and technical elements of the enabling environment, and at increasing: **Public sector awareness of vulnerability (key sectors in the economy)** **Public sector capacity to prepare investable adaptation propositions** **Quality of prioritized investment projects**
GCF/ Readiness Programme AF/ Readiness programme (Readiness grants, readiness support package grants, South-South cooperation grants, Project Formulation Assistance grants and Technical Assistance grants)	Improvement of quality of (b) institutional environment. **Capacity development** activities that deal with capacity and/ or technical gaps and aim at increasing: **Public sector awareness of vulnerability (key sectors in the economy)** **Public sector capacity to prepare investable adaptation propositions**
AF/ Project Scale up Grants	**Capacity development** and **management and planning** activities aim at supporting the design and development of scaling-up pathways for AF programs under implementation, which aim at increasing **public sector capacity to prepare investable adaptation propositions** and might have an indirect impact on **transaction costs**.

Climate Fund/ Instrument	Targeted impact
GCF/ Private Sector Facility (PSF) financing instruments & PPCR/ Private Sector Set Asides (PSSAs)[5]	**Financing**[6] activities that involve others (a) financing facilities, and (b) risk mitigation instruments and tackle the following barriers: **Risk to invest (perceived and real)** **Cost of capital**
PPCR/ Private sector aside (programmatic approach)	The programmatic approach within which some of the private sector-driven projects have taken place seem until a certain extent aim at a reduction of: Transaction costs
AF projects and programs (grant and in few cases loan financing)	Investment programs that aim at strengthening the technical and institutional building blocks of the enabling environment. These programs depending on the sector they target (e.g. energy, water, agriculture, etc) involve a different ratio of investments in **capacity development, management and planning, policy, information, warning or observing systems, technology** and other more capital-intensive activities such as investments in **green infrastructure** (i.e. Ecosystem-based Adaptation) and **grey infrastructure** (climate-proofing of existing assets and networks, expansion or development of new assets). Some of these programs involve **financing** activities that strengthen the financial element of the enabling environment.

The most important findings of this review are:

First, there are great similarities between the approaches followed by the GCF and the AF, the difference being that the GCF has a private sector facility and the AF not. These similarities are not a coincidence. With both funds being created by the UNFCCC, and with the success of the AF in implementing a Direct Access Modality, the GCF has also adopted a Direct Access Modality approach. This has allowed for the simplified accreditation of existing AF-accredited entities and in many cases for working with the same national authorities as counterparts. Additionally, given the AF's funding cap, by 2016 there was an implicit agreement that while the AF would focus on piloting innovative approaches at a smaller scale, the GCF would take on the role of upscaling these models, given its significantly larger funding capacity. As can be seen in Table 3, by early 2021 this agreement had already materialized in at least seven AF projects being scaled up with GCF funding.

Both GCF and AF readiness programs aim to contribute to a paradigm shift by increasing the awareness of different economic sectors about their vulnerability to climate change, and by strengthening governments in their capacity to structure the business case for public investments in adaptation and mitigation. This ultimately improves the effectiveness of their resulting preferred strategy and the quality of the prioritized investments projects. The PPCR contributes to the same goals yet adopts a programmatic approach and supports the formulation of Strategic Programs for Climate Resilience (SPCR).

5 The Private Sector Set Asides (PSSAs) allocate concessional financing on a competitive basis to projects that engage the private sector in sustainable forestry (FIP), climate resilience (PPCR), and energy access through renewable energy in low income countries (SREP).

6 'Financing' in the typology developed by Biagini et al. (2014) includes new financing or insurance strategies to prepare for future climate disturbances.

Second, the public sector investment projects and programs funded by all three MCFs aim to both increase the number of public sector adaptation investments and – through a variety of **capacity development and management and planning activities** – improve the quality of prioritized investments projects and the impact of adaptation investments. Besides investments to improve the **resilience of critical infrastructure networks**, a significant part of these funds is invested in climate services information systems, such as national meteorological and hydro-meteorological information systems and early warning systems for floods and droughts, which are important elements of the technical building block of an enabling environment. The question is whether these systems, if not explicitly aimed at the adaptation of the private sector, are generating information at the right level of granularity to incentivize private sector adaptation. As explicitly mentioned in indicator 2 of the Index Assessment Framework (IFC, 2013), for the private sector to be able to estimate the Risk/Reward Ratio of investments in adaptation, it needs to be able to quantify direct and indirect impacts of climate change in its business continuity functions. This means that data and information about the direct and indirect impacts of climate change is effective in driving private sector action only if elaborated for specific sectoral and geographic needs.

Third, the GCF's Private Sector Facility (PSF) and the PPCR's Private Sector Set Asides (PSSAs) provide financing instruments for dealing with two important barriers to private sector investments in adaptation and mitigation: a) private sector access to capital (**cost of capital**) and b) **investment risk (perceived and real)**. Additionally, the MDB-driven approach of the PPCR, coupled with PPCR public sector engagement and dedicated private sector windows, has proved a valuable combination to support private adaptation, as it ultimately reduces transaction costs for private sector actors willing to engage in adaptation and mitigation. While these instruments have proven effective in stimulating the development of commercially attractive business models for mitigation, when aiming at transformative projects in adaptation they may not be enough. More direct engagement in the development and testing of innovative **governance structures** and investment vehicles may be necessary for equally attractive adaptation business models to emerge.

Fourth, although not directly intended to leverage private sector investments, AF's contribution to transformational change has been valued by many due to its focus on direct country access, which encourages the creation of local capacities. Strengthening public institutions indirectly catalyzes larger and higher impact private sector investments, as stronger government institutions are more able to enforce existing regulations and come to better negotiated agreements for public-private engagement.

Finally, there does not seem to be an explicit emphasis by these three MCFs on piloting innovative or strengthening the quality of existing governance structures that allow for collective investments in adaptation, such as markets for environmental externalities or Payment for Ecosystem Services schemes. Innovative governance structures to implement collective investments are the key to reducing significant **transaction costs and the investment risk** for private actors – especially for adapta-

tion measures, due to the needed system scale and common resources and/or public good economic nature of these investments.

Based on the findings from our review, important conclusions and recommendations for leveraging greater private sector investments in adaptation and closing the adaptation implementation gap at the system scale are:

First, it is important to highlight the need for concessional finance in adaptation. Although the interest of the private sector in adaptation is increasing, the transition towards new business models that embody the needed paradigm shift in economic growth will require significant financial and technical support in the coming years. Concessional finance is a key financing tool in cases where returns are either uncertain or may take much longer than the ones the private sector normally works with.

Second, there are three main generic ways in which the public sector, supported by donors, MCFs and MDBs, can stimulate private sector engagement:

- Influencing investments that will happen anyway (e.g. investments in transport and other economic infrastructures) to make sure they are resilient (i.e., through regulations),
- Mobilizing private sector financing for adaptation by reducing risks and transaction costs, and aligning time horizons,
- Investing in research and development for technologies, like freely available climate models and data for public use in climate change adaptation planning by both the public and the private sector.

Third, for MCFs to be effective in their efforts to leverage private sector investments other than the traditional combination of financial expertise and financial capacity they have in house, a third type of expertise is key. This is technical expertise and sectoral know-how. It is vital for climate funds to count on a strong base of technical expertise in house and/or accessible through targeted partnerships and networks, to accelerate the required process of innovation. An example of such innovation is the assessment of water availability for private companies which, combined with financial expertise, can then inform the design of more effective sector-specific financing vehicles and/or instruments.

Fourth, and in line with the last point regarding technical expertise, technical assistance tailored to private sector needs may be required, especially in developing countries where there is limited installed technical capacity and expertise. This technical assistance is necessary to increase private sector awareness and understanding of the range of climate impacts under different climate scenarios (IFC, 2013; CIF, 2016). For example, as identified by the CIF (2016), there is often a lack of engineering studies at the right level of granularity to model changing water flow impacts on electricity production.

Last but certainly not least, much more attention needs to be paid by climate funds to the institutional elements of the enabling environment for private sector engagement. An area that deserves special attention is the creation of **governance structures** that reduce **transaction costs** and allow for successful public-private and private-civil

society cooperation. There is an urgent need for global and local non-traditional partnerships that bring the required expertise and contribute to reducing investment risks and transaction costs. **The question is who is willing to coach and finance the process of designing and pilot testing these innovative partnerships and/or collective investment vehicles.**

MCFs seem particularly well-positioned to assume this role, given their shared mission of driving a paradigm shift, the higher degrees of concessionally they can offer and their higher tolerance for risk. An explicit facilitator role linking the public and the private sector has proven to be of great value (CIF, 2016); this is a role often played by MDBs.

Consequently, a more direct engagement of climate funds and MDBs in the development, pilot testing and upscaling of innovative **governance structures** and investment vehicles seems urgent and necessary for the emergence of innovative business models that deem adaptation investments financially viable. Novel governance structures can allow for collective investments in adaptation at scale (i.e., at the river basin or coastal zone scale) and significantly reduce the transaction costs faced by private sector parties willing to co-fund these system scale initiatives.

As mentioned in Text Box 7, some communities of practices, such as the conservation finance and impact investment communities, are taking a proactive stance in this respect. An example are the efforts invested by the Coalition for Private Investments in Conservation (CPIC), partly supported financially by the Global Environmental Facility (GEF) in developing 'blueprints'[7] for private investments in conservation. Chapter 4 focuses precisely on presenting and analyzing a number of these innovative governance structures and implementation arrangements.

7 In order to increase investment in conservation, CPIC has agreed to identify priority 'blueprints' for delivering risk-adjusted returns from specific types of investment in natural capital. CPIC working groups have delivered a variety of investment models since the launch of the coalition and are sharing them as they become available. These can be accessed at http://cpicfinance.com/blueprints/

Aerial view of the Somoto Canyon in Madriz, Nicaragua. Credits Roberto Zúñiga L., Unsplash

Zwanburgermolen en Kagerplassen, Warmond, The Netherlands. Author V. van Zeijst

4. TOWARDS INVESTABLE CLIMATE ADAPTATION PROJECTS

A major challenge for greater private sector participation and investment in adaptation is the weak business case of adaptation investment projects, which translates to a lack of investable and bankable projects. For this reason, in this chapter we will look more in-depth at the role of actors other than climate funds in leveraging and driving private sector investments in adaptation as well as the innovations undertaken by them in terms of governance and financing arrangements that contribute to investable and/or bankable climate adaptation projects. First, we will look at the experiences of MDBs with adaptation, supported in some cases by MCFs. Second, we will look at several innovative financing instruments developed by the public and private sectors, motivated either by national or international sectoral regulations. We conclude this chapter by presenting pioneering experiences in different countries that exemplify the whole spectrum of options for public-private collaboration in adaptation. The shape of these public-private implementation arrangements are as dependent on the institutional setting as on the characteristics – both technical and financial – of the transaction or project to be implemented.

In addition to the barriers and drivers related to the presence or absence of an enabling environment (presented in Chapter 3), some of the intrinsic characteristics of adaptation projects and the ways in which they are currently structured deem them commercially unattractive and non-bankable. Innovations in the way these projects are structured that might enhance private sector participation are presented in this chapter.

4.1. MULTILATERAL DEVELOPMENT BANKS' EXPERIENCES WITH ENGAGING THE PRIVATE SECTOR

Private sector adaptation finance by MDBs is defined as the component of MDB investment in the private sector that relates to making the investment more climate-resilient (CIF, 2016). It corresponds to the incremental costs of project components, or to the elements or proportions of projects that are considered inputs to an adaptation process. It aims to reduce vulnerability and enhance resilience to climate change (MDBs, 2020). In 2015, five MDBs, including the African Development Bank (AfDB), the Asian Development Bank (ADB), the European Bank for Reconstruction and Development (EBRD), the Inter-American Development Bank Group (IDBG), and World Bank Group, including its private sector arm, the International Finance Corporation (IFC), together provided USD 106.9 million to finance climate-resilient private sector projects, valued at USD 2.6 billion (CIF, 2016).

As reported in the recent CIF report entitled "**Private Sector Investment in Climate Adaptation in Developing Countries: Landscape, Lessons Learned and Future Opportunities**", by 2016 the EBRD had a leadership position among MDBs. As shown in Figure 12, from the approximate total of USD 342 million, the EBRD deployed 78% of MDB private sector adaptation finance in 2013-2015, followed by the IFC with 13%,

the IDB with 5% and the ADB with 4%. In absolute terms, this means that as of 2016 the EBRD financed a total of 31 projects and USD 267.1 million with its own funds and an additional 25.1 million from the PPCR. Meanwhile, IDB financing to the private sector for adaptation amounted to 16.5 million with no support from the PPCR.

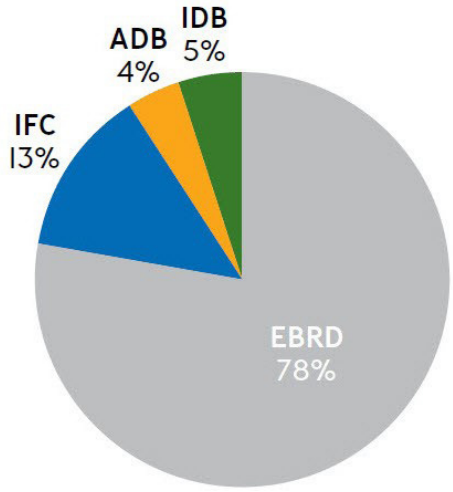


Figure 12. MDBs share in private sector adaptation finance (Source: Vivid Economics, presented in CIF 2016, page 27).

These shares and the total amount of investments by MDBs in private sector adaptation have developed rapidly over the last five years, due to the increasing political support of the climate agenda and the related new voluntary and obligatory standards being adopted by the financial sector, both of which are driving a more proactive role of MDBs in developing financial products to leverage private sector investments in adaptation. One of these advances is the recommendations made by the Task Force on Climate-related Financial Disclosures (TCFD) regarding disclosure and management of climate risks and opportunities. TCFD-aligned disclosures are to become mandatory in the UK by 2025.[8]

As a result of these developments, in 2019 MDBs reported a total of USD 14,937 million in commitments for climate change adaptation finance, of which 93 percent was committed to low-income and middle-income countries and approximately 8% to the private sector. Approximately 5% of this total, equivalent to USD 847 million, supported private sector adaptation efforts, which is more than double the amount (USD 342 million) reported in 2016. The above list of five MDBs providing adaptation finance to the private sector in developing countries has been expanded and now includes the European Investment Bank (EIB). The Islamic Development Bank (IsDB) also reports significant adaptation finance for low-income and middle-income economies; however, this is not yet directed to the private sector. By 2019 the IDBG was the leading MDB in adaptation finance, followed by the AfDB, with EBRD in 3rd place.

8 On November 9, 2020 the UK Government's Finance Minister, Rishi Sunak, announced that climate risk reporting will become mandatory for large companies and financial institutions in the UK.

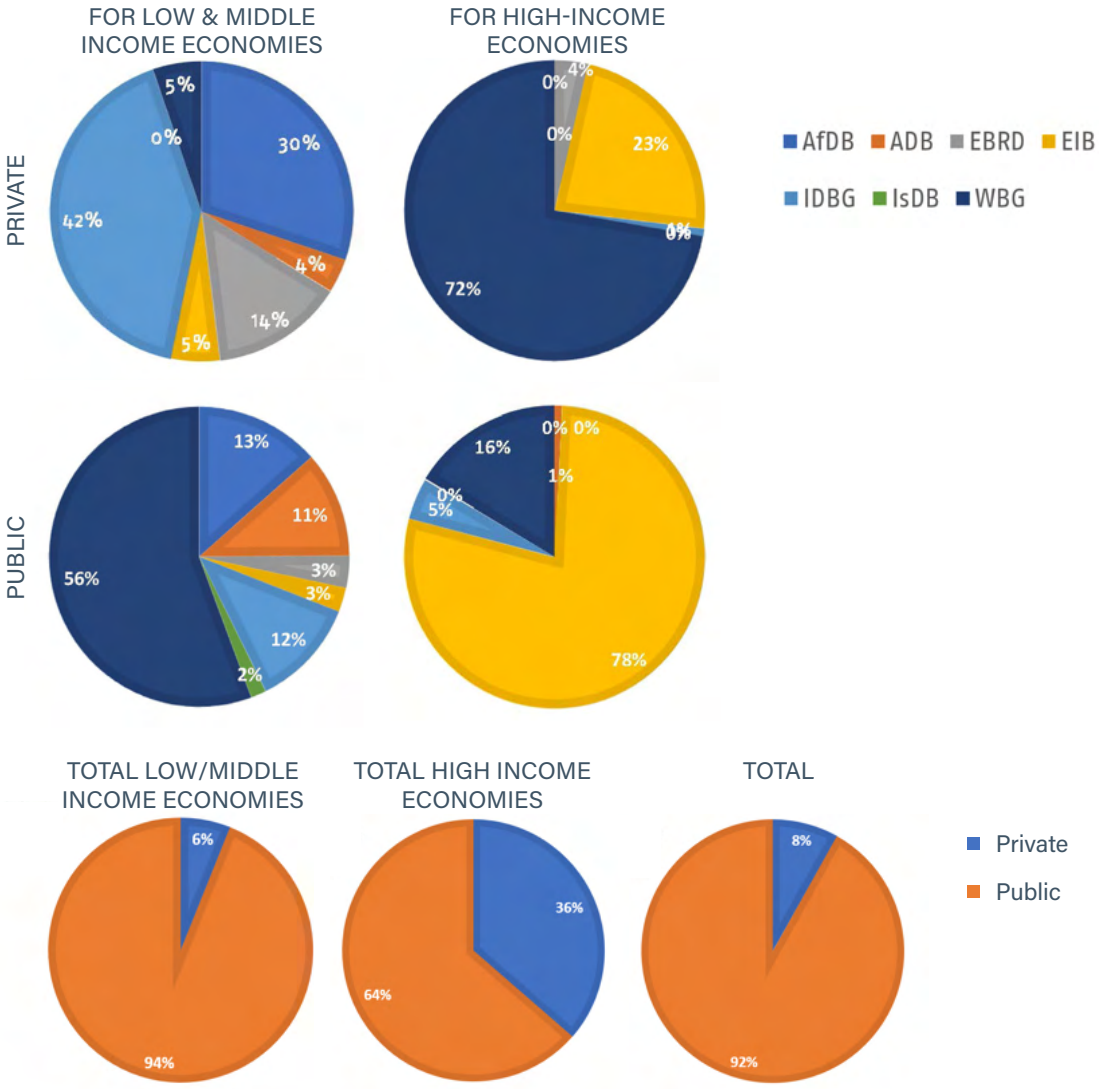


Figure 13. Adaptation finance by MDB and by type of recipient or borrower, 2019, in USD millions (Source: authors, based on amounts reported by MDBs in their 2019 joint report on climate finance, Table 11, page 16)

In addition to private sector finance provided by MDBs for adaptation or mitigation purposes, as of 2015 the MDBs had started to report on climate co-financing (CCF) flows. Tracking these CCF flows enables an estimation of the volume of financial resources invested by other public and private external parties alongside MDBs for either climate mitigation or adaptation (MDBs, 2019, p. 24). As shown in Figure 14, the main flows of finance are MDB climate finance, which includes MDBs' own account resources or external resources managed by them (e.g. from MCFs or trust funds), private co-financing and public co-financing. To track the private share of climate co-finance, the MDBs are implementing the methodologies developed by the MDB Taskforce on Private Investment Mobilization. This methodology focuses on calculating the private finance mobilized or leveraged by an MDB on a project-by-project basis, including both direct and indirect private mobilization.

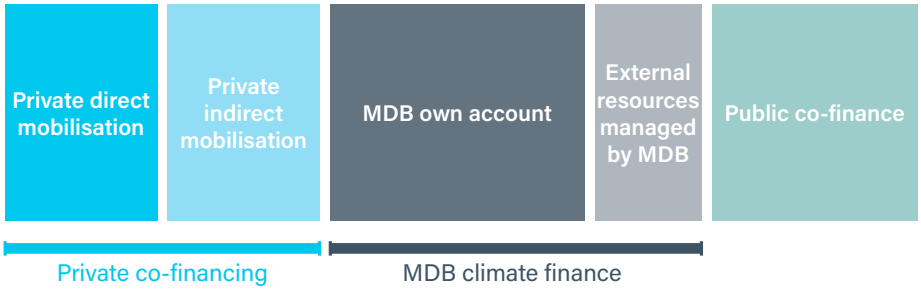


Figure 14. Public and private climate finance flows, as reported by MDBs (Source: MDBs 2019 joint report on climate finance, Figure 13, page 240)

Several pioneering examples in developing countries, referred to in the CIF (2016) report are:

IFC and IDB partnership with ECOM in rural adaptation for smallholder farmers, a pilot project in Nicaragua. In this project the IFC and IDB have set up a long-term lending facility of up to USD 30 million for the renovation of more than 5,000 hectares of coffee plantations affected by the La Roya fungus in Nicaragua. The first project approved by the facility is an example of blending, as it was made possible by combining loans, a first loss guarantee and private sector contributions. Exportadora Atlantic S.A., a subsidiary of ECOM, offered a USD 3 million long-term loan. Meanwhile, the Global Agriculture and Food Security Program is providing a 25% first loss guarantee for IFC and IDB's investment, which will lower the risks and interest rates charged to farmers. Starbucks has committed to purchasing the certified coffee produced by the project. The primary recipients of funding will be 500 farmers. The model being tested is a scalable model of climate-smart renovation that could be replicated by other countries and by other coffee traders.

CLIMADAPT: EBRD and PPCR joint project to fund adaptation in Tajikistan through a finance facility. The project involved the development of a pilot climate finance facility in late 2015. Its main objective was to enable the adoption of sustainable technologies and practices for climate adaptation, mainly regarding agricultural practices and energy efficiency. The project was funded through commercial loans, USD 5 million from EBRD and USD 5 million from PPCR in concessional loans. These funds were then channelled through three local financial institutions that had the networks and expertise required to directly engage with the local communities. These were Bank Eskhata (national bank), IMON International and HUMON (a micro-finance institution). The EBRD took an equity stake in two, Eskhata and IMON. Loans were offered in the local currency, and project leads met monthly with civil society, the private sector and other representatives to ensure the most suitable technologies were deployed for the local community (CIF, 2016, page 42). In addition to the loans provide by the EBRD and the PPCR, the project benefited from technical assistance provided by the UK's DFID (EUR 300,000) and the EBRD Early Transition Countries Fund (EUR 1.95 million). Grants for technical assistance were crucial in supporting the national FIs in the process of integrating climate spending into their banking operations as well as in supporting the realization of a comprehensive market demand study.

EBRD and IFC market study in Turkey. The study helped companies to identify actions with which they could manage climate change risks and drive opportunities. It also informed the development of two EBRD credit lines that enabled private sector investments in water-efficient technologies (EBRD & IFC, 2013). This experience also assisted the EBRD in the development of its CLIMADAPT project in Tajikistan. This market study, used to overcome the data gaps restricting private sector adaptation investment in Turkey, offers a model of how technical assistance, or 'readiness' funds, can be deployed as part of a broader investment platform to accelerate MDBs' processes of developing private sector projects and financial products that respond to national and sector-specific needs. The steps in this study that led to the prioritization of several sectors and determined the investments per sector are: a) engagement, b) identification of knowledge gaps, c) assessment of climate vulnerability, d) identification of adaptation actions, and e) assessment of commerciality.

Two more recent experiences by MDBs that deserve special attention are the ASEAN Catalytic Green Finance Facility (ACGF), an initiative of multiple MDBs and donors that is managed by the ADB; and the IDB Natural Capital Lab. As seen in Text Boxes 8 and 9, the former focuses on the infrastructure sector, while the latter focuses on Nature-Based Solutions and other approaches in line with an ecosystem-based adaptation approach, the ultimate goal of which is to reduce systemic climate and environmental risks by enhancing the well-being of marine, freshwater and terrestrial ecosystems.

Climate funds should consider the piloting, documentation and evaluation of the entire process followed in pioneering cases should be considered by climate funds. This would enable the development of rules of thumb for the design and further replication of these innovative implementation arrangements that enable the blending of public and private and national and international funds to ultimately enable the adaptation of the most vulnerable private sector groups.

Textbox 8. ASEAN Catalytic Green Finance Facility (Source: Excerpt from ADB website accessed February 2021)

ASEAN Catalytic Green Finance Facility

The ACGF is an ASEAN Infrastructure Fund (AIF) initiative supporting governments in Southeast Asia to prepare and finance infrastructure projects that promote environmental sustainability and contribute to climate change goals, both adaptation and mitigation. The AIF was created in 2011 by the Asian Development Bank (ADB) and member states of the Association of Southeast Asian Nations (ASEAN) to boost regional infrastructure. The ACGF was launched in April 2019. It is the only regionally-owned green finance initiative focused on developing and scaling up climate-positive projects in ASEAN.

During its pilot phase (2019-21) the ACGF aims to prepare and finance projects that reduce greenhouse gas (GHG) emissions and improve climate resilience, contribute to other environmental benefits and catalyze private, commercial, and institutional finance. The ACGF does this by providing loans funded from the AIF's equity, collating this with technical assistance and co-financing from the Asian Development Bank (ADB) and other development partners to originate, structure and provide de-risking funds for green infrastructure projects, with the aim of crowding-in private sector investment.

The ACGF's co-financing partners are ADB, Agence Française de Développement, the AIF, the European Investment Bank, the European Union, KfW, and the Government of the Republic of Korea.

The ACGF helps prepare and provides financing for green infrastructure projects that address three main objectives, as follows:

- Demonstrate a measurable contribution to green impacts, i.e., climate change adaptation, mitigation and environmental sustainability,
- Demonstrate an improvement in bankability, and
- Demonstrate the potential to catalyze private capital.

The facility will mobilize a total of USD 1 billion including UD 75 million from the ASEAN Infrastructure Fund, $300 million from ADB, $336 million from KfW, EUR 150 million from the European Investment Bank, and EUR 150 million from Agence Française de Développement.

In addition to these pioneering examples in developing countries, MDB's have played a significant role in the development of financing instruments such as Green Bonds and Climate Bonds that are expected to play an increasingly significant role in the financing of adaptation measures.

In more general terms, the MDB's experience with financing private sector adaptation shows that:

- In terms of technologies, water-efficient technologies received the most MDB adaptation finance for the private sector in the period 2013-15 (CIF, 2016). This prominent focus on water projects is consistent with the recent World Bank report which indicates that the impacts of CC will be channeled primarily through the water cycle and that without further action, water scarcity could cost some regions up to 6% of GDP (World Bank Group, 2016).
- Regarding existing knowledge gaps, useful tools to close them are feasibility studies, business risk assessments, and technical assistance and market studies (CIF, 2016, page 37). Informed by market studies, feasibility studies help evaluate alternative activities and business models that address the vulnerabilities of specific sector and supply chains. Meanwhile, a business risk assessment has proven useful in generating a range of alternative adaptation investments and engaging in a market sounding exercise with specific private sector parties to discuss their potential.
- MDBs have several competitive advantages as partners to advance the upscaling of private sector investments, most of them originating in their powerful combination of financial and technical capacity.

Textbox 8. IDB's Natural Capital Lab

IDB's Natural Capital Lab

The IDB's Natural Capital Lab serves as a one-stop shop for the IDB Group to drive innovation in the conservation, landscape, regenerative agriculture, biodiversity and marine ecosystem finance spaces. It seeks to bridge the gap between traditional environmental and financial actors from the public and private sectors to incubate, accelerate and scale new solutions to pressing problems.

The Natural Capital Lab is a risk-tolerant hub within the IDB Group. Given that the solutions to many natural capital problems are cross-cutting, it pursues an agenda of blended finance projects with all parts of the IDB Group (IDB, IDB Invest, IDB Lab), in addition to its own projects, knowledge and strategic partnerships.

As a lab for financial innovation, activities include the deployment of funding in the form of grants, loans, equity, risk capital or guarantees to:

- Test new models in natural capital finance across the public and private sectors,
- Accelerate the deployment of new technologies,
- Create enabling regulatory frameworks for innovation in natural capital,
- Identify entrepreneurs and projects, and support them with risk capital and linkages to innovation ecosystems,
- Link projects to existing investors, international funding sources (such as the GEF) and IDB finance for scaling,
- Test large-scale financing models for conservation,
- Experiment with investments based on natural capital valuation/risk, and
- Work with anchor companies in valuing and leveraging natural capital in their supply chains.

The achievement of the SDGs will only happen if the diversity of actors involved in advancing an innovation agenda learn to partner with each other. Government, academia, private sector, entrepreneurs and civil society cannot solve problems alone. The Natural Capital Lab prioritizes multi-stakeholder partnerships to provide evidence on how inclusive innovation facilitates results. As a lab for strategic dialogue and partnerships, activities include:

- Detailing the economic case for investment in natural capital sectors,
- Partnering with large global initiatives that convene leaders in technology, science, conservation and business to develop dialogues on natural capital innovation, and
- Developing a network of ministries of finance and international actors, such as the Convention on Biological Diversity, to discuss how natural capital can be an asset and driver of development, not a cost.

The share of adaptation finance provided by MDBs to the private sector was used to:

- Build resilience into the overall design of these projects, for example, providing technical assistance to ensure the overall project can withstand expected and uncertain future climate change impacts,
- Provide the funding to cover the incremental cost given of the resulting adjustments in project design, and

- Reduce real and perceived risks by the private sector, deploying financial instruments such as first loss guarantees, that enable local financial institutions to develop trust in the creditworthiness of new client groups and products (e.g. micro-loans for farmers investing in climate resilience).

Additionally, MDB's recent reports on lessons learned on applying blended finance and/or developing financing facilities for developing countries conclude that:

- **There is significant demand for structuring innovative financial models for bankability, as well as for expertise in delivery models that leverage greater private sector participation**. "This support is critical for early stage concepts, as well as for developed projects, to validate and demonstrate their climate impacts. Across sectors, there is a major need for technical support to incorporate models for private sector engagement and mobilisation"(ADB, 2021, p.23).
- **There is a need for a reduction in transaction costs and for easily accessible co-financing**. Despite the advantages of more attractive financing terms offered by blended financing facilities, increased transaction costs for borrower governments can act as a deterrent for co-financing by multiple partners, even when projects face a financing gap (ADB, 2021).
- **There is a need for national de-risking vehicles for scaling up**. "Given the scale of the challenge, it is becoming increasingly apparent that national or even provincial governments need to create green de-risking facilities with clear guidelines for use of funds and sound models to incentivise and finance green projects. Similar to the Viability Gap Funds model for public-private partnerships seen in India in the early 2000s, this will clearly show government commitment as well as actual and quick availability of concessional funds for green projects, all critical to scaling up green finance flows." (ADB, 2021, p.23).
- **Streamlining project preparation is key to reducing transaction costs and increasing interest from institutional investors**. As reported by the IFC (2021), one-off deals are often too costly to appraise and offer too much concentration risk. Aggregating assets and placing more attention on streamlining project preparation could significantly impact the interest of developed market pension funds. Donors working with smaller, frontier countries are often interested in supporting capacity building, yet they would leverage greater impact by investing in streamlining origination and making simpler to assemble projects, rather than support complex projects (IFC, 2021, p.41).
- **Bankability is to a large degree a function of effectively managing project risks**. While different instruments such as guarantees and mezzanine tranches can be used to buy down certain risks, this approach does not make a project less risky but simply transfers this risk to the public sector. Therefore, a key element of structuring projects will be allocating risks to the party most able to manage these at lower costs, incentivizing them to reduce these risks. A fair and effective risk allocation will also consider the different risk appetites of the different parties. The main added value of blended finance is that it brings different risk appetites and time horizons into the transaction (IFC, 2021, p. 40).
- **Partnerships and system understanding is an enabler of effective blended finance strategies**. Global and local partnerships that bring the required expertise and contribute to de-risking and reduction of transaction costs in a effective manner are needed. Blended concessional finance investment solutions benefit

from partnerships between a variety of development and private sector partners: international organizations, donor agencies, local banks and private enterprises (IFC, 2021). Their joint impact depends on their capacity to pool different types of expertise, including the knowledge of emerging markets that enable them to identify and structure projects that prove financially sustainable and commercially viable in the long run.

- **There is a need for comprehensive approaches to reinforce markets. For climate finance to be effective, it needs to be carefully designed to create and/or reinforce markets**. To avoid these markets – which are created with the support of concessional finance – from becoming dependent on subsidies, the design of a blended finance strategy needs to consider all aspects of the market that prevent these projects from becoming commercially viable. As explained earlier, all barriers and drivers of a technical, financial or institutional nature need to be considered in the design. In many cases these include different combinations of supplementary advisory services or technical assistance grants, capacity development interventions, and specific instruments (i.e., debt, equity, risk-sharing facility, guarantees or performance-based structures) that clearly respond to the main challenges or barriers identified.

4.2. INNOVATIVE FINANCING INSTRUMENTS FOR ADAPTATION

The increasing frequency of extreme events and the impacts of these events on business continuity in a large range of sectors is resulting in increasing pressure from shareholders and investors for companies to disclose their climate risks (of which water-related risks are the main element of physical risks) and their climate risk management plans. Both of these are an essential part of the due diligence process. The recommendations of the Task Force on Climate-related Financial Disclosures (TCFD) were released in the summer of 2017 during the G20 summit. One key recommendation was that metrics on physical climate risks and opportunities should be included in financial disclosures.

Accordingly, more and more companies and financial institutions are working closely with governments and NGOs to develop new financial instruments that facilitate investments in adaptation or are directly engaging in the financing of adaptation actions. An overview of financing mechanisms being developed by a variety of private actors (e.g. the insurance industry, associations of impact investors, and institutions such as the Climate Bonds Initiative) or initiated by governments (e.g. the Peruvian government's Obras por Impuestos mechanism) that allow for more active participation and investments of the private sector in adaptation is presented in Figure 15. As shown in the figure, these instruments are at different stages of development.

The two most recent are 'rhino bonds' and the Adaptation Benefit Mechanism (ABM). Rhino bonds are the world's first financial instrument created to protect species and one that captured the attention and interest of the impact investment community in 2020 (see Text Box 10 for more details). Although focused on ensuring a minimum population growth of a species, guaranteeing the well-being of a species often requires an improvement in the condition of their habitat and ecosystems on which they depend, which indirectly impacts levels of systemic risks and delivers adaptation benefits.

ABM is a mechanism launched by the African Development Bank in 2018. Its pilot phase started in March 2019. The concept of the ABM has been developed by the African Development Bank since 2016, with support by the Climate Investment Fund (CIF) and in consultation with several African countries, including the Republic of Côte d'Ivoire and Uganda, as well as other stakeholders. The project developers participating in the pilot phase are the International Agroforestry Centre (ICRAF) in Côte d'Ivoire, Whave Solutions in Uganda, and the Center for Governance and Human Security Studies (CGHSS) in Rwanda. The AfDB is planning to implement at least 12 ABM demonstration projects in Africa in the period 2019-2023. The results will inform and further develop the ABM before it is used in the international community.

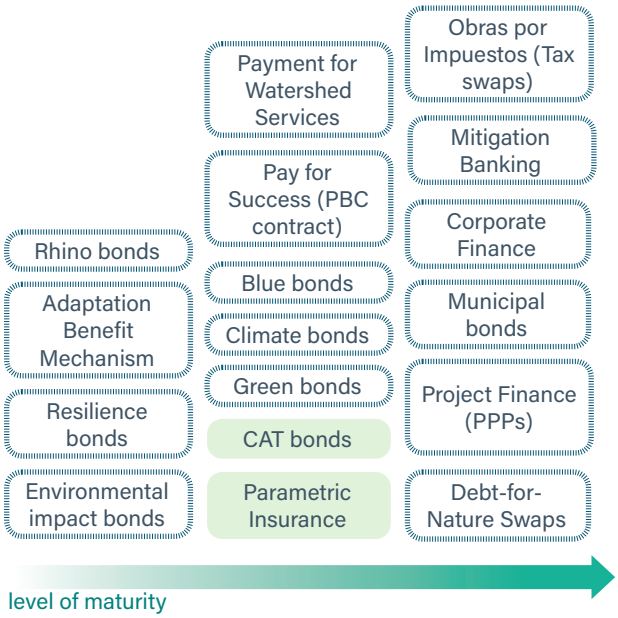


Figure 15. Innovative financing instruments for adaptation and/or ecosystem-based Disaster Risk Reduction (adapted from Altamirano, 2018a and Environmental Defense Fund, 2017).

Like rhino bonds, the Adaptation Benefit Mechanism is also a 'Pay for success' or results-based approach that creates a price signal for adaptation results. In this way it renders financially viable adaptation projects that would not otherwise be attractive to the private sector. Donors, philanthropies and companies (CSR investors) can fund verified adaptation results. Key elements of this approach are: a) Adaptation Benefits (AB's), which are verified outputs/outcomes that make households, communities or economies more resilient to Climate Change, b) the unit of measurement and price of AB's are project-specific, based on the cost of generating the adaptation result plus the profit margin, c) ABs are non-fungible and non-transferable (Unlike CDM, there is no secondary market), and last but not least d) the base for the transaction to take place is an 'Adaptation Benefit Offtake Agreement' (ABOA).

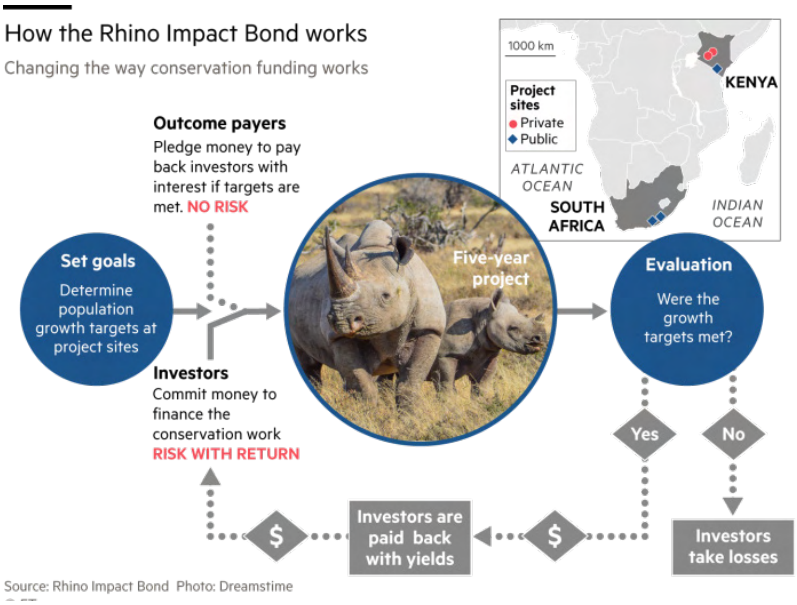
Textbox 9. Rhino Impact Bond

The Rhino Bond

The structure of the rhino bond is known as an 'outcome payments' model, similar to the models already used to fund health and education. According to Conservation Capital, the developer of this product, this is the first time that such a model has been applied to a conservation project, and it could revolutionize the way conservation is financed.

The rhino bond (or Rhino Impact Investment) is a five-year, £50m bond linked to the populations of African black rhinos in five sites across Kenya and South Africa. Investors in the bond will make a return on their money if the rhino population increases over those five years, and the yield will vary depending on the level of growth. Black rhino numbers have been in steep decline for the past 50 years.

The money raised from investors in the rhino bond will be used for conservation efforts on the five sites. It is expected that there will be different terms of investment, some of which will be higher risk (meaning the possible loss of capital if rhino numbers decline) but with potentially higher return. Lower-risk investments may have their capital preserved but may fail to make a profit if rhino population targets are not met.



At the far right of Figure 15 are instruments such as mitigation banking and public-private partnerships (PPPs). The type of mitigation banking most commonly used in the United States is the preservation, enhancement, restoration or creation (PERC) of a wetland, stream or habitat conservation area which offsets or compensates for expected adverse impacts to similar nearby ecosystems. The goal is to replace the exact function and value of specific habitats (i.e., biodiversity or other ecosystem services) that would be adversely affected by a proposed activity or project. A PPP, as defined by the World Bank, PPP Knowledge Lab, is "a long-term contract between a private party and a government entity, for providing a public asset or service, in which the private party bears significant risk and management responsibility and remuneration is linked to performance". Although these can generally be considered mature mechanisms, their application to finance adaptation projects is only nascent.

Bonds – green, climate, environmental impact and impact bonds in general – are an important category of instruments currently in high demand because of the combination they offer of financial returns and positive non-financial impact with a relatively low management effort required from the investor. This makes them particularly attractive for so-called passive investors such as institutional investors (pension funds, insurance companies, etc.). These fixed income instruments are designed to fund environmental development through financing from investors in exchange for repayments at maturity, which may include coupon payments and/or tax benefits. They were introduced in 2008 by the World Bank (World Bank, 2015). Before 2013 green bonds were only issued by MDBs. After corporations started issuing corporate green bonds, the market expanded significantly. Already by 2018 capital markets had evolved from a market in which investors knew and cared little about what their investments were supporting, to one where purpose matters more than ever. More than USD 500 billion has been issued in these kinds of labeled bonds since 2008 (World Bank, 2018).

Recent research from the Global Center on Adaptation (GCA) and Climate Bonds Initiative (CBI), in cooperation with the European Bank for Reconstruction and Development (EBRD), has found that more than 900 green bonds that have been issued to date include climate resilience components. Green bond issuances focusing largely or even entirely on climate resilience, such as the EBRD's USD 700 million Climate Resilience Bond issuance in 2019, were also identified. Their research concludes that though this represents only a fraction of the green bond market, it demonstrates that green bonds are fit-for-purpose for financing resilience and goes on to state that investors are hungry for green bonds, with demand far outstripping supply (GCA, 2021).

As explained in depth in the Dutch Climate Solutions report prepared by Duisenberg School of Finance (2015), entitled "An overview of Green Bonds and their potential for financing the Dutch Climate Solutions initiative", the particular name these green or impact bonds take depends on what the capital it provides is used for and the types of impacts it aims to generate. In some cases it implies a difference in requirements, standards and procedures. For example, Development Impact Bonds (DIBs), also sometimes called 'Social Impact Bonds' are an instrument specially developed for developing countries. With these, investments are only remunerated by donors or the governments upon the achievement of the agreed outcomes, once these have been verified by a third party.

The 'resilience bond', however, is a different type of bond. An innovation developed by a partnership between Re:Focus, Rockefeller Foundation, Swiss Re, Goldman Sachs and Risk Management Solutions, it is a new catastrophe bond-like product that can provide funding for project-based risk reduction solutions. This instrument enables the monetization of the physical and financial risk reductions associated with investments in resilient systems, such as seawalls and green stormwater infrastructure (EDF, 2017).

While Catastrophic (CAT) bonds function as insurance in the event of a disaster, resilience bonds take into account the role of resilience projects that may reduce the

impacts of an extreme event. They offer an approach to link CAT bonds and conventional project finance to support large-scale resilience projects. The innovative element of this approach is the quantification in risk reduction resulting from adaptation and resilience investments. Thanks to the adoption of these measures, lower losses for investors are expected, resulting in a reduced risk to the principal as well as a reduction in insurance premiums. These 'savings' can then be used to finance resilience projects under an agreed upon rebate mechanism. The risk to investors is generally defined by independent risk modelling firms, which make use of catastrophic models evaluate risk and losses, and to estimate the damage with and without the adaptation investment.

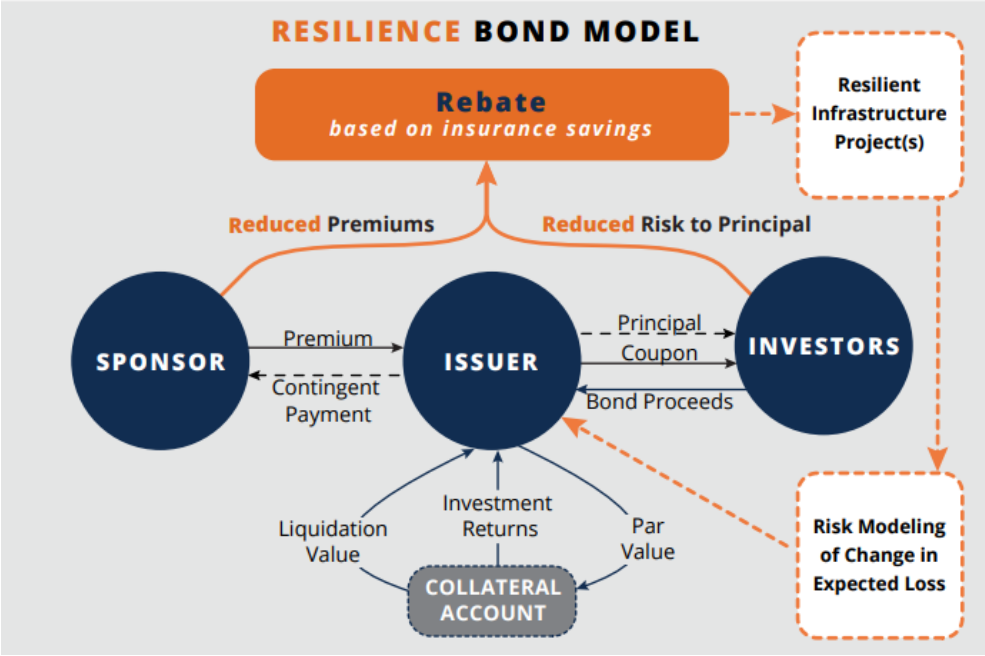


Figure 16. Structure of a resilience bond (Source: Vajjhala and Rhodes, 2015, p. 35)

Two of these innovative mechanisms can be used to finance adaptation or resilience measures only after a disaster takes place and money becomes available for reconstruction. Most MDBs and Insurance companies offering Catastrophic Bonds and Parametric Insurances require a 'build back better' approach to reconstruction.

A pioneering financing mechanism developed by the Peruvian government is the so-called 'Obras por Impuestos' (OxI), or 'works for taxes', which allow a companies the possibility to invest in projects proposed by local authorities and be awarded a tax reduction in the following years until the equivalent of the investment is achieved. The private company sponsoring the project is granted full freedom to realize the project or contract with any other company for its realization, without the need to follow public procurement procedures. The rationale behind the introduction of this procedure has been to speed up the process of infrastructure development throughout the country, where often local authorities are limited in their project preparation and formulation capacity (Altamirano et al., 2016). Although mainly used for infrastructure, the list of OxI projects published by the government of Peru from 2016-2020 includes a significant number of flood management projects.

'Mitigation Banking' and 'Payment for Watershed Services' are both mechanisms that allow for the creation of a market for environmental externalities. They therefore go beyond being simple financing mechanisms towards mechanisms for the creation of funding.

While these financial instruments do open a significant amount of opportunity for private sector engagement, two important remaining challenges in mainstreaming the use of these instruments for adaptation investments are: a) What is the business model of adaptation investments from a public and private point of view? Most of these instruments solve the financing challenge, not necessarily the funding challenge. Provided that this challenge is solved, the next question to ensure success in their use is: b) How can the implementation of Adaptation Projects be delegated to the private sector while making use of Performance-Based Contracts?

A sound Performance-Based Contract, including a clear allocation of risks, rewards and responsibilities which give fundament to the cash and risk profiles of the project, is a minimum requirement for the use of private financing and any innovative financing option that is truly sustainable. Additionally, the use of PBC contracts and PPPs may be the first step in involving private sector creativity in developing a business model for investments in adaptation and resilience.

4.3. THE PUBLIC-PRIVATE SPECTRUM OF PROJECT DELIVERY OPTIONS

As explained above, a key challenge and gap to be solved by governments concerns the adequate use of innovative project delivery and finance mechanisms in the implementation of their implementation strategies. Some project delivery and finance mechanisms that allow for greater private sector participation and financing of adaptation projects are shown in Figure 17.

The implementation of a climate adaptation strategy needs to be further specified at the level of individual investment projects, so-called 'transactions'. A first step towards developing bankable or investable adaptation projects is to prioritize, phase and cluster different interventions considered in the adaptation plan into investment projects that ensure the sustained provision of specific adaptation services. Then, as proposed in the "Financing Framework for Water Security" (Altamirano, 2017 and 2019), the main elements to be considered in the development of bankable projects and their required implementation arrangements are:

- the **characteristics of the transaction**: technical and financial characteristics of the project, such as how capital intensive the project is, how asset specific the investment required is (e.g. can the assets created be moved and reused for other purposes) and, most importantly, the main functions and services that will be provided through the asset being created by the investments, as well as how these services can be classified into types of economic goods (private, common resource, club or public),
- the **service level required over time**, and
- the **institutional setting** (strengths of the stakeholders – local government, private sector and community – and incentives created by formal and informal institutions).

Based on these three elements, a selection can be made from a wide range of project delivery and finance options, varying from purely public governance options up to the creation of markets for a private initiative, by taking into account the options that would be most effective in ensuring sustainability in the service provision.

In other words, as described by New Institutional Economics and Transaction Cost Economics (TCE) theories, a governance structure is chosen that proves most effective in mitigating hazards or minimizing costs involved in the economic transaction at hand. These governance structures and related types of contracts, as shown in Figure 17, include hierarchies, markets and hybrid. Hierarchies are when governments or public agencies decide to implement the adaptation measures themselves with their personnel. Market structures are when governments limit their role to economic regulators that set the right incentives for the development of markets and investments by the private sector on adaptation. Hybrids are when the government does allow for competition every so many years through public procurement processes, and this includes for example public-private partnership (PPP) contracts. These three alternative government roles fit the provision of public goods particularly well. In the management of common-pool resources, other polycentric forms of governance organized from the ground up and shaped to cultural norms may be more appropriate[9]. In terms of sectors, most infrastructure networks can be classified as assets that provide public goods, while agricultural value chains produce marketable and/or private and public goods.

A quick scan of procurement practices for climate adaptation projects worldwide – in this case, most specifically for flood protection – points out that these are often procured in a traditional way (i.e., as Design-Bid-Build (DBB) projects, see Figure 18). Flood protection projects are often tendered by making use of technical specifications instead of functional requirements and tend to be financed directly by governments (PPS Support and Programmadirectie Hoogwaterbescherming, 2014).

Nevertheless, in the past decades some countries have begun to experiment with the use of PPPs for flood risk management. The most pioneering examples are found in the UK (TU Delft & Deltares, 2013) and Australia (Ware et al., 2015), followed by more recent developments in the Netherlands. Meanwhile, in developing countries the increasing risks of flood faced by the private sector, combined with national governments' limited financial capacities to take risk-mitigating actions, have resulted, through a process of trial and error, in a wide range of public-private cooperation and co-funding models.

The results presented in Table 10 are a large range of options for public-private cooperation, given the different combinations of funding, financing and procurement models, ranging from 100% publicly funded projects to 100% privately initiated and funded projects. An example of the latter is a flood risk management plan that was developed, financed and implemented by Dole in Valle La Estrella in Costa Rica. This, of course, was an exceptional case, enabled by the large scale of the banana plantations owned by the company. At that scale, they were able to capture enough risk reduction benefits to justify their investments (RVO, 2016b).

9 In economics, a public good refers to a commodity or service that is non-rivalrous and non-excludable. Given the associated market failures, these services are typically administered by governments and paid for collectively through taxation.

As shown in Table 10, a possible model being used by the Netherlands, the UK and Australia is the so-called 'Private Finance Initiative' (PFI) model. PFIs are PPPs of a non-concessive nature, in which the private sector is responsible for the Design-Build-Finance-Maintain (DBFM) tasks and is paid back in the long term by the government, based on performance or so-called 'availability fee' payments. In such cases, funding remains public and the service remains a public service from which no one can be excluded.

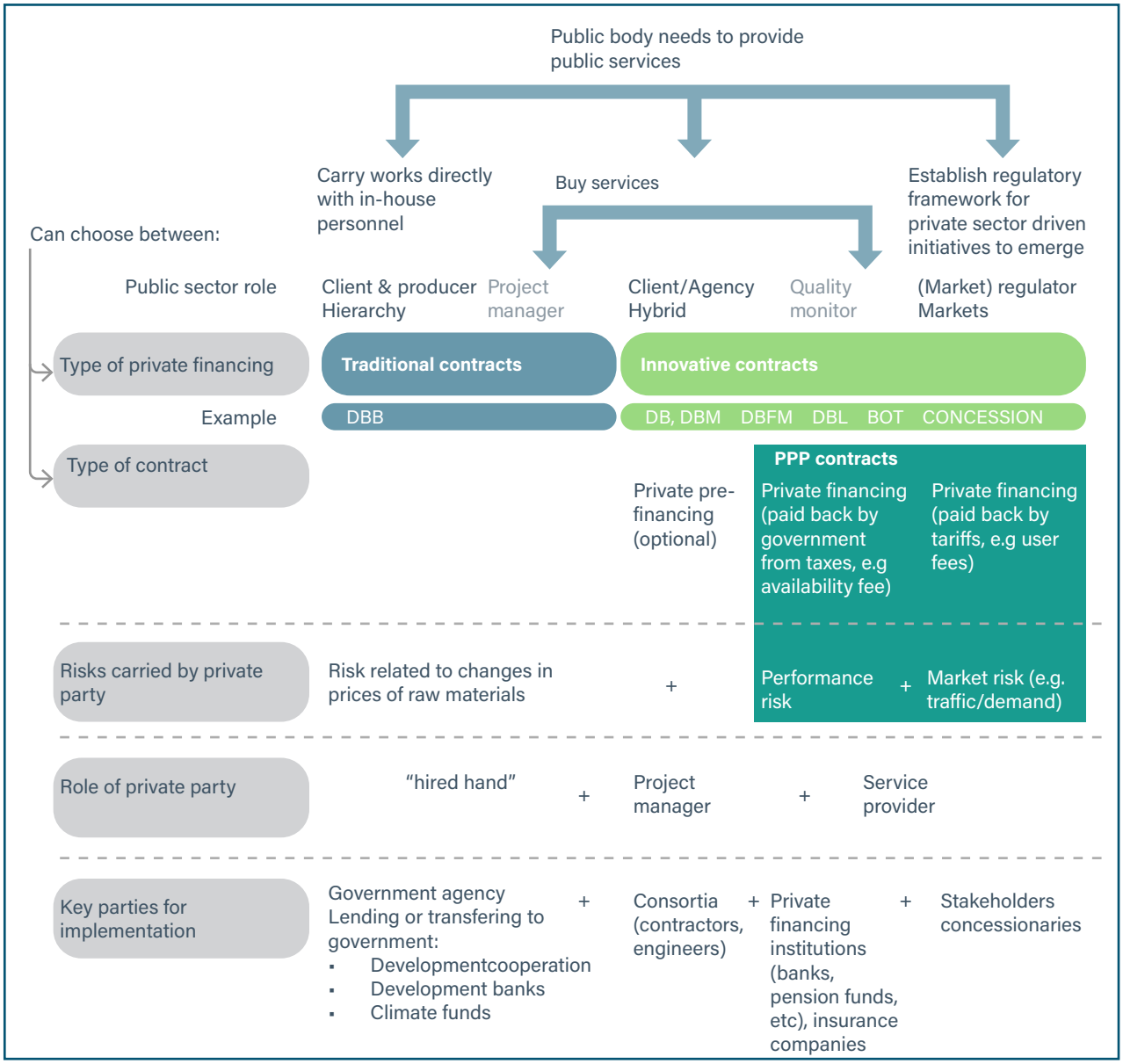


Figure 17. Procurement options for public services (Source: Altamirano, 2018b)

Other sets of options are being experimented in Australia and Costa Rica (see Text Box 11), where governments are taking the initiative to develop integral flood risk strategies but are sharing the responsibility for funding of the measures with the private sector (companies and/or property owners). Along with the choice of how to fund the project, governments then have options regarding how to procure and structure the

project: as a traditional Design-Bid-Build (DBB) project or an integrated project such as DBFM or, in the case of concessive types of PPPs, a Build-Operate-Transfer (BOT). Meanwhile, in cases initiated and 100% funded by the private sector, it is the private sector that 'buys' and decides about how to delegate the implementation and management of the project. In this option, governments still need to play a regulator role to ensure the strategies undertaken by the private sector are not counterproductive to the risk levels experienced by society in general.

Textbox 10. FEPI Example Costa Rica (Adapted from RVO, 2016b, DRR mission report Costa Rica, page 37)

Flood Risk Fund created by banana growers in Costa Rica (FEPI)

This increasing cooperation between CNE (National Commission for Emergency Management), FEPI (Corbana – National Banana Corporation), JAPDEVA (Board of Port Administration and Economic Development of the Atlantic Basin of Costa Rica) and MOPT (Ministry of Public Works and Transport) in Limon has several very positive aspects:

Banana growers are working towards collective and concerted action at the river basin level, leaving behind the farm level approach for flood protection that is often counterproductive.

Private (FEPI) funds are combined and used complementarily with public (CNE) funds for emergencies and reconstruction. FEPI funds had already started to finance important modeling efforts, based on which a flood protection master plan is being drafted. Given the emergency state declared, CNE funds for reconstruction have been made available, and these can be used for actions prioritized by the analyses already being undertaken by FEPI.

JAPDEVA funds aimed at regional development are also being blended with FEPI and CNE funds to finance the efforts in disaster risk reduction. These funds – around USD 2 million in 2016 – were expected to significantly increase once the APM container terminal of Moín would enter into operation. APM Terminals Moín was inaugurated in February 2019. During its first year of operations, the terminal serviced more than 1,100 ships, around 1.2 million TEUs and achieved important improvements in productivity and sustainability.

It is important to clarify that depending on the funding model, and not so much on the (pre)financing model, these services can be still considered as public or 'club' goods or as totally private goods. Although there are a variety of examples of public-private cooperation, the typical concession PPP model does not yet appear to be applied to adaptation projects. That is because for the application of this model, the business model of adaptation itself needs to be clear. The adaptation services given to different target groups by a specific project need to become quantifiable for tariffs to be implemented and for clear revenue streams to be generated. How can adaptation projects be structured in such a way that enough revenues are generated by tariffs or user charges, so that project developers are confident in taking market risks in addition to performance risks?

Nevertheless, these pioneering projects do advance the maturity of Performance-based Contracting or Pay for Success models, and these are the basis for more innovative financing arrangements such as the use of Environmental Impact Investment bonds and concessive PPPs, which would also help advance the business case of adaptation investments.

Table 10. Range of public-private implementation and financing arrangements for adaptation (adapted from Altamirano, M.A. (2017), "A financing framework for Water Security". Oral presentation, Water Futures workshop, during the XVI World Water Congress, Cancun, Mexico)

	RWS Locks Programme (6 projects) (NL)	Afsluitdijk Dike (NL)	Broadland Flood Alleviation Project (BFAP) (UK)	Pevensey Bay Coastal Defence(UK)	Tweed River Entrance Sand Bypass (AU)	City of Gold Coast A-line Seawall (AU)	Toogoom Seawall (AU)	FEPI (Costa Rica)	Valle la Estrella (Costa Rica)
Publicly Funded	Taxes	Taxes	Taxes	Taxes	2 States/ taxes	Taxes		Taxes	
Publicly Financed						Partly		Partly	
Privately Financed	Project Finance	Project Finance	Project Finance	Equity	Project Finance				
Privately Funded									
Tariffs									
Co-financed								Industry Corporation	
100% Privately Funded							Pool of owners		Company
Innovative Contract / Private Service Provider	DBFM / PFI	DBFM / PFI	DBFM / PFI	DBFM / PFI	DBFM / PFI				
Traditional Contract						DBB	DBB	DBB	
	Public goods					Natural Monopolies/ Club Goods			Private goods
Year	between 2014-2017	2017	2001	1999	1999	2013	2014	2012	1996
Duration	30 year	25 year	20 years	25 years	24 years	not applicable	not applicable	not applicable	not applicable
Project/contract amount		EUR 813m	£150m	£30m	AUD 23 m	AUD 31,7 m+ AUD 26 m	AUD 1.1 m-2.6m	CNE to invest USD 150 million in Caribbean coast, FEPI	USD 1.3 million
Scope	6 locks	32 km dike	40 km flood defences, Norfolk Broads – key EU wetlands	9 km long sea defences; open beach with fewer groynes	establish and maintain a safe, navigable entrance to the Tweed River and restore and maintain the coastal sand drift to the beaches on the southern Gold Coast of Queensland	42km of oceanfront coastline	370 m rock armour seawall	variety of flood protection projects in the Caribbean	Flood protection plan, including "room for the river" type of measures
Funding	Taxes	Taxes	Taxes	Taxes	Taxes	Taxes + Private investments	Tariffs / specialy rates levees to pay investments in 10 years	Taxes (CNE) + Annual Income Banana Sales, 2 USD cents/box exported (CORBANA)	Private investment Dole Company (10 year pay back). A flood of 1000 ha could mean USD 4 million in losses.
Contract granted by:	RWS	RWS	Environment Agency	Environment Agency	State of NSW and Queensland	not applicable	not applicable	not applicable	not applicable
Considered successful?	yes	yes	yes	yes			Controversy	yes, in progress	yes

Santa Cruz de Yojoa, Honduras. Credits Unsplash

4.4. DEVELOPING THE BUSINESS CASE OF ADAPTATION PROJECTS

Taking into account the new insights developed by the review of pioneering models for private sector participation in adaptation, we can conclude that for climate funds to bring about transformative change, they need to deepen their understanding of the different roles that the private sector can play. The potential of private sector participation in each of these different roles within different sectors also needs to be further explored. Four key roles the private sector could take are:

- **Equity investor**, providing co-funding for adaptation measures to be undertaken either within their own economic activities or in adaptation measures beyond the fence. In this role the private sector can provide funding in the form of tariffs or other monetary and non-monetary contributions that pay for the long-term adaptation benefits they receive. An example is companies located in a watershed investing up front or on a regular basis in watershed conservation measures that make them less vulnerable to drought events.
- **Service provider**, taking on the role of project developer. In this case a consortium of companies, often organized in a Special Purpose Vehicle (SPV), pre-finance an adaptation project themselves by combining a loan requested to banks and a limited share of own equity investments. They pay back these investments with the payments they receive for the adaptation services they deliver to either public or private sector clients. Project finance is often the type of financial structuring opted for in these types of projects.
- **Expertise provider**, contributing to the delivery of adaptation projects but not in an integrated manner as service providers do and, in most cases, not acquiring debt to implement the given activities or works. These could be consultancy

companies that support the design or other phases of the project without directly carrying performance or market risks.

- **Financier** (e.g. banks and fund managers), providing capital up front, often in the form of loans for: a) companies in the real economy that want to invest in adaptation measures to increase the resilience of their own assets and economic activities (group 1), and/or b) companies willing to invest in projects and/or assets to deliver adaptation and climate services to others (groups 1 and 2). Financiers, unlike investors (group 1), do not directly carry the market or performance risks involved in the delivery of these adaptation projects, and they receive a fixed interest rate for the money they lend. Therefore, their financial assessments of opportunities are different from those of investors.

Each of these roles concern different types of private sector actors, for which different drivers and barriers for engagement apply. MCFs are well-positioned to support countries in developing coherent midterm strategies to engage private sector in each of the (infrastructure) sectors and value chains vulnerable to climate change. These include a clear, phased and blended finance approach that deals with each of these specific barriers faced by each of these four sets of actors and that enable the creation of effective, competitive markets for different types of adaptation investments.

It can also be concluded that to make climate adaptation a financially viable concept for developing countries, a new generation of implementation arrangements need to be developed that are effective in improving the cash flow and risk profiles of adaptation projects and which make them attractive to private sector participation. An implementation arrangement includes the choice of governance mode and funding, financing and procurement strategy (Altamirano, 2019). Its success in generating enough revenue depends on a sound business model that is able to capture and monetize the multiple benefits of adaptation investments that are often experienced as positive externalities.

As stated earlier, when using the most innovative financing mechanisms and instruments (e.g. green bonds), an important requirement is a sound Performance-Based Contract (PBC) in which a 3rd party is paid for the delivery of a project and for providing a given level of service, specified through a number of key performance indicators (KPIs). In the world of public procurement of infrastructure, it is widely recognized that PBCs are the key building blocks of successful public-private partnership (PPP) contracts. The conditions in PBCs (i.e., payment mechanisms, bonus-malus schemes, and KPIs) and the way these contracts are tendered aim to incentivize the private sector to deliver value for money, and they enable effective risk transfer to the one most able to manage these risks most efficiently.

When opting for PBC and/or Pay-for-Success models for climate adaptation, including PPPs, it is essential to:

- **Define KPIs that specify minimum levels of service** for the main service(s) being provided by the project, e.g. flood protection;
- Have a validated baseline set of (performance) data per project;
- Develop specific **risk allocation matrices** for different types of adaptation projects that offer a fair allocation of risk and which reflect what contractors or third

parties implementing the project can really control, while creating incentives strong enough for the delivery of value for money; and

- **Implement risk sharing facilities**. This should be done considering the capacity to effectively transfer certain project risks to the private sector. Whether or not risks can be transferred will depend to a great degree on r the nature of the systems involved in the provision of the specified services and/or to the innovative nature of the technologies that need to be implemented in the project.

Developing countries that make use of climate funds' concessional funding and/or readiness programs could engage in a process of mutual learning with countries likes the Netherlands (which has the largest PPP program for the rehabilitation of locks), Australia and the UK (which have the most experience in using PPPs for flood protection). This could involve an exchange of best practices on how to set up a performance matrix and allocate risks between the public and private sectors for adaptation and climate resilience projects.

To not only solve the financing gap but also to find successful funding solutions, it is urgent to develop innovative business models for different types of adaptation measures that enable the generation of alternative revenue streams and which are deemed financially viable. The development of this new generation of implementation arrangements and investment vehicles requires co-creation as well as transdisciplinary and multisectoral cooperation in the process of project preparation. The **Financing Framework for Water Security** (FFWS) offers such an interface between the project delivery and finance communities, and between the water resources planning and watershed conservation communities. Within the FFWS the development of investable and/or bankable water security and climate adaptation projects is supported by a unique action research approach (Altamirano, 2017, 2018a) in which the full business case of these projects (see Text Box 12) is improved by:

- **Bridging the different worlds of expertise and making use of collaborative modeling techniques** to create a shared understanding of the system dynamics between different sectors and disciplines (e.g. project finance, water resources management, ecology and others). Through this process sound technical, biophysical and socio-economic assessments of the system can be developed, and the problem(s) the investment program and/or project is supposed to alleviate can be made clear. As explained later, through this process a clear theory of change for the proposed investment program is developed.
- **Blending different sources of funding and financing** – a deep understanding of the drivers of water risks and the multiple benefits of the proposed strategy is a sound starting point for the development of a blended finance strategy that mixes different thematic concessional funds (ODA Water, Climate Finance, Conservation Finance and others) and which then stimulates the creation of private markets in a synergetic way. The blended finance (OECD and WEF, 2015; OECD, 2018) approach is central to mobilizing private capital flows to emerging and frontier markets and leveraging greater private sector participation.
- **Advocating a nexus approach to National Investment Systems**: developing innovative cross-sectoral PPPs and multi-functional infrastructures that enable the capture of the significant value of adaptation and water security investment externalities.

- **Introducing climate risk management considerations in PPP schemes** and infrastructure investments, as this will incentivize private sector investments in financial and technical resources for improving the resilience of infrastructure networks.
- **Developing social business models** at the local and/or community level to reduce national funding gaps for the maintenance of structural and non-structural adaptation measures.
- **Embracing the possibilities of digital innovations** in shaping existing institutional and governance constraints, such as Fintech and Blockchain.

Textbox 12. The Five Case Model

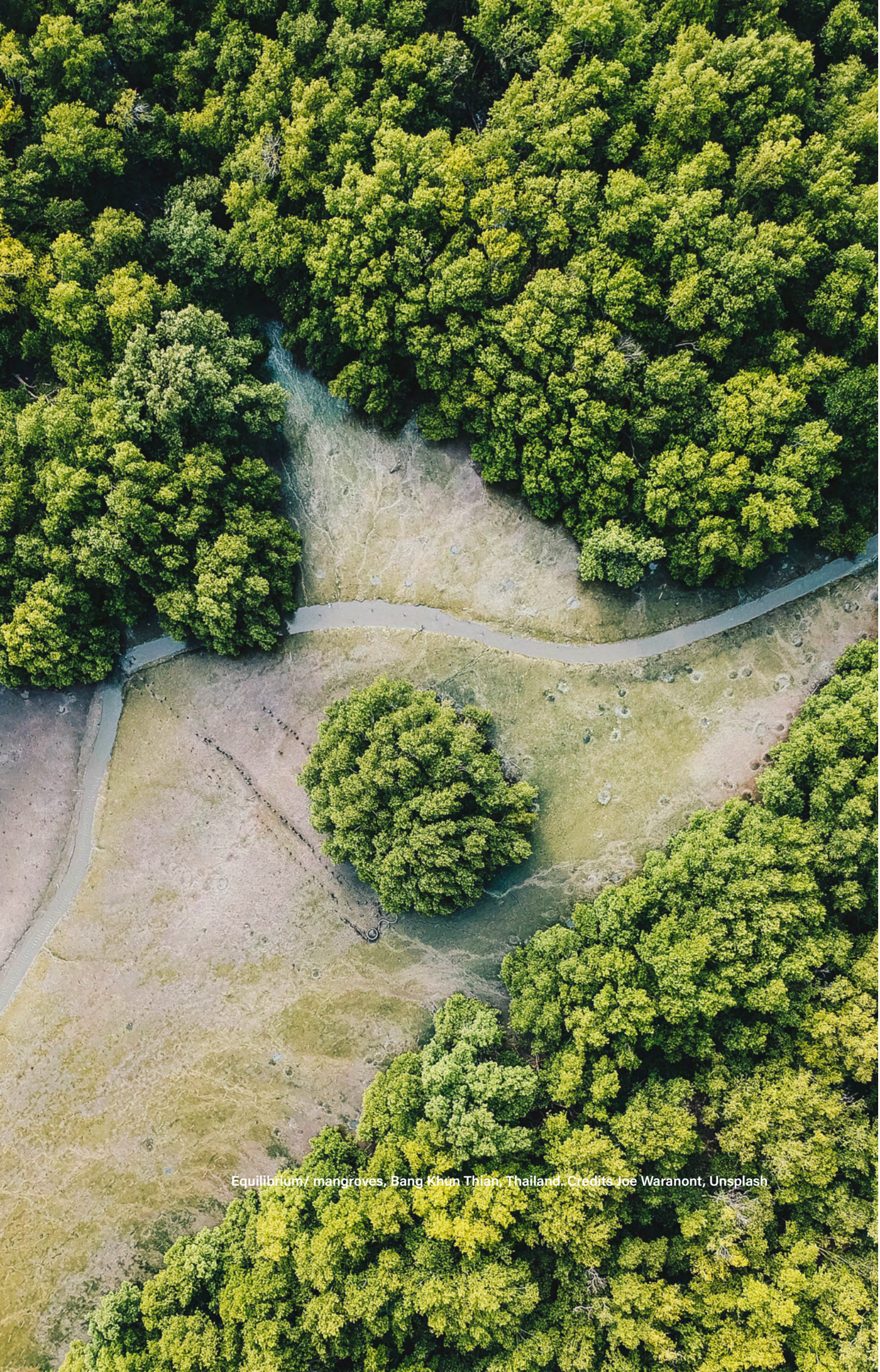
The Five Case Model

The objective of a business case is to ensure that programs and projects in which scarce public funds will be invested meet their intended goals and objectives and deliver the intended benefits by making sure the proposed investments: a) make a robust case for change – the 'strategic case', b) optimize Value for Money in terms of economic, social and environmental benefits – the 'economic case', c) are commercially viable – the 'commercial case', d) are financially viable – the 'financial case' and e) are achievable – the 'management case'.

The Five Case Model is the approach for developing business cases recommended by HM Treasury, the Welsh Government and the UK Office of Government Commerce. It has been widely used across central government departments and public sector organizations over the last 10 years. The model forms the basis of project and program business case guidance created by HM Treasury and the Welsh Government.

To improve the business case of adaptation investments, most positive externalities and value created by these investments need to be captured through diverse mechanisms that enable their conversion into revenue flows. Two of these mechanisms are value-capturing taxation strategies, as the ones used in the transport sector, and the creation of environmental and/or ecosystem markets.

Weston Super Mare, United Kingdom. Credits Unsplash



Equilibrium/ mangroves, Bang Khun Thian, Thailand. Credits Joe Waranont, Unsplash

5. THE WAY FORWARD IN DRIVING A PARADIGM SHIFT

This final chapter aims to summarize the main findings and conclusions of the research and offer operational recommendations for key actors in the global architecture (i.e., donors, climate funds, the private sector, the financial sector and governments) for enhancing the catalytic effect of climate finance in leveraging greater private sector investments and impact in adaptation. Ultimately, we hope that these recommendations can help to drive the required shift in our economic paradigm.

According to previous studies (IFC, 2013; CIF, 2016; CPI, 2020) and our review of the project pipelines of the AF, PPCR and GCF, there seems to be increasing interest from the private sector in investing in adaptation. Nevertheless, even with the support of MCFs, the investments materializing are not yet reaching the levels required to achieve the internationally agreed upon climate goals. Therefore, it was necessary to conduct a more in-depth analysis to be able to anticipate the drivers and barriers for private sector participation in adaptation. By examining the experiences of stakeholders other than climate funds (such as MDBs and impact investors) in leveraging private sector investments, we found inspiration on how climate funds can enhance their impact.

5.1. A DECADE OF CLIMATE FINANCE

From a review of the developments in the global climate finance architecture in the last decade, paying special attention to what Khan et. al (2020) called the 'post-Paris era' onwards, the important findings and trends observed regarding different key actors and the flows they manage are the following:

5.1.1. Global Climate Finance Landscape - trends observed

Global annual climate finance flows from both international and domestic sources have steadily increased from USD 306 billion in 2012 to an estimated USD 608-622 billion in 2019. Adaptation finance gained momentum in 2017-18, increasing 35% to an annual average of USD 30 billion versus USD 22 billion on average per year in 2015-16. Nevertheless, a majority is still directed towards mitigation, with adaptation representing the equivalent of 5% of total flows in the period 2017-18.

The share of private sector in these flows has fluctuated little, from 51% in 2016 to 48% for the period 2017-18, yet showed an increase in real terms from USD 232 to 274 billion. However, for adaptation, the vast majority of financing still comes from the public sector (CPI, 2017; CPI, 2019). In the period 2017-18 private corporations invested the largest share of climate finance (USD 155 billion). At the same time, the CPI analysis of 2018 records no private sector funding for adaptation projects, indicating that most private sector efforts have focused on mitigation but also that private investments in adaptation are difficult to track. Meanwhile, the World Bank Group report "Enabling private investment in climate adaptation and resilience" (Tall et al.,

2021) reports that only about USD 500 million (1.6 percent) of adaptation finance flows in 2017-18 came from private sources. The World Bank study also reports that a large share (70 percent) of these investments went to water and wastewater projects, followed by energy and other infrastructure (17 percent). It also reports that most private adaptation investments took place in higher-income countries, with Canada and the United Arab Emirates at the forefront.

These findings coincide with earlier findings from the CIF that found that water-efficient technologies received the most MDB adaptation finance for the private sector in the period 2013-15 (CIF, 2016) and could indicate a growing concern and interest from private sector in the management of water risks. This is not surprising knowing that that the impacts of CC will be channeled primarily through the water cycle and that without further action, water scarcity could cost some regions up to 6% of GDP (World Bank Group, 2016). As reported by the Carbon Disclosure Project (CDP, 2021) USD 301 billion of business value is at risk unless companies improve and innovate around water use, while the cost of response estimated at USD 55 billion. In other words, the cost of water risks to business is five times higher than cost of taking action.

Unfortunately, it also points to alarmingly low levels of private adaptation finance in developing countries and reinforces the message that an enabling environment for private sector investments is crucial. As public budgets will be more than ever constrained by COVID-19 recovery investments in other priority sectors (i.e. health care and social programs), to leverage private sector participation and investments in adaptation is more than ever critical for developing and emerging economies.

The global greening of financial markets is creating a greater role for institutional investors and funds. Climate finance flows from institutional investors averaged USD 9 billion in 2017-18, over three times greater than in 2015-16. The green bond market is growing very rapidly. Annual issuances of labeled bonds reached USD 165 billion on average in 2017-18, compared to USD 62 billion in 2015-16 (CBI, 2017, 2019).

Grants represent a larger share than ever before, even though overall the new financing for development approach presented in the Addis Ababa Action Agenda (UN, 2015), promotes a shift from grants only towards a more blended finance approach. Annual grant finance averaged USD 29 billion (5% of total flows) in 2017-18, compared to USD 18 billion (4%) in 2015-16 and USD 13 billion (3%) in 2013-14. This increase could be explained by enhanced efforts by public actors in building strong enabling environments and in undertaking demonstration projects for sustainable and resilient development across a range of sectors. The increase also reflects the need for public flows to reach more challenging sectors and geographies. Almost three-fifths of tracked grants in 2017-18 were international, and two-fifths were domestic.

Increasingly, risk management instruments are being used to leverage private investments. Annual commitments related to these instruments represented USD 1.5 billion averaged over 2017-18, compared to USD 970 million in 2015-16.

The major role of public institutions in providing project-level market-rate debt might be a reason for concern regarding the crowding out of private finance.

Public institutions provided 66% of project-level market-rate debt in 2017-18, with MDBs and national DFIs being the major providers. Such a high percentage creates reason for concern, especially in markets where proven private sector business models exist, such as large-scale renewable energy projects. In such markets a high percentage may indicate the risk of crowding out private finance. As there is an increasing use of blended finance strategies, with possible unintended side effects, a systematic and thorough analysis is required to understand what the most effective mandate for DFIs is in different types of markets (CPI, 2019; IFC, 2021).

5.1.2. The role of Multilateral Climate Funds (MCFs)

MCFs are becoming increasingly important in the overall climate finance landscape. The finance they provide has increased from of USD 2.45 billion in 2016 to USD 3 billion in the period 2017-18, with the Green Climate Fund playing an increasingly important role. Total support pledged to MCFs as of February 2020 was in the order of USD 11.2 billion for mitigation, USD 4.4 billion for adaptation and USD 25.3 billion for cross-cutting projects that aim at both adaptation and mitigation. The projects approved total 567 mitigation projects, 669 adaptation projects and 1,299 cross-cutting projects.

These amounts are still relatively small compared to total climate finance flows, but they demonstrate a growing trend in the funding commitments of MCFs, most significantly by the Green Climate Fund (GCF). Accordingly, MCFs are expected to play an increasingly pivotal role in channeling climate finance from developed to developing countries, and thus in unlocking potential opportunities for climate-smart investment by private sector entities.

5.1.3. The role of Multilateral Development Banks (MDBs) and Development Finance Institutions (DFIs)

Most public climate finance – predominantly from developed country governments – is channeled through intermediaries, principally development finance institutions (DFIs). DFIs can be national, bilateral or multilateral institutions, such as multilateral development banks (MDBs). The role of MDBs and DFIs in public climate finance has evolved in a generally positive direction. Their contribution to climate finance increased from USD 194 billion annually in 2015-16 to 213 billion in 2017-18. In relative terms DFIs accounted for 90 percent of total public climate finance in 2015-16 and 71 percent in 2017-18, and for 33 percent and 37 percent respectively in terms of overall climate finance flows (CPI, 2018 and 2020a). MDBs accounted for the equivalent of USD 57 billion in 2017-18, or a bit more than a quarter of the DFI total.

5.1.4. Trends in the private adaptation finance landscape

Private sector adaptation finance and its net contribution to resilience are difficult to account for (UNEP, 2016). The private sector invests in adaptation by making use of either internally generated resources or finance accessed from public or private bodies such as banks, equity providers and MDBs. Therefore, as proposed

by the CIF (2016), the easiest flows to account for are those of international public adaptation finance directed to the private sector. MDBs maintain accounting of these flows. They define their **private sector adaptation finance** as the component of their investments in the private sector that relates to making the investments more climate-resilient (CIF, 2016). According to Buchner et al. (2015), the total of international public adaptation finance flowing towards the private sector in 2014 was only 5.6% of all adaptation funds (approximately USD 1.4 billion of the USD 25 billion total).

The largest providers of these funds were multilateral development finance institutions (DFIs), including MDBs. In 2019 MDBs reported a total of USD 14.9 billion in commitments for climate change adaptation finance, of which 93 percent were committed to low-income and middle-income countries and approximately 8% to the private sector. Approximately 5% of this total, equivalent to 847 USD million, supported private sector adaptation efforts, which is more than double the amount of USD 342 reported in 2016.

To the private sector, climate change does not only represent a risk, but also an important business opportunity. The IFC estimated that there would be a USD 23 trillion investment potential in climate-smart products and services between 2016 and 2030 (IFC, 2016). Climate finance, as the concessional finance targeted to drive a paradigm shift, is expected to be a crucial building block of a blended finance strategy that can unlock these opportunities.

5.1.5. Increasing complexity and barriers to access

The total number of public and private channels within the global climate finance architecture has been steadily growing. In 2008 the total was 99; while in 2015 it was already more than 90 (NDC Partnership, 2008; OECD, 2015). This multitude of funding channels increases the options for recipient countries and, theoretically, also the possibilities to provide funding complementarity (CFU, 2020b). At the same time, it introduces considerable fragmentation into the delivery of climate finance.

This fragmentation increases the complexity of the global climate finance landscape and may result in difficulty in tracking it transparently. Additionally, and more importantly, it results in vast transaction costs. These are faced upstream by contributors, who may be duplicating efforts. They are also faced downstream by governments, civil society and private sector in developing countries, for whom limitations in project preparation capacity may translate transaction costs into to barriers to access (Robinson and Dornan, 2017; Robinson and Gilfillan, 2017). Much closer cooperation and effective coordination, both upstream and downstream, is required for the effective transition to new economic growth models that ensure both resilience and carbon neutrality.

5.1.6. The need for coordinated public-private adaptation action

Summarizing, even though the percentage of climate finance dedicated to adaptation versus mitigation has increased between the Paris Agreement (2015) and 2020 (e.g. from 13 to 24% in the case of MDBs), investments in adaptation, especially those

involving the private sector, are still dwarfed by mitigation investments. All in all, adaptation finance continues to fall significantly short of the required global adaptation financing of USD 180 billion annually for the period 2020-2030 (GCA, 2019). As reported by UNEP in its recently published Adaptation Gap Report 2020, annual adaptation costs in developing countries alone are currently estimated to be in the range of USD 70 billion, and these might reach USD 140–300 billion by 2030 and USD 280–500 billion by 2050. As adaptation finance and adaptation costs are difficult to compare, all that can be deduced using the available evidence is that given the pace of climate change and impacts, the adaptation finance gap is not narrowing as a result of current efforts (UNEP, 2021, p.XIV).

There is also much yet to be done to achieve the balance between adaptation and mitigation called for in Article 9 of the Paris Agreement. While adaptation is likely to remain a largely public finance activity (World Bank Group, 2019), given the inherent public good and common resources economic nature of most projects, there are increasing opportunities to raise the input level of the private sector in climate adaptation finance. Developments like the recommendations of the Task Force on Climate-related Financial Disclosures, and others aimed at greening the financial sector, are increasing private sector awareness of the risks associated with climate change and also the business opportunities.

Against this context, climate finance is expected to be a crucial building block in a blended finance strategy that can unlock these opportunities and drive a paradigm shift. The need to intensify climate adaptation action and significantly increase the share of public and private financing for adaptation was the key message during the Climate Adaptation Summit in January 2021. Multiple world leaders expressed their commitment to this agenda and communicated concrete goals. Among these commitments are:

- The **Netherlands** will ensure that its climate finance is equally balanced between mitigation and adaptation. The country is committed to contributing an additional EUR 20 million to the Least Developed Countries Fund to adapt to climate change; and EUR 100 million for the Drylands Sahel program for sustainable agriculture, including better incomes for farmers and livestock farmers.
- One-third of **France**'s climate finance aid, equivalent to EUR 2 billion, will be allocated to climate adaptation.
- **Germany**[10] committed a total of EUR 270 million in extra budget for climate adaptation, in support of vulnerable communities, to be used to extend risk financing and insurance. Within the framework of the InsuResilience Global Partnership, the aim is to provide EUR 500 million each year, particularly in insurance for poor people to cover disastrous climate-related risks such as lost harvests or flooding.
- The **African Development Bank** (AfDB) has committed to mobilize USD 25 billion as climate finance between 2020 and 2025, of which at least 50% will support climate adaptation and resilience building.

10 Germany is one of the world's major donors in the field of climate finance, and it is meeting its international climate finance pledges. In 2019 it provided EUR 4 billion on the basis of budget funds, marking a doubling of funding since 2014. Africa is a priority region for Germany's engagement in the field of adaptation to climate change, with a focus on food security and water supply.

Meanwhile, the World Bank Group, in its Action Plan on Climate Change Adaptation and Resilience, committed to ramping up direct adaptation climate finance to USD 50 billion over the period 2021-25. This commitment to an average of USD 10 billion per year is more than double the average of the finance recorded in 2015 and 2018. The plan includes piloting new approaches to increase private finance for adaptation and resilience.

5.1.7. The impacts of COVID-19 on the global climate finance landscape

The impacts of COVID-19 on climate finance are expected to differ significantly over time and across regions. Yet some of the most important near-term impacts projected for developing countries are already clear. These include declining domestic resource mobilization as economic activity is reduced (CPI, 2020a), as well as a significant reduction in external private investments, as the global economic fallout has led to a flight to safety of unprecedented magnitude (OECD, 2020).

At the same time, there are reasons for hope. First, the way the COVID-19 crisis has evolved worldwide has created an unprecedented global understanding of the systemic risks that exist for our economies and our well-being at large. As the impacts of this crisis are more and more experienced and understood, an opportunity for systems innovation and change is also opening. According to BlackRock's Global Client Sustainable Investing Survey (BlackRock, 2020), COVID-19 and its related health and economic challenges have not slowed investor demand or damaged the outlook for sustainable investing. On the contrary, the 'tectonic shift' it recognized earlier seems to be taking place. This shift is a historic opportunity to increase private sector participation in adaptation, provided the systemic barriers faced by the private sector with regard to investing in adaptation versus mitigation are dealt with on time.

Second, in the medium- to long-term, the fiscal stimuli packages being set in place by different governments could set in motion the required transformation and shift in our economic development models, provided they are properly designed and implemented.

The outlook for climate finance in the next years depends more than ever on successful public-private collaboration. In this context, the role of Development Finance Institutions (DFIs) and MDBs will be crucial in driving a green recovery. They have a unique role to play in shaping the recovery through country-led policy dialogues and collaboration with the private sector (CPI, 2020a). A summit of DFIs (Finance in Common, 2020) called for "linking short-term needs with long-term transformations". Public financial institutions seem to be accelerating efforts to embed sustainability into their lending activities.

Summarizing, COVID-19 is a stark reminder that a shift in our economic development paradigm is urgent. This shift requires collaboration between global and local actors in development finance and beyond, not as a one-off but consistently across the next decade.

5.2. ACHIEVING A PARADIGM SHIFT THROUGH ADAPTATION PROJECTS

According to the Global Commission on Adaptation (2019), rising seas and greater storm surges could force hundreds of millions of people in coastal cities from their homes and generate losses of more than USD 1 trillion yearly by 2050 in coastal urban areas. Meanwhile, a World Bank report (2016) states that the impacts of climate change will be channeled primarily through the water cycle and that water scarcity could cost some regions up to 6% of their GDP.

Accordingly, the planning and design of effective adaptation measures will require a systemic approach that adopts proper measurement and analysis tools on a scale that is adequate to capture the dynamics of the water cycle. We need to create a shift from climate proofing specific (infrastructure) assets to climate proofing entire value chains[11] and infrastructure systems[12], and we need to start seeing water security on a much larger scale – at the level of watersheds and entire coastal zones.

To reverse these frightening trends, the GCA proposes three revolutions: a revolution in understanding, a revolution in planning and a revolution in finance (GCA, 2019). First it is essential to understand the dynamics between our current economic system and environmental security. By understanding the dynamics that emerge between our natural systems and climate, socio-economic and institutional systems we can identify leverage points for systems change (Altamirano, 2019). Leverage point are points of power that could be impacted through different policies and measures. These shifts could change existing economic growth dynamics where growth seems to be coupled with increasing vulnerability to climate and environmental risks and ecosystem degradation. They could also drive the uptake of a 'regenerative economy' or 'regenerative capitalism', an economic system that goes beyond economic growth towards collective well-being and environmental sustainability (Lovins et al., 2018; Fullerton, 2015).

Successful adaptation is not about making incremental or piecemeal investments. Rather, it is about planning for and doing (investing) differently, systematically taking into account both present and future climate risk from the start (World Bank, 2019, p.6).

Effective climate risk reduction requires planning at the system level, moving from a 'resistance' paradigm to one of 'resilience', aiming in the long term at real 'transition' (See Figure 18).

11 Value chains can be defined as the range of goods and services that link the producer to the customers or end-consumer. A 'supply chain' refers to the system and resources required to move a product or service from supplier to customer. The 'value chain' concept builds on this to also consider the manner in which value is added along the chain, both to the product or service and to the actors involved.

12 Infrastructure is the set of fundamental facilities and systems that support the sustainable functionality of households and firms. In general, infrastructure has been defined as "the physical components of interrelated systems providing commodities and services essential to enable, sustain, or enhance societal living conditions" and maintain the surrounding environment.

Moving in this direction with adaptation requires, among others:

- **Leveraging the resilience dividends of ecosystems and acknowledging the insurance value of ecosystems** (Paavola and Primmer, 2019; Dallimer et al., 2020; Unterberger and Olschewski, 2021) and Natural Assurance Schemes (Denjean et al., 2017). By making use of the full potential of healthy ecosystems as buffers that protect our societies against climate change-driven extreme events we also advance cost-effectiveness. For this to be possible, we need to invest in Nature-based Solutions (NbS) and hybrid (green and grey) infrastructure strategies for environmental and climate security. As reported by UNEP (2021), despite evidence of an increase in finance for NbS with adaptation benefits, funding levels remain low. Analysis of investments realized by the GEF, GCF, AF and the International Climate Initiative suggests that support for green and hybrid adaptation solutions has risen considerably over the past two decades, with cumulative investment in projects with NbS components now standing at USD 94 billion, of which 13% is directed specifically towards NbS. Yet of all international climate finance, only 3% is being invested in NbS (Nature4Climate website, accessed March 2021).
- **Taking a multi-hazard and source-to-sea approach**, aiming at the water security of entire inland and coastal systems. The source-to-sea approach directly addresses the linkages between land, water, delta, estuary, coast, near-shore and ocean (pelagic) ecosystems in support of holistic natural resources management and economic development (Mathews et al., 2019). Meanwhile, the multi-hazard approach, as proposed by the Sendai Framework for Disaster Risk Reduction, can be defined as an approach that considers more than one hazard in a given place (e.g. floods, droughts) and the interrelations between these hazards, including their simultaneous or cumulative occurrence and their potential interactions (Budimir et al., 2014; Gill and Malamud, 2016).
- **Tackling the vulnerability of communities in a holistic matter**. It is important to understanding the physical as well as the socio-economic mechanisms that cause vulnerability for communities and especially for the most disadvantaged groups (Hallegate, Fay and Barbier, 2018).
- **Adopting a value chain approach in the analysis of climate resilience.** We must explicitly consider the roles of the companies and communities operating these value chains, as well as the contributions of critical infrastructure networks managed by the public sector to overall systemic resilience. The weakest link ultimately determines how resilient a value chain is. If critical infrastructure networks are not sufficiently maintained and well managed, the private sector companies operating in the value chain that depend on them will experience a disincentive to increase the resilience of their operations beyond the level defined by these networks.

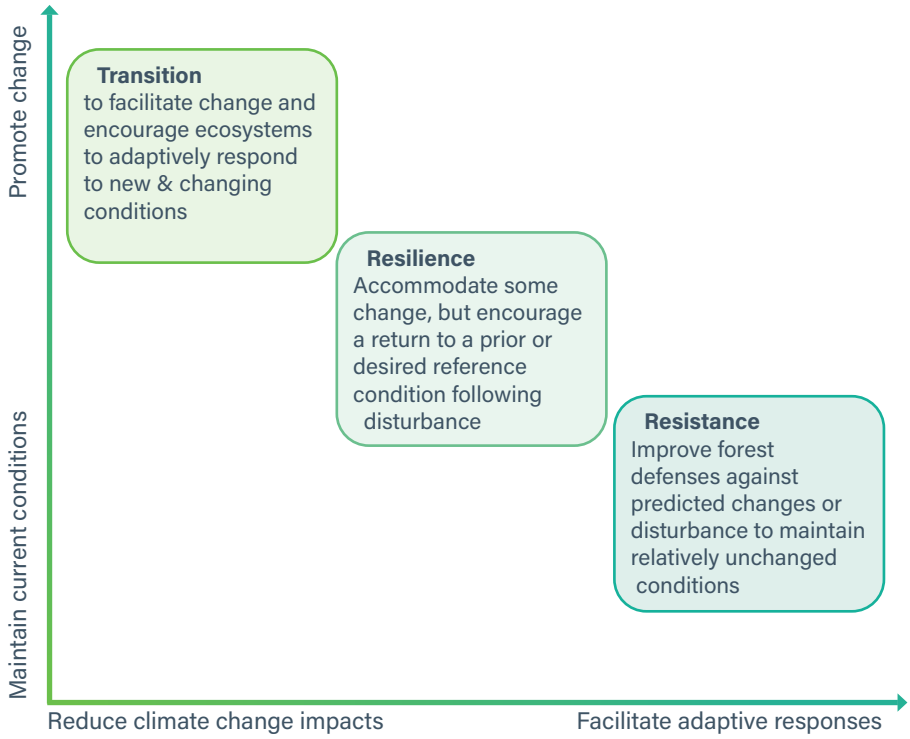


Figure 18. Alternative Adaptation strategies. (Adapted from Nagel et al., 2017)

The high impact and transformational adaptation projects that might result from applying these principles are nevertheless expected to be challenging to design and implement, due to several reasons:

- **System scale interventions involve complex projects.** These projects need to take into account the interdependencies between multiple functions and sectoral investments. This complexity is expected to increase the magnitude of transaction and project preparation costs, but also of contractual risks for both the public and the private sectors. See, for example, the case of the master plan for the sustainable development of Manila Bay, depicted in Figure 19.
- **The public good and/or common pool resource economic nature of system scale interventions has historically made private sector involvement controversial.** System scale interventions, such as watershed conservation, ecosystem restoration and the upgrading of entire infrastructure networks to significantly reduce the levels of systemic risks, are expected to show more characteristics of public goods and/or common pool resources, requiring public-private cooperation as well as collective action and investments. Historically, private sector participation in the provision of public goods and the management of common pool resources has been limited and even controversial.
- **These projects will most probably involve the deployment of innovative technologies**. The use of non-proven technologies adds significant performance and construction risks, ultimately making these projects less attractive for private sector investors and/or financiers.

a) **There are many uncertainties and knowledge gaps.** There are still important knowledge gaps that need to be solved to ensure that system scale and water-

shed or landscape interventions have the desired long-term effects. Examples are the knowledge gaps around Ecosystem-based Adaptation and/or Nature-based Solutions. Despite the increasing number of research projects on this topic, important questions remain regarding the effectiveness of Nature-based Solutions in mitigating diverse hydrometeorological risks. These include the effectiveness of reforestation and land use practices in reducing drought risks in the long term, how much protection mangroves and other natural flood barriers can guarantee under extreme conditions. Other questions concern the cost-effectiveness of projects like these versus traditional grey infrastructure solutions, and their vulnerability in the long term to a changing climate and increasing biodiversity risks.

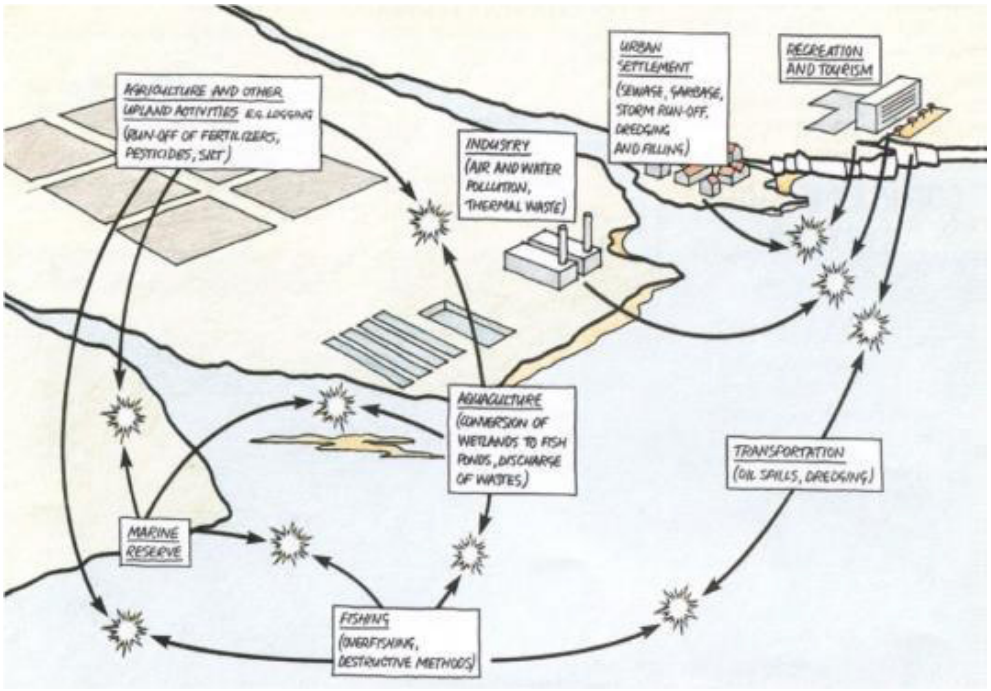


Figure 19. Master plan for the sustainable development of Manila Bay: interactions between uses that need to be considered in its development (Source: DRR Mission Report, "Manila Bay Master Planning to Achieve the Sustainable and Inclusive Management and Development of Manila Bay", January 2015, Government of the Netherlands. Figure 2.2 Complex user interactions (positive or negative) within the plan area).

5.3. PUBLIC-PRIVATE COOPERATION TO IMPROVE THE BANKABILITY OF CLIMATE ADAPTATION PROJECTS

A balanced and well-informed strategy for private sector engagement needs to be developed that acknowledges, among others, the following:

First, most adaptation projects have a public good and/or common resources economic nature. In these sectors a number of market failures may create an inherent conflict of interest between the public sector's societal goals and the private sector's key driver of maximizing profits. In other words, the optimal level of investment and effort required for collective well-being is often beyond what is commercially optimal and viable.

Second, the increasing frequency of extreme events has created awareness among most private actors regarding the need for adaptation and has raised their genuine interest in contributing to increasing resilience in infrastructures and value chains.

Third, most economic activities (e.g. value chains) and assets (e.g. infrastructure assets) that require urgent adaptation are under private sector management and/or ownership.

Fourth, there are significant differences between economic sectors in terms of both technical and institutional characteristics. The co-evolution of governance and technology in these sectors within a particular region or country need to be taken into account in the design of an effective strategy for private sector engagement and blended finance. A comprehensive understanding of the economic governance of each sector and the allocation of roles between public, private and civil society actors may prevent misalignments and increase the effectiveness of the resulting strategy in incentivizing private actors to achieve the expected efficiency and financial sustainability gains.

The World Bank report entitled "Options for Increased Private Sector Participation in Resilience Investment" (World Bank, 2017) analyzes the potential and need for blended finance solutions in four economic sectors: water, agriculture, transport and energy. In addition to sectoral differences, this study underlines the need to also consider the differences between two broad classes of investment: infrastructure and value chains. Investment in infrastructures requires different competencies than those needed for investment in value chains. They involve different investment processes and project selection criteria and attract different classes of investors.

To finalize, our analysis of the project portfolios of the GCF, AF and CIF/PPCR, and of the pioneering experiences of MDBs and impact investors, leads to the conclusion that in order to make climate adaptation a financially viable concept for developing countries, a new generation of implementation arrangements is required. Innovative business models and implementation and financing arrangements need to be developed that are effective in improving the cash flows and risk profiles of adaptation projects and which make them attractive to private sector participation.

5.3.1. Private sector key roles

In this endeavor it is important to define four key roles private sector actors could play:

- **Equity investor**, providing co-funding for adaptation measures to be undertaken either within their own economic activities or in adaptation measures beyond the fence;
- **Service provider**, taking on the role of project developer;
- **Expertise provider**, contributing to the delivery of adaptation projects but not in an integrated manner and, in most cases, not acquiring debt to implement the given activities or works; or
- **Financier** (e.g. banks and fund managers) or provider of capital up front, often in the form of loans for third parties willing to invest in adaptation.

Each of these roles concern different types of private sector actors. They vary per sector and/or value chain, whereby different drivers and barriers to engage may apply. MCFs in cooperation with DFIs and donors are well-positioned to support national governments in developing coherent methods and long-term blended finance strategies that enable the creation of effective, competitive markets for adaptation technologies and services in these different sectors and value chains.

5.3.2. Need for co-creation of next-generation investment vehicles

As previously mentioned, a recent BlackRock survey showed that investors expect to double their allocation to sustainable and impact investing within the next five years (BlackRock, 2020). However, as stated recently in a Harvard Business Review Article (2021), to achieve these goals they will have to do more than simply double the amounts they invest, as there is still a scarcity of readily bankable projects for them to invest in. They would have to get more involved in the development of projects upstream.

For the use of innovative financing mechanisms and instruments such as green and resilience bonds, an important requirement is the design of a sound performance-based contract (PBC), an area still under development for adaptation projects. To improve the business case of adaptation investments, most positive externalities and value created by these investments need to be captured through innovative mechanisms that enable their conversion into revenue flows.

For the development of this new generation of investment products, including PBC contracts for adaptation projects and novel governance structures for collective investments at a watershed level such as ecosystem markets, increasing collaboration between multiple parties and sectors is needed. A process of co-creation is important, in which impact investors are fully at the table with the 'problem solvers' – the people and organizations working on the environmental and social challenges that these investors want to help fix (Harvard Business Review, 2021).

The objective of the action research approach presented in Chapter 4, entitled Financing Framework for Water Security, is precisely that of enabling a transdisciplinary, multisectoral and collaborative process of project preparation.

The detailed recommendations presented in the closing meeting of the research visit to the GCF, November 30th, 2017 ("Towards a Climate Resilient Future: The challenge to leverage private sector investments in adaptation") are presented in Appendix A.

5.4. FURTHER RESEARCH NEEDED

Remaining knowledge gaps faced by MCFs for which expertise from private sector actors, especially those involved in the delivery of infrastructure services, could prove useful are:

- Evidence and experiences with which to compare the effectiveness of NbS and/or green infrastructure with that of grey infrastructure and to develop the investment case for the former;

- Business case(s) for adaptation projects and for the entire transition process that will help to get the private sector on board in this type of investment, given the transitions risks and transaction costs involved in making the transition; and
- Further research in general to solve a question that is key to increasing the leverage factor of climate finance and its potential to bring about a paradigm shift, namely: how to make adaptation to climate change a financially feasible concept for developing countries.

Accordingly, secondary questions that need to be addressed to close current finance gaps and to ensure the continuous provision of services vital for resilient economies are:

- How can the private sector be most effectively engaged in climate adaptation – either as (co-) investors or as service providers that ensure sustainability in service provision?
- What role can the private sector realistically play in different sectors and types of climate adaptation projects?
- How can bankable and/or investable projects for climate adaptation best be structured? What funding and financing strategies are best suited to implementing different climate adaptation measures?
- What innovative business models and market-based mechanisms have proven (or may prove) successful in generating revenues to repay adaptation investments, or at least cover operation and maintenance expenses, to ensure sustained service provision?
- What taxations strategies, such as value capturing, might enable the generation of additional revenue sources and reduce the funding gap for climate adaptation projects?

5.5. MULTILATERAL CLIMATE FUNDS ROLE IN DRIVING 'TRANSFORMATIONAL CHANGE'

To summarize, for MCFs to be able to accelerate the achievement of a paradigm shift in the development models of developing countries, as well as to ensure the long-term effectiveness of the investments realized and their financial sustainability over time, we offer the following recommendations:

First, it is important to pay more attention to the operationalization of adaptation and resilience goals. This is somewhat less ambiguous when performance metrics are applied, whereby it is crucial to aim at system-level interventions. Shift the goal from climate proofing specific assets to climate proofing entire value chains, aiming at environmental and water security at the level of watersheds and entire coastal zones. As stated before, effective climate risk reduction requires planning at the system level, moving from a 'resistance' paradigm to one of 'resilience', aiming in the long term at real 'transition' towards a new economic order that adopts a regenerative logic.

Second, move from a public versus private financing strategy to a public-private blended finance strategy. This means investing more in: a) the creation of an enabling environment and easing the transition, b) becoming actively involved in the develop-

ment and testing of public-private models for service delivery of adaptation services, e.g. performance-based contracts for adaptation projects, and c) investing in the pilot testing of innovative governance structures that reduce transaction costs for private entities to invest in collective actions.

Last but not least, a systemic approach by climate funds, DFIs and donors is required to systematically and complementarily deal with barriers to private sector participation. Their concerted efforts, including those to jointly develop the climate rationale and alternative cost-sharing arrangements for different types of adaptation investments per sector, would be of great help in guiding countries and vulnerable communities toward developing higher-quality funding proposals while reducing overall public and private sector transactions costs.

5.6. FINANCING A PARADIGM SHIFT: A BLUEPRINT FOR GLOBAL-LOCAL COOPERATION

As stated in the World Bank's most recent Action Plan on Climate Change Adaptation and Resilience, effective climate change adaptation requires a different approach to development. Adaptation and development are inextricably linked and reciprocal: "good adaptation can deliver good development outcomes, and securing good development requires effective adaptation action" (World Bank, 2019, p.6).The challenge of closing the implementation gap in adaptation involves not only the need to significantly increase financial flows towards capital investments in new assets or the enhancement of existing assets, but also the need to finance the overall process of transition to a new development paradigm, with all of the additional inherent transition risks and transaction costs involved.

While the adaptation financing gap is significant, finance is only one of many barriers to the effective adaptation to climate change. In many cases, finance might not be the most binding constraint (World Bank, 2019). Often the governance of public goods and common resources such as water, and the elevated transaction costs involved in collective action, are the most binding constraints hampering adaptation investments. Strengthened cooperation and effective coordination between multiple actors at both the global and local levels might be more effective in closing the implementation gap of adaptation at the system scale than simply making more financial resources available.

At the same time, access to finance can act as a power incentive to drive transformation in governance. Through these changes it may also indirectly impact behavioral change. Yet to drive systems change, the scale at which climate investments are planned and prepared, and the criteria used to evaluate the effectiveness of these investments, need to change. The following was concluded in a dialogue between DFIs, donors, local banks and local governments during the 2020 Stockholm World Water Week, entitled "Financing a Paradigm Shift in Development Models in Asia-Pacific and Latin America":

The ultimate test of effectiveness is: are our programs creating the conditions for systemic change and favoring empowerment of local actors in the long term over efficiency in project delivery in the short term?

Special attention needs to be given to preventing concessional finance and development assistance programs from reinforcing local dependencies and crowding out local commercial and private finance as well as local human capital.

The development finance community and the global climate finance landscape can both be defined as multi-level systems. In order to drive a significant change in development models, influence needs to be exerted at different levels and in a coordinated fashion. In view of the increasing fragmentation of the global climate finance architecture, the crucial question then is: **How can the ability of the different levels of the system be enhanced to engage with each other to reinforce the process of change instead of dispersing attention and efforts?**

Each of the actors within the global climate finance architecture can exert influence to remove external barriers and limitations for communities to develop in a resilient way and for the private sector to invest in adaptation (e.g. access to finance, access to efficient technologies, etc.). They can also work to remove internal barriers to changes in behavior and practices (e.g. limiting beliefs or assumptions about how water systems work). A complicating factor is that since these actors operate at different levels, something that motivates change at the macro level might not be effective in motivating change at the local level.

Actors within the global climate finance architecture can undertake programs and projects that exert influence at five different levels:

- **Individual** – behavior and capability (e.g. a farmer's land use practices);
- **Community** – social capital and capacity to engage in decision making and collective action;
- **National institutions** – capacity and maturity, ability to plan developmental paths and connect with the communities they want to serve;
- **Regional and global public and private sector institutions** (including actors in the international development finance landscape such as MCFs, multilateral development banks and donors; and regional institutions like transboundary water management organizations and regional economic unions or communities) – level of involvement and ways to engage to create an enabling environment in the countries in which they work; and
- **Multinationals and companies** with a regional or global presence – ability to engage with local actors and global organizations to plan transformation in the value chains in which they operate.

A preliminary generic blueprint for coordinated action and allocation of responsibilities is presented in Table 11. This blueprint was developed with consideration for these different levels of action, the strengths of different actors within the global climate finance architecture, and the institutional, technical and financial elements of an enabling environment for private sector investments in adaptation. More than a normative allocation of roles, this table is a first attempt at starting a dialogue between these actors and other coordinated actions. This overview is far from complete; two crucial actors not yet included are: 1) the insurance sector and 2) private and institutional investors in general.

Making explicit at which level different programs and activities are operating and what kind of influence and impact they are hoping for could significantly help in mapping possible synergies and leveraging even greater impact. By mapping ongoing efforts collectively, blind spots and inconsistencies among efforts that aim to reduce the overall impact of public and private climate finance can be discovered and tackle on time.

To embrace this complexity does not mean that actors will not be able to specialize and focus their efforts on some aspects more than others. Quite to the contrary, the development of a shared long-term plan can enable each of the actors in the global climate finance architecture to further develop their strengths and capacities. The difference is that the pacing of their individual efforts will be informed by this larger plan and the agreed upon allocation of roles.

Besides, there are elements from the enabling environment for private sector investments that can only be put in place through close collaboration. An example is data and information about the proven adaptation and resilience benefits of investments, as these need to be sourced from a wide range of actors and communities, requiring a collaborative approach (CPI, 2019).

More efficient upstream coordination is expected to result in the reduction of transaction costs faced by actors upstream and downstream, at global and local level. This will ensure that a larger share of resources reaches the last mile. It will also ensure a stronger impact multiplier for individual actions, as synergy between measures of multiple sectors is expected to increase.

Table 11. Complementary roles of DFIs, MCFs, local banks and national governments

Area	Role of DFIs -including MDBs	Role of Climate Funds	Role of Local Banks	Role of National Governments
(Investment) Planning	Support the adoption of multi-stakeholder participatory planning approaches (World Bank 2019). Ensure that resulting plan and measures to be implemented advance equity and resilience of most vulnerable groups. Providing upstream support to ministries of finance and planning through between others climate informed macro-level analysis (World Bank 2019): a) Macro-modelling of climate impacts b) Debt sustainability analysis c) Public expenditure reviews d) Poverty diagnostics	**Supporting technically and financially the process of strategic planning at system scale** and advocating for a cross-sectoral nexus approach to public investments, ultimately incentivising donors and governments to go beyond climate-resilient projects to building systemic resilience . **Ensure national adaptation planning is evidence-driven and country-owned** (World Bank 2019).	Engage in strategic planning processes (e.g. DRM and IWRM) contributing with sectoral specific expertise, risk management expertise and the private sector lense regarding economic and financial viability and sustainability of investments proposed.	Developing a **solid pipeline of investable projects**, both grey and green infrastructure: departing from a evidence-based and inclusive processes of **strategic planning at system scale** (i.e. the watershed) and from a nexus (water/energy/food/environment) perspective, followed by a process **investment planning** minding that the synergies envisioned in the strategic plans are kept when developing a project portfolio and sound project preparation of individual projects is guaranteed.
Climate Data and information, communication and knowledge	**Provide technical assistance and advisory services**, to improve the access to climate data, analytics and tools that are sector and/or asset specific and that enable companies in the real economy to calculate the business case of investing, and do informed investment selection and portfolio management; e.g. market consultations and business-tailored audits. **Create the evidence base about adaptation measures, costs and benefits** to encourage private sector interest (specially multinationals) by demonstrating the use of innovative approaches in middle-income countries that could be after adopted in developing and emerging economies.	Invest in climate monitoring, forecasting and early warning systems, that enable climate services to be freely available in a sustainable manner for key stakeholders and the general public (World Bank 2019). **Investing in the development of local and sector specific and relevant climate risk screening tools** and know-how that if made available to local banks could help them to shape finance for resilience and adaptation investments in a variety of value chains. **Documenting and keeping up to date the worldwide evidence** on the cost-effectiveness of (innovative) adaptation measures.	**Stress testing of lending portfolios** (e.g. floods and droughts) and make results available to clients to raise understanding of individual and systemic vulnerability. **Offering tailored advisory services to clients in different sectors and value chains** to assess their vulnerability and develop an adaptation strategy at firm and/or landscape/watershed level in cooperation with other private and community actors operating at that level.	**Raise public awareness on climate risks** and launch education or communication campaigns (World Bank 2019).

Area	Role of DFIs -including MDBs	Role of Climate Funds	Role of Local Banks	Role of National Governments
Policies and institutions (including procurement)	**Engage in policy consultations with governments** (e.g. the EBRD project in Tajikistan) and facilitate dialogue between governments and businesses (Trabacchi & Mazza, 2015) to generate buy-in from decision makers, with the ultimate goal of integrating adaptation within existing national planning and evaluation systems, and helping to streamline workflow and standardize formats for reporting. **Ensure systematic climate risk management across all sectors** (World Bank, 2019). **Improve cross-ministerial and cross-country coordination** (World Bank, 2019). Build institutional capacity for climate risk analysis, planning and project implementation. **Develop project preparation and implementation capacity** of national and local governments. **Policy-Based Lending**[1] **and/or Development Policy Financing** (DPF) options such as Policy-Based Loans (PBLs) that provide borrowing countries with flexible, liquid (fungible) funding to support policy reforms and/or institutional changes in a sector or subsector. Both, DPF and PBL, normally facilitate policy reforms needed to improve country and sector efficiency. Yet in a climate change context, resilience would be the main goal. DPF can be extended as loans, credits/grants, or guarantees (ADB, 2007; IADB, 2018; World Bank, 2021).	**Enable the integration of adaptation and resilience into national planning and evaluation systems** and incorporate national actors at the margins of climate action into tracking initiatives to improve domestic public-sector tracking. (Richmond and Hallmeyer 2019). **Support the creation of multisectoral platforms** (e.g. readiness program) ; promote and support through technical assistance the uptake of a nexus approach to public investment (e.g. multisectoral and multipurpose projects that can be financed by different ministries) and public procurement.	Ensure the operationalization and enforcement of national regulations and policies through their lending and due diligence procedures.	Adjust regulatory frameworks to a) create stronger incentives for private investment and b) give consistent policy signals that give certainty and direction to investors (CPIC 2021). Put in place a robust systems for monitoring implementation of public and private adaptation actions.

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Area	Role of DFIs -including MDBs	Role of Climate Funds	Role of Local Banks	Role of National Governments
Incentives and behavior, including Governance structures and investment vehicles to reduce transaction costs	**Enhance collaboration with the financial system and between actors of supply chains to drive private investors' engagement in climate resilience.** **Support the creation of safe spaces for public-private dialogue** for innovative partnerships or initiatives to take place. **Provide technical assistance (combined with risk mitigation mechanisms such as guarantees) for:** **a) the development of innovative cross-sectoral PPPs** and multi-functional infrastructure investments that enable the capture of the value of significant externalities of water security and adaptation investments, and b) **develop specialized financial products** and credit lines by local banks and micro-finance institutions.	Drive the development of proven investments models, innovative business models and financial mechanisms. Carry the transaction costs involved in the development of environmental markets and other governance structures that allow for collective investments, and/or beyond-the-fence investments by companies in water security, at the watershed level. Pay for comprehensive evaluation, monitoring and process of cross-national lesson drawing, keeping an up to date repository of lessons learned about which models or blueprints work for which types of investments and/or sectors and within which institutional conditions.	Translate and tailor global rating systems and resilience metrics to local conditions and mainstream these into own processes, while ensuring in this tailoring that the final result is: - the creation of sufficiently strong incentives for private players in different vulnerable sectors, and - access to finance for the sectors most in need of adaptation and/or affecting the most vulnerable groups of society.	As (economic) regulators, play a crucial role in increasing the awareness of local banks about the need to determine, assess and manage climate change-related risks within their portfolios. Through taxation and a variety of policies and their enforcement, create disincentives to discourage investments in projects that are not resilient.

Area	Role of DFIs -including MDBs	Role of Climate Funds	Role of Local Banks	Role of National Governments
Finance	**Technical assistance to ministries of finance to develop sound public financing incentives** that allow the crowding in of private investments (World Bank, 2021). Scale up support to social resilience, focusing on the most vulnerable populations (World Bank, 2019). **Develop credit enhancement measures** to address local banks' credit default risk perceptions and facilitate access to finance, in line with (local) borrowers' investment needs (Trabacchi & Mazza, 2015). Develop intermediated and targeted financing structures for the adaptation of water-intensive (agro-industrial) value chains, by: a) developing alliances with members of these value chains and/or b) engaging with local financial institutions in on-lending to MSMEs.	**Offer credit enhancement options to MDBs** so that they can offer the same benefits to local financers. **Carry and/or offer specialized risk mitigation mechanisms** (e.g. guarantees) for performance risks and others risks introduced by the innovative nature of technologies being adopted, such as NbS and other unproven technologies. **Develop a universally shared adaptation rating system and resilience metrics:** including establishing definitions for resilient assets, an unambiguous and widely shared ontology. A shared taxonomy and standards would help build a pipeline of climate-resilient projects and accelerate the structuring of an asset class similar to green bonds (World Bank, 2019). Resilience rating systems need to cover both levels: the resilience of the specific project to climate risks and the extent to which the project builds adaptive capacity and strengthens in-country for climate resilience (World Bank, 2019).	Drive the engagement of local businesses based on their unique understanding of local barriers to investment. Engage with SMEs, whose financial needs are typically too small to benefit from direct DFI support. Shift toward green finance and play an active role in developing an enabling environment for green capital flows, including trading platforms, low-carbon indices and green funds (CPI, 2019).	Offer guarantees, tax benefits and risk-sharing mechanisms that help remediate a market failure and incentivize adaptation investments by the private sector (World Bank, 2021).

Overall, there needs to be a shift from competition towards collaboration – not as a one-off, but consistently across the next decade. We need to ensure that every innovation adopted changes institutions at the system level, triggering new formal and informal partnerships and raising the individual capacities of all players. This requires consistency, continuity and commitment in the way we explore opportunities, scale them up and replicate them across sectors.

The generic allocation of risks and responsibilities presented is intended for illustration purposes. In view of the systemic opportunity that the COVID-19 crisis seems to be opening up, what is urgently needed are safe spaces for systemic reflection and strategic partnerships that muster the required leadership and political will to achieve the required changes.

Textbox 13. The insurance sector's role in enabling investments in adaptation and resilience

The insurance sector role in driving a paradigm shift

The insurance sector has a crucial role to play, given its in-depth expertise in risk management and its extensive knowledge of the value at risk in different geographies. To start with, the insurance industry could support the development of transformational investment pipelines and better-informed risk management of municipalities by sharing its expertise and data on historic losses and damage (i.e., data on the locations of insurance claims associated with extreme rainfall or storms). By leading the discussion and development of catastrophic models that consider the roles of ecosystems in systemic resilience, the industry could incentivize investors to look at the portfolio in a systemic way (Altamirano, 2019).

For example at the initiative of Finance Norway, and based on a collaboration with a selection of insurance companies – Western Research, the Norwegian University of Science and Technology (NTNU) and nine pilot municipalities (Bærum, Grue, Kongsvinger, Løten, Nord-Odal, Ringsaker, Stavanger, Tromsø and Trondheim), a dialogue was initiated which facilitated sharing asset-level loss data held by insurers with the cities' planning and infrastructure sectors (Climate Adapt website, accessed February 2021). In this pilot project titled: "Insurance Loss Data Sharing Project for Climate-Resilient Municipalities", the insurance industry shared asset-level loss data with the nine municipalities (to inform and prioritize the management, renovation and reinvestment in public infrastructure.

As stated by Bouchard (2021) in his article 'What Future Will We Choose?':

"If we're going to "flatten the curve" of weather losses in 15 years, we need to initiate large-scale community resilience starting . . . now. If we want to help mayors, county commissioners and governors take the brave steps needed to protect their constituents (i.e., our balance sheets) we need to find new ways to arm them with the knowledge and financing to get the job done. If we want a holistic policy framework that aligns incentives around priorities informed by risk, we in insurance need to influence debates we aren't even part of today. And if we're serious about winning, we need to understand that the resilience sprint we're running is the ultimate team sport that will require a relay of impact-oriented partnerships".

The insurance sector can also play a catalyzing role and drive the implementation of hybrid (green-grey) disaster risk reduction strategies by: a) implementing risk-based premiums based on models that take into account the resilience dividends of ecosystems; b) requiring minimum resilience standards and consideration of climate and water risks from the projects they finance as institutional investors; and c) offering new insurance schemes and products that allow for the monetization of the resilience

dividends of ecosystems. An example is the parametric insurance policy to cover Mexico's coral reef, developed through cooperation between the state government of Quintana Roo, the tourism industry, TNC and SwissRe (Altamirano, 2019; Marchal et al., 2019).

Working closely together, the different actors within the global climate finance architecture could leverage greater impact by:

- Confronting together the practical impossibilities of existing financing instruments and supporting a better long-term alignment of interests and procedures of different (financial) institutions to lower the transaction costs experienced especially by local actors (public, private and civil society);
- Identifying and elucidating principles for effective use of climate finance to accelerate private sector investments in adaptation and the building blocks of the business case of adaptation
- Identifying leverage points and drafting a roadmap for the design and/or upscaling of effective blended finance blueprints for transformational adaptation investments in different sectors;
- Designing strategic investment pathways and multisectoral blended finance strategies for the creation of new markets that embody a new (regenerative) economic development model and prevent unintended crowding out effects;
- Sharing lessons learned and detailed information about blended finance blueprints and financing instruments effective in driving the envisioned transition – this will ensure the long-term financial sustainability of adaptation services, thereby accelerating learning and the evolution of these instruments; and
- Working together to transform public and private investment and procurement procedures to enable multisectoral and multifunctional investments.

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REFERENCES

Adaptation Fund (2020) Adaptation Fund Raises Nearly US$ 116 Million in New Pledges for Adaptation Action in Most Vulnerable Countries. December 16th, 2020. Website accessed January 5, 2021. Retrieved from: https://www.adaptation-fund.org/adaptation-fund-raises-nearly-us-116-million-in-new-pledges-for-adaptation-action-in-most-vulnerable-countries/

Adaptation Fund (2019). Annual Performance Report 2019, Adaptation Fund. Retrieved from: https://www.adaptation-fund.org/wp-content/uploads/2020/01/AF-APR-2019-11.27.2019_final_-1.pdf

Adaptation Fund (2021) National Implementing Agencies. Website accessed January 5, 2021. Retrieved from: https://www.adaptation-fund.org/apply-funding/implementing-entities/national-implementing-entity/

Altamirano, M.A., de Rijke, H., Basco Carrera, L., Arellano Jaimerena, B. (2021). Handbook for the Implementation of Nature-based Solutions for Water Security: guidelines for designing an implementation and financing arrangement, DELIVERABLE 7.3: EU Horizon 2020 NAIAD Project, Grant Agreement N°730497 Dissemination.

Altamirano, M. A. (2020). "Financing a Paradigm Shift in Development Models in Asia-Pacific and Latin America." Water Science Policy, 5 October. Available at: https://www.watersciencepolicy.com/2020/10/05/financing-a-paradigm-shift-in-development-models-in-asia-pacific-and-latin-america

Altamirano, M.A. (2018a, March). Climate Change: Challenge and Opportunity Working with the Climate Finance Community to Achieve a Paradigm Shift. Keynote for the session Innovative financial mechanisms for adaptation to Climate Change. World Water Forum 2018.Brasilia, Brasil.

Altamirano, M.A.(2018b, June). Achieving Sustainable Development: the potential of Public Private People partnerships. Lecture given at the Enabling Closer Cooperation training programme for Junior LAC diplomats, Clingendael Academy, The Hague

Altamirano, M.A. (2017). A financing framework for Water Security. Oral presentation, Water Futures workshop, during the XVI World Water Congress, Cancun, Mexico.

Altamirano, M. A., Steenbergen, J., de Keijzer, O., Perdon, R. (2016). DRR -Team Scoping Mission Report Peru. Technical assistance on early warning systems and flood risk management in relation to El Nino advise on specific concerns near Ecuadorian/ Peruvian Border . Dutch DRR team, RVO, Kingdom of the Netherlands.

Altamirano, M.A., Boendermaker, C. (2014) Afwegingskader geïntegreerde contracten Hoogwaterbeschermingsprogramma (Decision Support Framework for Integrated Contracts for the Netherlands Flood Protection Program). Report for PPS Support and Programmadirectie Hoogwaterbescherming. Available at: https://www.pianoo.nl/sites/default/files/documents/documents/afwegingskadergeintegreerdecontractenhwbp.pdf

Altamirano, M. A., Van de Guchte, C. and Benitez Avila, CA (2013). Barriers for Implementation of Green Adaptation. Exploring the Opportunities of Private Financing. World Water Week 2013. Oral presentation for the workshop Cooperation for Sustainable Benefits and Financing of Water Programs. Stockholm, Sweden.

Altamirano, M.A., Langenberg, V. (2014). Financing green adaptation strategies to Climate Change: The potential of Public-Private Partnerships (PPP). Deltas in times of climate change II. Oral presentation in the Financing Adaptation

session. Rotterdam, The Netherlands.
Altamirano, M. A. (2010). Innovative contracting practices in the road sector: Cross-national lessons in dealing with opportunistic behaviour.
Amerasinghe, N., et al. (2017). The Future of the Funds. Exploring the Architecture of Multilateral Climate Finance. World Resource Institute.
Asian Development Bank (2021) ASEAN Catalytic Green Finance Facility. Website accessed February 3, 2021. Retrieved from: https://www.adb.org/what-we-do/funds/asean-catalytic-green-finance-facility/terms-criteria
Banhalmi-Zakar, Z., et al. (2016). Mechanisms to finance climate change adaptation in Australia, National Climate Change Adaptation Research Facility 2016.
Biagini, B., & Miller, A. (2013). Engaging the private sector in adaptation to climate change in developing countries: importance, status, and challenges. Climate and Development, 5(3), 242–252. http://doi.org/10.1080/17565529.2013.821053
Biagini, B., et al. (2014). "A typology of adaptation actions: A global look at climate adaptation actions financed through the Global Environment Facility." Global Environmental Change 25: 97-108.
(BNG), C. B. and M. A. A. (Deltares) (2014). Afwegingskader geintegreerde contractvormen Hoogwaterbeschermingsprogramma, PPS Support & Programmadirectie Hoogwaterbescherming.
BNEF (2020) Electric Vehicle Outlook 2020. Available at: https://www.bnef.com/insights/23133/view
Budimir, M. E. A., Atkinson, P. M., & Lewis, H. G. (2014). Earthquake-and-landslide events are associated with more fatalities than earthquakes alone. Natural hazards, 72(2), 895-914.
Canales Trujillo, N., & Nakhooda, S. (2013). The effectiveness of climate finance: A Review of the Adaptation Fund. ODI Working Paper 373.
Carbon Disclosure Project. (2015). CDP Global Climate Change Report 2015. Retrieved from https://www.cdproject.net/CDPResults/CDP-Global-500-Climate-Change-Report-2012.pdf
CBI, 2017. Bonds and Climate Change: The State of the Market 2017. Available at: https://www.climatebonds.net/resources/reports/bonds-and-climatechange-state-market-2017
CBI, 2019. Green Bonds: The State of the Market 2018. Available at: https://www.climatebonds.net/resources/reports/green-bonds-state-market-2018
CBD (2009). Connecting Biodiversity and Climate Change Mitigation and Adaptation: Report of the Second Ad Hoc Technical Expert Group on Biodiversity and Climate Change. Montreal, Technical Series No. 41, 126 pages.
CIF (2021). CIF funding by region (MDB-approved). Website accessed January 5, 2021. Retrieved from: https://www.climateinvestmentfunds.org/
CIF (2019). PPCR operational and results report (PPCR/SC.23/3) Presented during the PPCR Sub-Committee meeting in Quarzazate, Morocco. Retrieved from: https://www.climateinvestmentfunds.org/sites/cif_enc/files/meeting-documents/ppcr_23_3_orr_updated_1_0.pdf
CLIMATE ADAPT (2021). "Use of insurance loss data by local authorities in Norway." Sharing adaptation information across Europe. from https://climate-adapt.eea.europa.eu/metadata/case-studies/use-of-insurance-loss-data-by-local-authorities-in-norway.
CPI (2015) Global Landscape of Climate Finance 2015 [Buchner, B. K., Trabacchi, C., Mazza, F., Abramskiehn, D., & Wang, D.] Climate Policy Initiative, Venice.
CPI (2018) Global Climate Finance: An Updated View 2018, November 2018 [Padraig Oliver, Alex Clark, Chavi Meattle). Climate Policy Initiative, Venice.
CPI (2019) Global Landscape of Climate Finance 2019 [Barbara Buchner, Alex Clark, Angela Falconer, Rob Macquarie, Chavi Meattle, Rowena Tolentino, Cooper

Wetherbee]. Climate Policy Initiative, London.
CPI (2020a). Updated View of the Global Landscape of Climate Finance 2019 [Rob Macquarie,Baysa Naran, Paul Rosane, Matthew Solomon, Cooper Wetherbee]. Climate Policy Initiative, London.
CPI (2020b). A Snapshot of Global Adaptation Investment and Tracking Methods. [Morgan Richmondk, Chavi Meattle, Valerio Micale, Padraig Oliver, Rajashree Padmanabhi]. Climate Policy Initiative, London.
CPIC (2021). How blueprints can help drive private finance in conservation. Coalition for Private Investment in Conservation. Website accessed January 5, 2021. Retrieved from: http://cpicfinance.com/blueprints/
CFU (2020a) Data Dashboard. Climate Funds Update website accessed January 4, 2021. Retrieved from: https://climatefundsupdate.org/data-dashboard/#1541245664232-8e27b692-05c8
CFU (2020b). The Global Climate Finance Architecture [Charlene Watson, Liane Schalatek]. Climate Finance Fundamentals 2 (February 2020). Climate Funds Update. Available at: https://climatefundsupdate.org/wp-content/uploads/2020/03/CFF2-2019-ENG-DIGITAL.pdf
C2es. (2015). Weathering the Next Storm: a Closer Look At Business Resilience, (September). Retrieved from http://www.c2es.org/publications/weatheringnext-storm-closer-look-business-resilience
Dallimer, M., Martin-Ortega, J., Rendon, O., Afionis, S., Bark, R., Gordon, I. J., & Paavola, J. (2020). Taking stock of the empirical evidence on the insurance value of ecosystems. Ecological Economics, 167, 106451.
Deltares (2013). Water - its control and combination. Multifunctionality and flood defences. June 2013.
De groot, K. Altamirano, M.A., Wiggers A. (2016b). DRR-Team Mission Report Costa Rica March 6-13. The Hague, the Netherlands, RVO.
Denjean, B., Altamirano, M. A., Graveline, N., Giordano, R., Van der Keur, P., Moncoulon, D., ... & Bresch, D. N. (2017). Natural Assurance Scheme: A level playing field framework for Green-Grey infrastructure development. Environmental research, 159, 24-38.
EBRD & IFC. (2013). Climate Risk Case Study. Pilot Climate Change Adaptation Market Study: Turkey.
Environmental Defense Fund (2017). Green Finance Markets and Innovative Mechanisms, EDF workshop Incubating Financial Mechanisms to Support Nature-Based Coastal Resilience, January 2017, Washington D.C.
East Asia and Pacific Region, Australian AID (2013). Green Infrastructure Finance. A Public-Private Partnership Approach to Climate Finance.
Eisenhardt, K.M.. (1989). Agency Theory: An Assessment and Review. The Academy of Management Review, 14(1), 57–74. Retrieved from https://www.jstor.org/stable/258191
Fayolle, V., Fouvet, C., Soundarajan, V., Nath, V., Acharya, S., Gupta, N., & Petrarulo, L. (2019). Engaging the private sector in financing adaptation to climate change: Learning from practice. New Delhi: Action on Climate Today.
Fulmer, J. (2009). What in the world is infrastructure. PEI Infrastructure investor, 1(4), 30-32.
Gerdes, E. and A. Gleijm (2012). Bridging the Gap in Water Related Climate Adaptation Projects. The Role of Private Initiative. RebelGroup. July 2012.
GIZ (2016). Demystifying Adaptation Finance for the Private Sector UNEP Finance Initiative, GIZ, and German Ministry of Economic Cooperation and Development presentation for the workshop Cooperation for Sustainable Benefits and Financing of Water Programs. Stockholm, Sweden.
Global Canopy Program (2009). The Little Climate Finance Book. A guide to financing options for forests and climate change.

GCA (2021). "Green Bonds for Resilience: Mobilizing Trillions for a Resilient Future." Global Center on Adaptation. Retrieved from: https://gca.org/green-bonds-for-resilience-mobilizing-trillions-for-a-resilient-future/
GCA (2019). Adapt Now: A Global Call for Leadership on Climate Resilience. Global Commission on Adaptation. Available at: https://cdn.gca.org/assets/2019-09/GlobalCommission_Report_FINAL.pdf
GCF (2018). Technical Expert Workshop on Climate Adaptation Finance. Songdo, Incheon, Republic of Korea, Green Climate Fund: 52.
GCF (2021) Resource Mobilisation. GCF's first replenishment. Website accessed January 5, 2021. Retrieved from: https://www.greenclimate.fund/about/resource-mobilisation/gcf-1
Gill, J. C., & Malamud, B. D. (2016). Hazard interactions and interaction networks (cascades) within multi-hazard methodologies. Earth System Dynamics, 7(3), 659-679.
Gregory, N., et al. (2021). Using Blended Concessional Finance to Invest in Challenging Markets. ECONOMIC CONSIDERATIONS, TRANSPARENCY, GOVERNANCE, AND LESSONS OF EXPERIENCE, IFC.
Hallegatte, S., Fay, M., & Barbier, E. B. (2018). Poverty and climate change: Introduction. Environment and Development Economics, 23(3), 217-233.
IFAD (2021) Channeling climate and environmental finance to smallholdersfarmers. Website of the International Fund for Agricultural Development (IFAD) accessed January 5, 2021. Retrieved from: https://www.ifad.org/en/asap#:~:text=The%20Adaptation%20for%20Smallholder%20Agriculture,environmental%20finance%20to%20smallholder%20farmers.&text=The%20ASAP%20fund%20allows%20IFAD,leverage%20resources%20for%20technical%20assistance
Inter-American Development Bank (2021) Natural Capital Lab. Website accessed March , 2021. Retrieved from: https://www.iadb.org/en/environment/natural-capital-lab
IMF, 2020. World Economic Outlook. June 2020. Available at:
https://www.imf.org/en/Publications/WEO/Issues/2020/06/24/WEOUpdateJune2020
International Finance Corporation (2016). IFC Climate Implementation Plan. https://www.ifc.org/wps/wcm/connect/51183b2d-c82e-443e-bb9b-68d9572dd48d/3503-IFC-Climate_Investment_Opportunity-Report-Dec-FINAL.pdf?MOD=AJPERES, April 2016.
Intergovernmental Panel on Climate Change (IPCC) (2018). Global Warming of 1.5° C: An IPCC Special Report on the impacts of global warming of 1.5 °C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty. Available at: https://www.ipcc.ch/sr15/
IIF (2020), IIF Capital Flows Tracker – April 2020 – The COVID-19 cliff (blog), Institute of International Finance, Washington D.C., https://www.iif.com/Portals/0/Files/content/1_IIF_Capital%20Flows%20Tracker_April.pdf.
Kaluba, D. C. (2015). Pilot Program for Climate Resilience. Zambia PPCR II OECD DAC ENVIRONET-WP-STAT Workshop on Partner Country Perspectives for Tracking Domestic and International Climate- and Biodiversity-Related Finance, Paris, National Climate Change Secretariat, Ministry of Finance, Zambia.
Khan, M., Robinson, S. A., Weikmans, R., Ciplet, D., & Roberts, J. T. (2020). Twenty-five years of adaptation finance through a climate justice lens. Climatic Change, 161(2), 251-269.
Lovins, L. H., Wallis, S., Wijkman, A., & Fullerton, J. (2018). A finer future: Creating an

economy in service to life. New Society Publishers.
Madsbjerg, S. and J. Rodin (2021). What Impact Investors Can Learn from the Organizations They Work with. Harvard Business Review.
MBSDMP (2020) Manila Bay Sustainable Development Master Plan. Website accessed June 10th, 2020. Available at: http://mbsdmp.com/
Maltay, J. and B. J. Sikken (2015). An overview of Green Bonds and their potential for financing the Dutch Climate Solutions initiative Dutch Climate Solutions Program Duisenberg School of Finance.
Marchal, R., Piton, G., Lopez-Gunn, E., Zorrilla-Miras, P., Van der Keur, P., Altamirano, M.A., ... & Dartée, K. (2019). The (Re) Insurance Industry's Roles in the Integration of Nature-based Solutions for Prevention in Disaster Risk Reduction—Insights from a European Survey. Sustainability, 11(22), 6212. https://www.mdpi.com/2071-1050/11/22/6212
Mathews, R. E., Tengberg, A., Sjödin, J., & Liss-Lymer, B. (2019). Implementing the source-to-sea approach: A guide for practitioners. SIWI, Stockholm.
MDBs (2017). 2016 Joint Report on Multilateral Development Banks Climate Finance. Retrieved from: http://www.ebrd.com/2016-joint-report-on-mdbs-climate-finance.pdf MDBs (2020) 2019 Joint Report on Multilateral Development Banks' Climate Finance, MDBs.
Meadows, D. (1997). Places to Intervene in a System. Whole Earth, 91(1), 78-84.
Mehta, A., et al. (2021). Asean Catalytic Green Finance Facility 2019-2020. Accelerating Green Finance in Southeast Asia, Asian Development Bank
Nagel, L. M., Palik, B. J., Battaglia, M. A., D'Amato, A. W., Guldin, J. M., Swanston, C. W., ... & Peterson, D. L. (2017). Adaptive silviculture for climate change: a national experiment in manager-scientist partnerships to apply an adaptation framework. Journal of Forestry, 115(3), 167-178.
National Chamber Foundation (2012). Public Private Partnerships and Infrastructure Resilience: How PPPs Can Influence More Durable Approaches to U.S. Infrastructure. 2012.
Nature4Climate (2021) Website accessed March 7, 2021. Retrieved from: https://nature4climate.org/
NDC Partnership (2018) Climate funds update. Website accessed January 5, 2021. Retrieved from: http://ndcpartnership.org/content/climate-funds-update
OECD (forthcoming), Global Outlook on Financing for Sustainable Development 2021, OECD Publishing, Paris, http://www.oecd.org/dac/financing-sustainable-development/.
OECD (2020) The impact of the coronavirus (COVID-19) crisis on development finance. Available at:
http://www.oecd.org/coronavirus/policy-responses/the-impact-of-the-coronavirus-covid-19-crisis-on-developmentfinance-9de00b3b/
OECD (2019), Climate Finance Provided and Mobilised by Developed Countries in 2013-17, OECD Publishing, Paris, https://doi.org/10.1787/39faf4a7-en.
OECD (2018), Making Blended Finance Work for the Sustainable Development Goals, OECD Publishing, Paris, https://dx.doi.org/10.1787/9789264288768-en.
OECD (2016), 2020 projections of Climate Finance towards the USD 100 billion goal: Technical Note, OECD Publishing.
OECD and WEF (2015), Blended Finance Vol.1: A Primer for Development Finance and Philanthropic Funders. https://social-finance-academy.org/uploads/wef-oecdblended_finance_a_primer_development_finance_philanthropic_funders_report-2015.pdf
PPIAF (2016). Climate Risks and Resilience in Infrastructure PPPs: Issues to be Considered. March 2016.
Paavola, J., & Primmer, E. (2019). Governing the provision of insurance value from ecosystems. Ecological Economics, 164, 106346.
Pay Without Performance by Lucian Bebchuk and Jesse Fried, Harvard University

Press 2004 (preface and introduction)
Popovici, O. M. (2013). Financing flood protection measures in developing countries: Are private investments feasible? Experience from Pevensey Bay Coastal Defence Project in UK Civil Engineering Faculty & Climate Adaptation Department (Deltares). Delft, TUDelft MSc.
Puig, D., Olhoff, A., Bee, S., Dickson, B., & Alverson, K. (Eds.) (2016). The Adaptation Finance Gap Report. Nairobi, Kenya: United Nations Environment Programme.
Robinson, S. A., & Dornan, M. (2017). International financing for climate change adaptation in small island developing states. Regional Environmental Change, 17(4), 1103-1115.
Robinson, S. A., & Gilfillan, D. (2017). Regional organizations and climate change adaptation in small island developing states. Regional Environmental Change, 17(4), 989-1004.
Reinsberg, B., Michaelowa, K. and Eichenauer, V. (2015) 'The rise of multi-bi aid and the proliferation of trust funds', in Arvin, B.M. and Law, B. (eds.) Handbook on the Economics of Foreign Aid. Elgar.
Stenek, V., et al. (2013). Enabling Environment for Private Sector Adaptation. An Index Assessment Framework. Washington, International Finance Corporation.
Sultana, M., Rahman, A., & Chowdhury, S. (2013). A review of performance based maintenance of road infrastructure by contracting. International Journal of Productivity and Performance Management.
Trabacchi, C., & Mazza, F. (2015). Emerging solutions to drive private investment in climate resilience, (June), 40.
Treasury, H. M. S. (2013). The green book: appraisal and evaluation in central government.
UNEP (2021). The Adaptation Gap Report 2020. Available at: https://www.unep.org/resources/adaptation-gap-report-2020
UNEP. (2018). The Adaptation Finance Gap Report 2018.
UNEP. (2016). The Adaptation Finance Gap Report 2016.
United Nations (2015). The Addis Ababa Action Agenda. Third International Conference on Financing for Development,13–16 July 2015 , Addis Ababa, Ethiopia, United Nations.
Unterberger, Christian, and Roland Olschewski. "Determining the insurance value of ecosystems: a discrete choice study on natural hazard protection by forests." Ecological Economics 180 (2021): 106866.
Vajjhala, S., & Rhodes, J. (2015). Leveraging Catastrophe Bonds: As a Mechanism for Resilient Infrastructure Project Finance. Re: focus Partners, RE: bound Program, www. refocuspartners. com/reports/RE. bound-Program-Report-December-2015. pdf (accessed May 5, 2018).
Ward, J. and E. Caldwell (2016). Private Sector Investment in Climate Adaptation in Developing Countries: Landscape, Lessons Learned and Future Opportunities. Washington, Climate Investment Funds. The World Bank Group.
Ware, D., et al. (2015). An overview of financing models for coastal protection in Australia. Australasian Coasts & Ports Conference 2015. Auckland, New Zealand
World Bank (2021). Enabling private investment in climate adaptation and resilience. Current Status, Barriers to Investment and Blueprint for Action. [Arame Tall, Sarah Lynagh, Candela Blanco Vecchi, Pepukaye Bardouille, Felipe Montoya Pino, Elham Shabahat, Vladimir Stenek, Fiona Stewart, Samantha Power, Cindy Paladines, Philippe Neves and Lori Kerr]. Washington D.C. World Bank Group.

World Bank (2019). Action Plan on Climate Change Adaptation and Resilience. Managing risks for a more resilient future. Washington D.C.
World Bank (2018). "From Evolution to Revolution: 10 Years of Green Bonds." Retrieved from: https://www.worldbank.org/en/news/feature/2018/11/27/from-evolution-to-revolution-10-years-of-green-bonds
World Bank (2017a). Additional Financing for Zambia Strengthening Climate Resilience (PPCR Phase II) (P165442). Report No: PAD2660. A. R. Environment and Natural Resources Global Practice, World Bank. Retrieved from: http://pubdocs.worldbank.org/en/317731531554864256/6303-PPCR-Zambia-74A-IBRD-Private-Sector-Support-to-Climate-Resilience-PPCR-Phase-II-Document.pdf
World Bank (2017b). Options for Increased Private Sector Participation in Resilience Investment. Focus on Agriculture, World Bank Group. Finance and Markets
World Bank Group (2014). Applying Results-Based Financing in Water Investments. Water Papers. Water Partnership Program of the World Bank and Global Partnership on Output-Based Aid. May 2014.
World Bank Group (January 5, 2015). Green Bonds Attract Private Sector Climate Finance http://www.worldbank.org/en/topic/climatechange/brief/green-bonds-climate-finance
World Economic Forum. (2016). The Global Risks Report 2016 11th Edition. Geneva. Retrieved from http://www3.weforum.org/docs/GRR/WEF_GRR16.pdf
Adaptation Fund (2018) Adaptatin-fund.org. Retrieved 22 November 2016, from https://www.adaptation-fund.org/project/ecosystem-based-adaptation-communities-central-forest-corridor-tegucigalpa/
https://www.adaptation-fund.org/project/enhancing-the-resilience-of-the-agricultural-sector-and-coastal-areas-to-protect-livelihoods-and-improve-food-security/
https://www.adaptation-fund.org/project/climate-change-adaptation-programme-in-the-coastal-zone-of-mauritius/

APPENDIX A

RECOMMENDATIONS TO GCF TO ADVANCE PRIVATE SECTOR ENGAGEMENT IN CLIMATE ADAPTATION PROJECTS

Below are the detailed, hands-on recommendations presented in the closing meeting of the research visit to the GCF on November 30, 2017 in a presentation entitled: "Towards a Climate Resilient Future: The challenge to leverage private sector investments in adaptation".

1. Work on transitions and creation of the enabling environment: support governments in the creation of markets for externalities and consider the private sector as service provider not only as financier.
2. Facilitating and de–risking collective investments at watershed or coastal zone scale:
    a) Provide more 'hand-holding' to develop non-conventional Public-Private Partnerships.
    b) Facilitate Public-Private dialogues.
    c) Collaborate with MDBs to increase 'buy-in' at all levels. Accelerate the process of embedding adaptation and climate risk management considerations into supply chains, centered around Climate Impacts information, downscaled per sector.
3. Partner in piloting new governance structures – to reduce Transaction Costs of collective and multisector investments:
    a) Watershed or coastal zone scale long term "collective" contracts to ensure resilience
    b) Procurement of multifunctional infrastructure and innovations
4. Promote new private sector stakeholders, additional to banking or asset managers to become AE or beneficiaries of the private sector windows:
    a) Infrastructure operators/ PPP sponsors: climate proofing of infrastructure
    b) Value chains (e.g. beverages, mining): "business continuity"
5. Widen the menu of financial instruments and explore additional strategies to create incentives in the private sector to invest in resilience, e.g.:
    a) Conditional financing: sectoral climate screening tools (Like the ones being developed by IFC Climate Business)
    b) (Risk-based) Parametric Insurance schemes
    c) Guarantees to lower performance risk of innovations
6. Increase technical expertise in-house, so as to be able to influence perceived risk and enable the development of customized financing instruments

a) Reduce the perception of risk by private sector actors new to the sector; and

b) Enable the development of performance-based (adaptation) metrics and contracts, as these are the basis for innovative Financing Instruments and Bankable Climate Adaptation Projects.

7. Proactively creating demand and opening up pathways for paradigm shift:
   a) Support NDAs technically and financially to serve as launching customers to paradigm-shifting innovations in the public sector (e.g. changes in public sector procurement procedures);

   b) Capitalize on the efforts and initiatives of the water, food and energy security communities. An example would be to take existing water funds further: tackling the challenge they have regarding the surety and variety of cash flows, which would allow securitization and front-loading investments.

   c) Strategically pioneer the selection of cases that can be documented, and which could share their experiences toward helping achieve a paradigm shift. Examples are: the Peruvian case to set up a public Payment for Watershed Services Scheme, aiming to mainstream the use of green infrastructure for water security (droughts and floods); the Colombian Adaptation Fund (Fondo de Adaptación), now financially structuring a major adaptation project (Canal del Dique) that involves green and grey infrastructure measures and will identify new possible revenue sources for the project; and the Philippines' Manila Bay Sustainable Development Master Plan, which aims to offer a sound base for decision making by national and local authorities about public and private sector proposals for the area (solicited and/or unsolicited), in the shape of an evaluation framework and a blueprint for the sustainable and resilient development of the area.

Torres del Paine National Park, Chile. Credits Unsplash

Kingdom of the Netherlands

CMIA Climate Markets & Investment Association

Building the business case for adaptation

Private sector

The private sector is an untapped source of finance, expertise and capacity to innovate.

Climate finance

It could play a key role in unlocking private investments in adaptation, which are sustainable and enable a fair transition towards a new economic model.

Investments in adaptation are urgent

Today we face:

Adaptation finance gap: 3X → ~$70 bn / year

Today's adaptation share: total climate finance 5% → ~$30 bn / year

If we don't invest now:

We'll face up to 10X the costs

$140-300 bn / year

Today:

25 mn people displaced

If we don't act now:

4 bn people vulnerable

What are the systemic barriers to private finance access?

Prohibitive transaction costs

Transaction costs are the total costs involved in making the investment possible. This includes all project preparation costs, including the costs of organizing all private and public actors that need to be involved, gathering information, planning, deciding, changing plans, resolving disputes, feasibility studies...

Transition-related implementation risks

Effective adaptation happens at system scale and requires the adoption of innovation. Approaches like Ecosystem-based management and planning that require a coherent policy and regulation framework to become financially viable, increase performance and demand risks throughout the project. Investments are context-specific and hardly re-deployable further enhancing transition-related risks.

A key tool: procurement

Strategic public and private procurement can accelerate the creation of new markets:

Examples:
- Performance-based contracts
- Public-private partnerships
- Forward contracts

Building blocks of the business case for adaptation

1 Public-private programmatic and blended finance approach

Climate funds, DFIs and donors can:

- Strengthen local project preparation capacities
- Intensify global cooperation
- Exploit the full potential of private sector participation
- Cooperate in the design and implementation of blended finance blueprints

2 Development of novel governance structures

Private sector participation can be secured through governance structures that enable collective investments at watershed or landscape level. Examples are:

- Collective investment schemes, e.g. water funds
- Environmental markets, e.g. stormwater markets
- Parametric insurance schemes for ecosystems, e.g. Coral Reef Insurance Policy

3 Need for global and local partnerships

Sustainable investment requires the creation of innovative partnerships and investment vehicles:

- Higher diversity in the expertise and network of partners can help de-risk and reduce the transaction costs of investments.
- The Next Generation of Investment Vehicles and Partnerships require closer collaboration between investors and problem solvers.

Climate finance can be a game changer...

...provided it is used catalytically to enable systems change and market creation.

Only through consistent global-local and public-private cooperation can a truly transformational pipeline of investments that reach the last mile be achieved.

To view the full report Leveraging Private Sector Investments in Adaptation: The Evolving Role of Climate Finance in Enabling a Paradigm Shift go to https://www.cmia.net/news/press-releases/mobilising-private-finance-for-adaptation-the-case-for-a-fair-transition-2/