



Innovative Financial Instruments and Their Potential to Finance Climate Change Adaptation in Developing Countries

IISD REPORT



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With inputs from
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Written by Matt Gouett with input from Deborah Murphy and Jo-Ellen Parry.

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Foreword

The 4-year Mobilizing Development Finance for Strategic and Scaled-up Investment in Climate Adaptation research project (2019–2022) was implemented by the International Institute for Sustainable Development in partnership with the African Centre for Technology Studies in Kenya, Prakriti Resources Centre in Nepal, and Libélula in Peru. The project was supported by Canada’s International Development Research Centre (IDRC). A project advisory committee—comprised of representatives from the African Development Bank, Asian Development Bank, Inter-American Development Bank, World Bank, IDRC, Institute for Climate Economics, and governments of Kenya, Nepal, and Peru—provided strategic advice on the research directions and outputs.

The research project explored common challenges to scaling up finance for adaptation across different contexts from the perspective of select developing countries and multilateral development banks. Its findings provided insights into the barriers that limit the use of development financing to address national adaptation priorities and identified opportunities to overcome these constraints.



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Abbreviations and Acronyms

ACTS	African Centre for Technology Studies
BO2	Business Oxygen
COP	Conference of the Parties
COVID-19	coronavirus disease 2019
CRAFT	Climate Resilience and Adaptation Finance and Technology Transfer Facility
EBRD	European Bank for Reconstruction and Development
GCA	Global Center on Adaptation
GCF	Green Climate Fund
GEF	Global Environment Facility
IBRD	International Bank for Reconstruction and Development
IDA	International Development Association
IFC	International Finance Corporation
IISD	International Institute for Sustainable Development
IMF	International Monetary Fund
IPCC	Intergovernmental Panel on Climate Change
K-Rep Bank	Kenyan Rural Enterprise Programme Bank
MDB	multilateral development bank
MERESE	Mechanisms of Remuneration for Ecosystem Services
MFI	microfinance institution
MIGA	Multilateral Investment Guarantee Agency
MINAM	Ministerio del Ambiente / Ministry of Environment (Peru)
NAP	National Adaptation Plan
NGO	non-governmental organization
OBA	output-based aid
OECD	Organisation for Economic Co-operation and Development
PES	payment for ecosystem services
PPP	public-private partnership



SME	small and medium-sized enterprise
TIF	tax increment financing
UNFCCC	United Nations Framework Convention on Climate Change
USD	United States dollar



Glossary

- Adaptation** The Intergovernmental Panel on Climate Change (IPCC) (2022a, p. 2898) defines adaptation in human systems as “the process of adjustment to actual or expected climate and its effects, in order to moderate harm or exploit beneficial opportunities. In natural systems, adaptation is “the process of adjustment to actual climate and its effects; human intervention may facilitate adjustment to expected climate and its effects.”
- Bonds** Bonds are debt instruments where the issuer borrows funds from buyers of the bond on the promise that they will repay the funds along with interest (Fernando, 2022).
- Climate finance** The IPCC (2022, p. 2902) notes that there is no agreed-upon definition of climate finance and that the term climate finance “is applied to the financial resources devoted to addressing climate change by all public and private actors from global and to local scales, including international financial flows to developing countries to assist them in addressing climate change. Climate finance aims to reduce net greenhouse gas emissions and/or to enhance adaptation and increase resilience to the impacts of current and projected climate change. Finance can come from private and public sources, channelled by various intermediaries, and is delivered by a range of instruments, including grants, concessional and non-concessional debt, and internal budget reallocations.”
- Concessional loan** Concessional loans “are extended on terms substantially more generous than market loans. The concessionality is achieved either through interest rates below those available on the market or by grace periods, or a combination of these. Concessional loans typically have long grace periods” (International Monetary Fund, 2003).
- Credit risk** Credit risk is the risk of loss caused by a borrower’s, counterparty’s, or debtor’s failure to make a timely payment or by the change in value of a financial instrument based on changes in default risk (CFA Institute, n.d.).
- Default risk** Default risk refers to the probability that a borrower defaults or fails to meet its obligation to make full and timely payments of principal and interest, according to the terms of the debt security (CFA Institute, n.d.).



- Development finance** Development finance streams include non-concessional finance and concessional finance.
- **Non-concessional finance** (mainly project-based loans but also policy loans, equity investments, and loan guarantees) is provided to middle-income countries and private sector firms in developing countries. Non-concessional lending windows are mainly financed through borrowing on international capital markets and offer recipients advantages in terms of the timing and level of repayments and the duration of loans.
 - **Concessional finance** provided to least developed and low-income countries needs to be replenished (mainly by developed countries). MDBs deploy official development finance within a mandate to promote economic and social development. Concessional finance is often provided through developed countries' official development assistance, which is defined by the Organisation for Economic Co-operation and Development (2019, p. 1) as “government aid that promotes and specifically targets the economic development and welfare of developing countries.”
- Economic value** Economic value is the value that a person places on an economic good based on the benefit that they derive from the good. It is often estimated based on the person's willingness to pay for the good, typically measured in units of currency. The economic value should not be confused with market value, which is the market price for a good or service which can be higher or lower than the economic value that any particular person puts on a good (Banton, 2020).
- Equity investment** Equity, often called shareholders' equity or owners' equity on a balance sheet, represents the amount of money that belongs to the owners of a business after all assets and liabilities have been accounted for (Landry, 2018). An equity investment is the purchase of a share in the ownership of a company or project.



Finance	Finance in this report means all investment in adaptation, recognizing the difference between public finance (international and domestic; public financial institutions) and private finance (companies, households, private financial institutions), and between the various instruments to finance adaptation (Adaptation Committee, 2022). Finance may be grant money provided by the public sector as well as capital raised from lenders from the public and private sectors that needs to be repaid. Funding in this report is used to refer to the financing of the operating expenses of projects.
Guarantee	A guarantee is a contractual promise made by a bank, insurance company, or other entity to guarantee payment of a debt obligation of another party, such as a private company (Corporate Finance Institute Team, 2022).
Innovative financial instruments and mechanisms	<p>Innovative financial instruments for adaptation are new approaches and mechanisms to acquire, structure, govern, and allocate financial resources. These instruments can include three alterations to traditional finance:</p> <ol style="list-style-type: none">1. The acquisition of new financial resources (including from financial institutions, private investors, institutional investors such as pension funds, impact investors, foundations, and other philanthropists) and blending with traditional resources (such as public grants, loans, climate finance, and official development assistance) to finance adaptation actions. Typically, public and philanthropic capital has a catalytic function to improve the risk–return profile of investment opportunities in order to attract private investors.2. Mechanisms to improve the efficiency of raising and distributing financial resources, including those that reduce transaction costs, improve transparency, and improve access to investment opportunities.3. Mechanisms to enhance the effectiveness of investments, including through a focus on the results and performance of the projects being financed.
Interest	Interest is a payment provided to lenders of funds by borrowers (CFA Institute, n.d.).



- Loan** A loan is a type of credit vehicle in which a sum of money is lent to another party in exchange for future repayment of the value or principal amount. In many cases, the lender also adds interest or finance charges to the principal value, which the borrower must repay in addition to the principal balance (Kagan, 2021).
- Multilateral development banks** The European Investment Bank (2020) explains that multilateral development banks (MDBs) are supranational institutions set up by sovereign states, which are their shareholders. Their remits reflect the development aid and cooperation policies established by these states. They have the common task of fostering economic and social progress in developing countries by financing projects, supporting investment, and generating capital for the benefit of all global citizens. MDBs also play a major role in international capital markets, where they raise the large volume of funds required to finance their loans. The main MDBs are the African Development Bank, Asian Development Bank, Asian Infrastructure Bank, European Bank for Reconstruction and Development, European Investment Bank, Inter-American Development Bank, Islamic Development Bank, New Development Bank, and World Bank (International Bank for Reconstruction and Development, and International Development Association).
- Private sector finance** Private sector finance is direct financing provided by private commercial banks, microfinance institutions, insurance companies, institutional investors, private equity and venture capital investors, private foundations and charities to projects and programs. Private finance can include private enterprises investing in their own operations to improve resilience to climate. The sources of private sector financing and support can be either domestic or international (Crawford & Church, 2019; Parry et al., 2017).
- Public finance** Public finance, for the purposes of this paper, refers to the funding and financing of projects and programs that are provided by local and national governments. In some cases, this funding and financing are channelled through domestic government ministries, departments, and agencies, but they can also be channelled through international organizations. To this point, this paper considers finance from the MDBs and multilateral climate funds as public finance.



Resilience

The IPCC (2022, p. 132 & 134) explains that resilience is a “broad concept, encompassing both outcomes and processes, an ability to maintain essential function and an ability to transform.” Resilience is defined as “the capacity of social, economic, and environmental systems to cope with a hazardous event or trend or disturbance, responding or reorganizing in ways that maintain their essential function, identity, and structure while also maintaining the capacity for adaptation, learning, and transformation.”

Return on investment

Return on investment refers to a calculation used to determine the expected return of a project or activity in comparison to the cost of the investment, typically shown as a percentage. This measure is often used to evaluate whether a project will be worthwhile for an investor to pursue (Landry, 2018).



Executive Summary

Significant financial resources are required now and in the coming decades to achieve the transformational changes necessary for people and systems to adapt to our changing climate. As previous global finance targets have been missed, there is ever growing demand to significantly scale up investment in climate adaptation. The 2021 Glasgow Climate Pact, for instance, urges “developed country Parties to at least double their collective provision of climate finance for adaptation to developing country Parties from 2019 levels by 2025” (United Nations Framework Convention on Climate Change [UNFCCC], 2022a, p. 4). This commitment was reaffirmed at the 2022 UN Climate Conference in Sharm El Sheikh, Egypt.

Private sector investment has been raised as an option to help address the gap in financing for adaptation, and innovative financial instruments have been highlighted as a means to spur greater private sector investment in climate adaptation. To date, however, the level of private sector investment in adaptation action has been quite low. In 2019/2020, private finance accounted for only 2.3% of finance that flowed to adaptation projects.¹ In 2017–2018, a significant share of private investment in adaptation was made in higher-income countries such as Canada and the United Arab Emirates; very low levels of private finance for adaptation flowed to developing countries.

This report aims to unpack why innovative financial instruments have not facilitated more finance toward climate adaptation in developing countries and their potential to do so in the future. It discusses some of the main reasons why adaptation investments are less attractive to private investors compared to other opportunities. For instance, some adaptation projects and programs do not have clear revenue-generating opportunities to recompense the investor taking on the investment risk. Without this clarity, agnostic investors will find other opportunities. As well, the investment size of adaptation projects tends to be smaller when compared to mitigation and other investments, meaning that due diligence and transaction costs are often higher as a proportion of overall project costs.

The paper also reviews a range of innovative financial instruments that potentially could be used to scale up finance for adaptation, few of which are currently being used in developing countries. Some of these instruments, such as blended finance mechanisms and guarantees, are well known and could be used more widely in developing countries to help close the adaptation finance gap. Others, such as stormwater markets, are lesser known and may present innovative opportunities to enhance finance volumes for adaptation if applied in new contexts.

Although considered innovative, these financial instruments are not necessarily new. Rather, they can be innovative in terms of the way in which they utilize and/or combine existing mechanisms and structures to incentivize (private) investors to increase their investment flows to projects that deliver climate adaptation benefits.

¹ Estimate based on disaggregated data provided by Climate Policy Initiatives that was used to inform their annual Global Landscape of Climate Finance reports.



The lessons that emerge from our review of the limited use of available financial instruments in developing countries to advance adaptation priorities are four-fold and interconnected:

- First, **blended finance arrangements that bring together concessional public capital and private capital have been and will continue to be the means through which private finance supports many adaptation projects.** Within these arrangements, there is space to expand the types of instruments used by public entities to incentivize private investment—to move away from primarily using grants and concessional loans to adjust risk and return calculations for private investors.

Increasing the usage of credit de-risking instruments like guarantees and liquidity facilities is one way to increase flows to adaptation. Multilateral development banks (MDBs) have used these instruments to attract private finance to development projects, but their use in financial arrangements for adaptation projects has been limited. Expanded use of these instruments would be consistent with the Sharm El Sheikh Implementation Plan’s call for MDBs to “[deploy] a full suite of instruments” as part of their commitment to substantially increase climate finance (UNFCCC, 2022b, p. 7).

MDBs and other public funders also should evaluate where in the blended financing structure their finance is most valuable and what types of financing are needed at particular points in project development. For example, a publicly backed loan guarantee may facilitate adaptation project construction, whereas a liquidity facility may be more suitable to back operational costs.

Increasing the usage of credit de-risking instruments like guarantees and liquidity facilities is one way to increase flows to adaptation.

- Second, **packaging adaptation projects alongside projects that generate revenue is a way to increase flows to adaptation.** Adaptation projects on their own are unlikely to be attractive to private sector investors, as many support the provision of public goods and lack clear potential to generate the revenue needed to repay loans or equity investments. Packaging these projects with those that generate other benefits, such as carbon reductions or combining seawalls with toll roads, may make them more attractive to the private sector. In addition, creating portfolios of aggregated or bundled adaptation projects may increase the interest of private investors.
- Third, **some financing arrangements that would be considered standard in one country or market could be considered innovative in another market.** As illustrated through the case examples presented in the paper, in some markets, traditional instruments, such as blended finance arrangements, may be innovative. As such, “innovation” does not need to mean the creation of new financing arrangements. Rather, it may mean the application of tested arrangements to different issues—such as climate adaptation—or the application of mechanisms that have been successful in one sector or country to a sector or country in which they previously have not been used.



- Fourth, **grant and concessional finance from a public entity is the most suitable form of finance for some adaptation projects in some geographic regions**—such as adaptation interventions in poor and fragile countries and communities that do not provide an adequate return on investments. These initiatives should be identified and put aside as they can cloud the conversation of incentivizing private finance to other adaptation projects.

Our analysis suggests that efforts to diversify the finance for adaptation landscape need to be targeted toward innovating how existing instruments are used. The challenge is to determine the most appropriate instrument or combination of instruments to stimulate the provision of private finance for adaptation, identify the entities that will provide this financing, and identify where it will be used. In addition, efforts to scale up private finance for adaptation need to focus on those sectors where there is greater opportunity to meet the revenue generation expectations of private financiers.

Given the numerous financial instruments that could be used to finance adaptation projects, it is clear that, rather than developing new instruments, it is innovative approaches to combining available instruments and matching them to specific projects that have the greatest potential to increase private sector financing for adaptation.

Our analysis suggests that efforts to diversify the finance for adaptation landscape need to be targeted toward innovating how existing instruments are used.



1.0 Introduction

The mounting human and financial costs of climate change have become more visible in recent years, as increasing global temperatures lead to a greater number of climate-related disasters. The Centre for Research on the Epidemiology of Disasters (2023) has reported that disasters in 2022, including record-breaking heatwaves in Europe, drought in East Africa, and flooding in Pakistan, led to the loss of more than 30,000 lives and caused USD 223.8 billion in economic losses. The number of climate-related disasters will increase in the future, with the most recent assessment of the Intergovernmental Panel on Climate Change (IPCC, 2023) reporting that even under a low-emission scenario, the world will experience severe climate risks and impacts. Stemming the increase of human suffering and economic pain due to these impacts requires arresting the current trajectory of greenhouse gas emissions and strengthening strategies and actions to adapt to current and future climatic changes.

Significant financial resources are required now and in the coming decades to facilitate the transformational changes necessary for people and systems to adapt to a changing climate. The 2021 Glasgow Climate Pact urged “developed country Parties to at least double their collective provision of climate finance for adaptation to developing country Parties from 2019 levels by 2025” (United Nations Framework Convention on Climate Change [UNFCCC], 2022a, p. 4). This commitment was reaffirmed at the 2022 UN Climate Conference (COP 27). The Sharm el-Sheikh Implementation Plan also called upon multilateral development banks (MDBs) to mobilize climate finance from various sources and encouraged them to deploy “a full suite of instruments, from grants to guarantees and non-debt instruments” to increase flows of climate finance (UNFCCC, 2022b, p. 7).

Earlier calls have led to a growth in the flows of finance for adaptation over the past decade, with the Climate Policy Initiative (2022, p. 15) reporting that finance for adaptation increased from USD 14 billion in 2011 to USD 56 billion in 2020. However, the rate of this growth has not met political commitments and falls far short of the estimated annual costs of adaptation needs in developing countries of USD 160–340 billion by 2030 and USD 315–565 billion by 2050 (UN Environment Programme, 2022, p. 10). The IPCC (2023, p. 28–29) notes that insufficient finance is a barrier to the implementation of adaptation options, especially in developing countries, and that climate change adaptation continues to lag significantly behind financial flows for climate change mitigation.

Private sector investment has been raised as an option to help address the gap in financing for adaptation, and public finance can leverage private sector finance by addressing investment barriers (IPCC, 2023, p. 80). Innovative financial instruments have been highlighted as a means to spur greater private sector investment in climate change adaptation (see for example, Global Center on Adaptation [GCA], 2019; World Economic Forum, 2019). These instruments are not necessarily new; rather, they can be innovative in terms of how they utilize and/or combine existing mechanisms and structures to incentivize investors to increase their investment flows



to projects that deliver climate change adaptation benefits. The innovation stems from new combinations of the various types of financial instruments, as well as the creation of new partnerships among providers of finance for adaptation.

Innovative financial instruments for adaptation include mechanisms and approaches that can be used to acquire, structure, govern, and allocate financial resources toward adaptation priorities. They can enable access to financial resources from financial institutions, private investors, institutional investors (such as pension funds), impact investors, foundations, and other philanthropists, and may be blended with traditional sources of financing.

Source: International Institute for Sustainable Development (IISD), 2022.

This report aims to unpack why innovative financial instruments have not facilitated more finance for climate change adaptation in developing countries and explore their potential to do so in the future. It discusses some of the main reasons why adaptation investments are less attractive to private investors than other opportunities. For instance, some adaptation projects and programs do not have clear revenue-generating opportunities to recompense the investor taking on the investment risk. Without this clarity, agnostic investors will find other opportunities. Also, the investment size of adaptation projects tends to be smaller when compared to mitigation and other investments. Therefore, investors have to incur relatively higher due diligence and transaction costs to add adaptation investments to their portfolios.

To set the context for this discussion, Section 2 provides a brief overview of the current financing for the adaptation landscape, with a focus on the role of the private sector. Section 3 discusses the challenges in expanding the role of the private sector in financing adaptation projects. Section 4 covers specific financial instruments that have already been used to finance adaptation projects or which hold promise to do so if well considered. This section also includes brief synopses of case studies of innovative financing for adaptation in Kenya, Nepal, and Peru to demonstrate the applicability of these instruments in developing countries. Lessons garnered from these case studies and other research are used to inform the recommendations to enhance finance for adaptation in Section 5. The paper concludes in Section 6 by recapping the relative successes and failures of using innovative financial instruments to scale up investments in adaptation and the prospects for their role in the future.



2.0 Landscape of Private Finance for Adaptation

The volume of finance flowing to adaptation has grown in recent years, mainly driven by increases through bilateral development channels and MDBs (UNFCCC Standing Committee on Finance, 2022). For instance, Climate Policy Initiative's 2022 review of flows of climate finance (public and private, international and domestic, and in developing and developed countries) estimated that flows of finance for adaptation averaged USD 49 billion in 2019 and 2020, compared to an average of USD 18 billion in 2011 and 2012. This amount accounted for just 7.5% of global climate finance (Climate Policy Initiative, 2022).

Despite the upward trend in the flows of finance for adaptation, including public and private sources, the IPCC (2022b) noted that the amounts are insufficient for required adaptation action, especially in developing countries. In 2020, according to the UN Environment Programme's *Adaptation Gap Report 2022*, international adaptation finance flowing to developing countries was an estimated USD 28.6 billion, or 34% of total climate finance flowing to these countries; which is significantly lower than the estimated annual costs of adaptation needs in developing countries by 2050 (UN Environment Programme, 2022, pp. 10 & 21).

To date, most adaptation finance has been provided by public entities; in 2019/2020, private finance accounted for only 2.3% of finance that flowed to adaptation projects.² In 2017/18, a significant share of private investments in adaptation initiatives were in higher-income countries, such as Canada and the United Arab Emirates, while very low levels of private finance for adaptation flowed to developing countries (Tall et al., 2021). This difference may be attributed to the fact that developing countries are viewed as having riskier investment climates.³

Despite the public sector providing almost all adaptation finance to date, private sector finance is essential to supplement public investment if the adaptation finance gap is to be closed (Climate Policy Initiative, 2022; GCA, 2022; Songwe et al., 2022; Tall et al., 2021). In particular, there is a need to attract both domestic and international private finance into adaptation initiatives led by the private sector or co-financed by the public sector.

² This estimate is based on disaggregated data provided by Climate Policy Initiative and was used to inform their annual *Global Landscape of Climate Finance* reports.

³ This perception has a range of implications, including for how financing is loaned and repaid in many developing countries. For instance, the cost of capital for poor countries is around 14% while rich countries can borrow capital at interest rates of 1% to 4% (Masterson, 2023).



Private sector finance for adaptation is direct financing provided by commercial banks, microfinance institutions, insurance companies, institutional investors, private equity and venture capital investors, private foundations, and charities to implement or facilitate adaptation projects and programs. The sources of private sector financing and support can be either domestic or international.

The private sector includes private enterprises that demand finance for their own adaptation activities and to invest in their own climate resilience, as well as private financiers that supply finance to private enterprises and governments in ways that are aligned with their risk-return profiles.

Source: Crawford & Church, 2019.

The IPCC Working Group II reported growing agreement that private finance for adaptation might best be targeted at the infrastructure, agriculture, and water management sectors (New et al., 2022). This finding mostly aligns with the research of Tall et al. (2021), which reported that private sector finance for adaptation in 2017–2018 flowed mainly to water and wastewater projects, followed by energy and other infrastructure-focused projects that increased the climate resilience of these investments. Similarly, an International Monetary Fund (IMF) staff paper noted the opportunities for private finance in early warning systems, global mangrove protection, and climate-resilient infrastructure (Prasad et al., 2022).

Of the private sector finance for adaptation provided in 2019 and 2020, almost 63% was in the form of corporations and institutional investors providing equity to specific projects. The remaining major flows came from grants from institutional investors (26% of private finance flows to adaptation) and low-cost project debt provided by institutions (5% of flows).⁴ The ways in which institutional investors financed project-level equity, as well as grants and low-cost project debt, suggest that some of these institutions may already realize the need to combine types of finance. It also speaks to the challenges of financing adaptation projects—challenges that must be overcome if finance for adaptation is to be scaled to needed levels.

⁴ This estimate is based on disaggregated data provided by the Climate Policy Initiative and was used to inform their annual *Global Landscape of Climate Finance* reports.



3.0 Private Sector Finance for Adaptation: An overview of the challenges

As the majority of financing for adaptation projects is sourced from public entities, whether they be domestic or international, discussion often turns to the need to scale up financing for adaptation from the private sector and the challenges of making private finance more prevalent in adaptation projects' finance structures. Among these challenges is the pervasive belief that the lack of large-scale private financial flows to adaptation is due to a lack of bankable adaptation projects. It is important to point out, however, that there may not be a lack of projects, but a lack of projects that meet the risk and return characteristics and are large enough to attract private investors. A 2022 survey of private investors undertaken by the Organisation for Economic Co-operation and Development (OECD, 2023) found that low levels of financial return, small investment size, and lack of incentives were the main reasons that private investment accounts for such a small amount of flows of finance for adaptation. In addition, the lack of common metrics for measuring the benefits and outcomes, combined with information gaps around the effectiveness of investment in adaptation, hinder efforts to mobilize private sector finance for adaptation (Frontier Economics & Paul Watkiss Associates, 2022; Tall et al., 2021).

Governments also need to strike an equitable balance between making strategic investments to attract private sector finance for adaptation and prioritizing the flow of finance for adaptation toward individuals and sectors that are most fragile (New et al., 2022, p. 2591). The latter consideration—the channelling of limited public funding for adaptation to those most in need—may contribute to adaptation investments not being attractive to the private sector.

As well, private investors need a return on their investment. For investors providing loans, this return on investment is generated through interest payments on the principle provided by the lender to the project proponent. Private investors that make equity investments become part owners of the project and are entitled to a share of profits. They may also have the opportunity to sell their ownership share in a project for more than they paid for it. In both cases, the project needs to generate revenue that can offset costs so that the project can make the interest payments or divvy the profits among the ownership group. Revenue is generated when an entity, such as an individual end user, private company, or government, pays for the benefit a project provides. Adaptation projects can produce economic value by preventing future costs but may not always produce revenue or generate income-earning opportunities that cover the added costs of addressing climate risks. Box 1 provides an example of a mangrove restoration project to illustrate the difference between economic value and revenue.



Box 1. Economic value versus revenue: Illustrating the difference through a mangrove restoration project

Throughout the world, many countries are seeking to increase the climate resilience of their coastal communities through the restoration of mangrove forests. This nature-based solution can provide protection against storm surges that are anticipated to become larger as sea levels rise and extreme weather events become more intense.

From a cost perspective, restoration of a mangrove forest requires a project financier willing to pay for the planting of the mangrove seedlings and the ongoing maintenance of the area in which the seedlings are planted until the mangroves reach their full maturity. During the initial planting and maintenance of the mangroves, the financier is likely paying an organization and their workers to undertake this work. Thus, workers are able to earn wages because the restoration is undertaken and the project thereby produces direct economic value.

The main beneficiaries of the mangrove restoration are the people living in the area, as they gain greater protection from flooding after the project's implementation. However, valuing that protection is difficult as it requires complex calculations related to the projected value of land and dwellings, as well as other economic costs incurred due to flooding. The value of that protection is also dependent on the severity and frequency of flooding that would have occurred without the mangroves, which would be influenced by projected sea level rise, rainfall, and wind patterns, all of which may be impacted by climate change.

Along with flood protection, multiple mangrove restoration projects have cited increased fish production and aquaculture as either the primary or secondary benefit (International Union for Conservation of Nature, 2020; Narayan et al., 2017). These projects estimate higher incomes for aquaculture farmers and fishers while producing wider ecosystem benefits for which it may be difficult to assign economic values.

From this relatively simple example, the difficulty for private investors in financing adaptation projects can be seen. Were a private investor to finance the mangrove restoration, how would its loan be repaid or equity investment be returned? Which of the beneficiaries would pay?

Beneficiaries that could potentially repay the investor include the workers that derived income from the mangrove planting and maintenance. However, as they are already being paid by the project financier for their services, they are unlikely to return that income to the financier.

There are those people living in the area vulnerable to flooding to whom the mangroves provide protection. This group seems a likely payer for the mangroves, except when one considers the inexactness of flood calculations. It may be difficult to convince this group to pay for flood protection if they do not think a flood is in the offing. Moreover, if this group realizes that flooding is likely but has not relocated previously, it may indicate that they do not have the financial capacity to pay for the protection the mangrove may provide.



Finally, there are the aquaculture farmers and fishers. Their ability and willingness to pay are likely tied to the number of farmers and fishers and the total increase in their own incomes. For example, if there are many aquaculture farmers and fishers and each benefits only marginally, the transaction costs for the project financier to recoup the project costs from these beneficiaries are likely prohibitive. From the perspective of the investor, ideally there would be a few larger beneficiaries with whom the project financier could reach an agreement before investment to reduce transaction costs and minimize repayment risk.

An additional issue inherent to many adaptation projects is the market failure or imperfection of having the dispersed beneficiaries of adaptation projects pay for the project costs, thereby creating a revenue stream to repay a loan or create a return on an equity investment (Druce et al., 2016; Stoll et al., 2019; Stout, 2022). As illustrated in the case study in Box 1, it is not that adaptation projects fail to produce economic gains, but that these gains often flow broadly. These distributed benefits make it difficult for private investors to assess the financial viability of adaptation projects.

Given the range of potential beneficiaries, in many situations, adaptation projects are served well by an entity that acts as a liaison between the project financier and the financial beneficiaries. For large projects, this may be a national government, whereas for smaller projects, such as in the case study of the Chira water basin in Peru described in Box 5 and Appendix A.3, organizations such as water boards may be the right intermediating mechanism. Aggregating many small projects into one offering may also be needed to attract private sector investment. It has been suggested that the emphasis on blended finance arrangements will need to shift to portfolio-level approaches, rather than individual projects, to meet the needs of large financial investors such as pension funds (Lankes, 2021).

Dispersed beneficiaries and the value of an intermediary point to the difficulties of scaling adaptation projects. Adaptation projects tend to be far more localized than mitigation projects. An adaptation project that addresses potential ocean flooding in one municipality may be different from a flood protection project in a municipality downriver from the first one. To a certain extent, mitigation strategies are more homogenous and involve large investments in infrastructure (Furness, 2022). As a result, adaptation projects have been smaller in financial scale than mitigation projects, which means that an agnostic climate investor is more likely to invest in a mitigation project due to lower relative transaction costs than an adaptation project.

Perhaps the best evidence of the different scales of projects is provided by looking at project data available from the Green Climate Fund (GCF).⁵ The GCF (n.d.-a) is an operating entity of the financial mechanism of the UNFCCC and is mandated under the UNFCCC to deliver 50% of its resources to mitigation and 50% to adaptation in grant equivalent. Despite this expectation, as of January 2023, of the USD 11.4 billion that the GCF had approved, 29.4% went to adaptation

⁵ GCF data is used because of its availability and our belief that it is indicative of the ways in which MDBs and other climate funds finance adaptation and mitigation projects.



projects, 33.6% to mitigation projects, and 37.0% to projects that were considered as cross-cutting and having both mitigation and adaptation benefits (GCF, 2023).

The GCF portfolio also illustrates significant differences in the size of adaptation projects and the extent to which they have received private sector financing. As can be seen in Table 1, the number of adaptation projects financed is higher than the number of cross-cutting projects and the number of mitigation projects, which translates into a smaller average adaptation project size. This dichotomy is also illustrated in Figure 1, which shows the dispersion of project values across the adaptation, cross-cutting, and mitigation themes. The majority of adaptation projects financed by the GCF received less than USD 50 million in financing, whereas the majority of mitigation projects received more than USD 100 million.

Table 1. Types of GCF-funded projects under implementation and approved, as of January 2023

Type of project	All projects		Projects with private sector financing	
	Number of projects	Average total project size (USD million)	Number of projects	Average total project size (USD million)
Adaptation	85	65.2	5	236.8
Cross-cutting	58	245.2	11	440.8
Mitigation	66	343.1	29	394.6

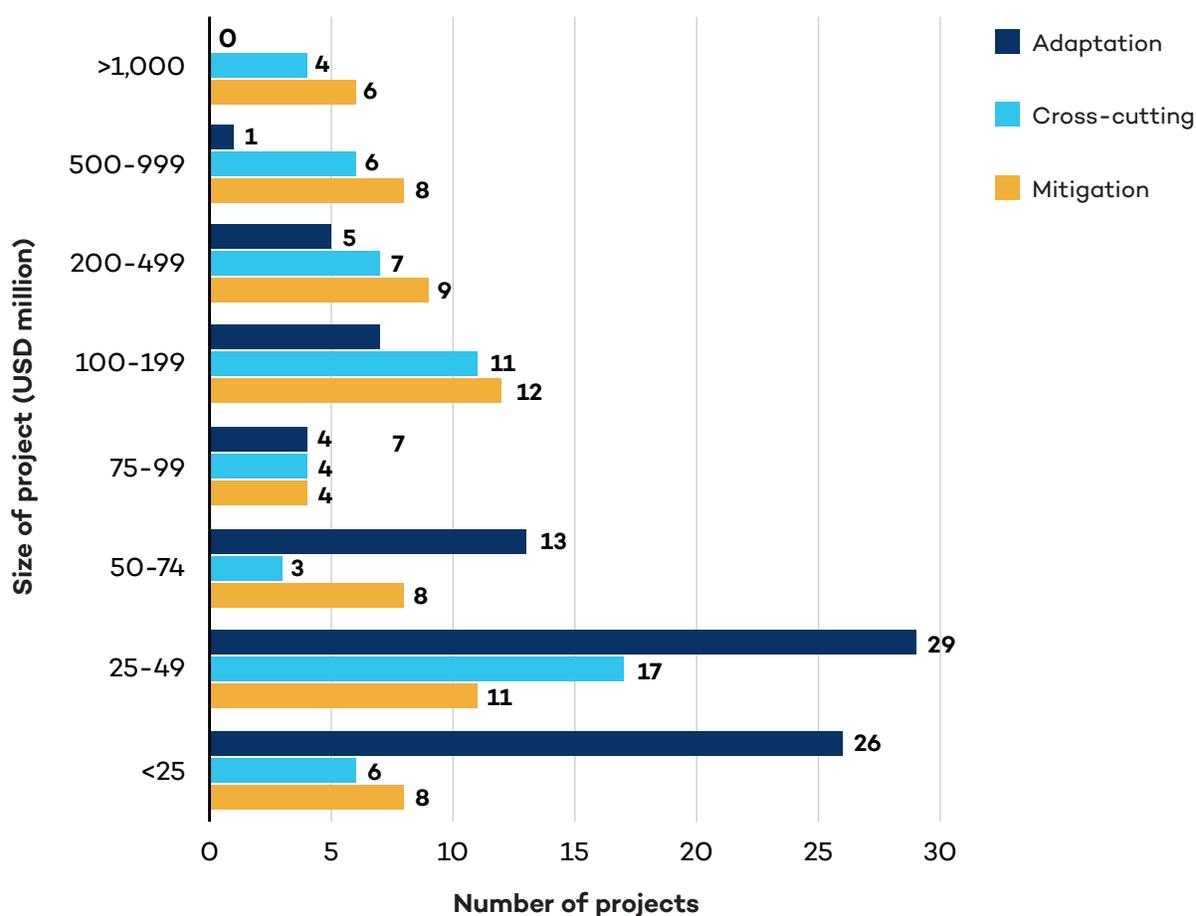
Source: Authors' calculations based on GCF project data.

Moving further into the data provided by the GCF, it is instructive to disaggregate the projects in which a portion of the finance was provided by the private sector. When doing so, it is evident that while private sector financiers of GCF-approved projects favour mitigation projects, they also favour projects of a certain size. As seen in Table 1, the average size of the five projects with private sector financing was significantly larger than the average size of all projects when comparing across the type of projects. This disparity is most pronounced in adaptation projects, where the average size of those with private financing was slightly over 3.5 times larger than the average size of all adaptation projects.

The details related to the five GCF-financed adaptation projects co-financed by the private sector are presented in Table 2. Of the total value of these five adaptation projects, on average, the GCF provided 31% of the total capital with the private sector providing the other 69%. In contrast, for the mitigation and cross-cutting projects co-financed by the private sector, the GCF share averaged 19% and 22%, respectively.



Figure 1. Number of GCF projects, by size, as of January 2023



Source: Authors' calculations based on GCF project data (n.d-b, 2023).

To recap, adaptation projects have been predominantly financed by public entities. This is primarily due to the ways that the benefits of adaptation projects flow to broad populations, which make it difficult for private investors to earn market rate returns on their investments. Moreover, adaptation projects have smaller investment sizes than other climate investments, which causes private investors to incur higher relative transaction costs per average investment than if the same investor were to invest in a mitigation project. In some cases, the difficulties can be overcome if beneficiaries can be organized to pay for the benefits they receive, but this is unlikely to ever be the case for many adaptation projects in some developing country contexts. With this acknowledged, there are some financing instruments that public and private project developers could use to provide opportunities to scale up private sector financing of adaptation actions.



Table 2. GCF adaptation projects with private financing, as of January 2023

GCF project number and name	Countries	Total project value (USD)	GCF financing (USD)	Private financing (USD)	Project description
FP078: Acumen Resilient Agriculture Fund Approved: 2018	<ul style="list-style-type: none"> • Uganda • Ghana • Nigeria • Kenya 	56 million	Grant: 3 million Equity: 23 million	Grant: 3 million Equity: 27 million	Supporting pioneering and early-growth innovative agribusinesses that enhance the climate resilience of smallholder farmers.
FP097: Productive Investment Initiative for Adaptation to Climate Change Approved: 2019	<ul style="list-style-type: none"> • Guatemala • El Salvador • Honduras • Nicaragua • Costa Rica • Panama • Dominican Republic 	28 million	Grant: 3 million Loan: 12.5 million	Loan: 12.5 million	Reducing obstacles for micro, small, and medium-sized enterprises to access credit and supporting the best available adaptation measures.
FP179: Tanzania Agriculture Climate Adaptation Technology Deployment Programme Approved: 2021	<ul style="list-style-type: none"> • Tanzania 	200 million	Grant: 20 million Guarantee: 10 million Loan: 70 million	Loan: 100 million	Strengthening the resilience of Tanzania's agriculture sector by facilitating access to agriculture climate adaptation technologies.
FP180: Global Fund for Coral Reefs Investment Window Approved: 2021	<ul style="list-style-type: none"> • Philippines • Sri Lanka • Fiji • Bahamas • Belize • Brazil • Comoros 	500 million	Equity: 125 million	Equity: 375 million	Creation of a private equity fund to encourage investments in the blue economy, protecting coral reefs.



GCF project number and name	Countries	Total project value (USD)	GCF financing (USD)	Private financing (USD)	Project description
<p>FP180: Global Fund for Coral Reefs Investment Window Approved: 2021 (continued)</p>	<ul style="list-style-type: none"> • Mexico • Ecuador • Seychelles • Colombia • Mozambique • Jordan • Jamaica • Guatemala • Panama • Indonesia 				
<p>FP181: Climate Resilience and Adaptation Finance and Technology Transfer Facility (CRAFT) Catalytic Capital for the First Private Investment Fund for Adaptation Technologies in Developing Countries Approved: 2021</p>	<ul style="list-style-type: none"> • Brazil • Mexico • South Africa • Rwanda • Bahamas • Trinidad and Tobago 	400 million	Equity: 100 million	Equity: 300 million	CRAFT is intended to mobilize capital to scale up technologies for climate resilience and adaptation and apply them in developing countries using a South–South technology-transfer mechanism.

Source: GCF, 2023.



4.0 Innovative Financial Instruments for Adaptation

Financial instruments in and of themselves will not make investors, whether public or private, who are unwilling to invest in adaptation projects more likely to invest in these initiatives. These entities may have different investment priorities and/or may not comprehend the need to increase financing for adaptation. However, as in any investment space, there is a group of investors that will invest in a sector or project if the risk and return profile becomes more favourable. Furthermore, there is a third group of investors that will make an investment based on their conviction in the outcome. For some, this outcome may be investment profit, but for others, it may be supporting environmental or social outcomes. For adaptation projects, certain innovative financing instruments, as discussed below, can work to satisfy investors in the second group and, hopefully, alongside evidence of success, convert some investors from this second group to the third group of investors.

This section looks at three types of instruments that could be used to finance adaptation and discusses how their use may be increased in the future. The first of these are financial instruments that have already been used to finance adaptation projects. The second type consists of financial instruments that may be used to adjust the risk and return profile for private investors and attract more private finance for adaptation. Finally, the third are those financial transactions, mechanisms, or arrangements that may induce more financing to flow to adaptation but will not finance adaptation projects directly.

Many of these instruments have been utilized in developed countries but have had limited or no utilization in developing countries, particularly so in the least developed countries. In many situations, this limited uptake in developing countries is due to the perceived elevated risk environment, low profitability for investments in adaptation (Abalkina & Zaytsev, 2021), and a lack of experience with innovative financial instruments (Sherchan & Singh, 2021). Nevertheless, the analysis briefly discusses these instruments, as they may become more prevalent in developing countries. Further information about these instruments, including an overview by sector and case study location, can be found in IISD's inventory of innovative financial instruments for adaptation (IISD, 2022).

We start by looking at the potential growth of well-established financial instruments.

4.1 Established Instruments to Finance Adaptation

This section focuses on five main financing instruments that have been used for adaptation purposes and through which it is likely that more adaptation finance will flow. The first three instruments, blended finance, private–public partnerships (PPPs), and payment for ecosystem services (PES) arrangements, have been adopted in developing countries as illustrated in the case



studies. The other two instruments, stormwater markets and tax increment financing (TIF), have been used to finance projects with adaptation relevance in developed countries but, as yet, do not seem to have been applied in a developing country context.

4.1.1 Blended Finance

Blended finance is defined as the use of catalytic capital from public or philanthropic sources to increase private sector investment in sustainable development (Convergence, n.d.). This catalytic capital is delivered through financial instruments such as grants, loans, equity, and guarantees. Blended finance can help match risk-adjusted returns to investor requirements by reallocating risk to (public) parties that are in a better position to take on that risk (Lankes, 2021).

Blended finance is not itself a financial instrument but rather a method of structuring different instruments. (See Box 2 and Appendix A, which include information about a blended finance initiative in Kenya that included grant funds, local community equity, output-based subsidies, and microfinance loans.)

Box 2. Blending grants, community equity, and microfinance loans for water access in Kenya

Kenya is increasingly vulnerable to climate change and its impacts on access to water. Consequently, as indicated in a case study written by the African Centre for Technology Studies, Kenya requires significant amounts of investment to enhance levels of access to safe water—investment that cannot be met by the government, non-governmental organizations (NGOs), and philanthropy alone.

The case study outlines a blended finance scheme that was implemented from 2013 to 2018 through which water projects were financed by combining investments from the local community equity, grants and output-based subsidies from the World Bank, and microfinance loans from the Kenyan Rural Enterprise Programme (K-Rep) Bank. The capital from the World Bank allowed K-Rep Bank to make loans to qualified community groups that had the potential to pay for the water project's operation and maintenance costs. In addition, technical assistance provided through grant finance facilitated the development of bankable loan applications.

Lessons drawn from the case study included:

- Reporting of results, which was a stipulation of the concessional capital from the World Bank, provided evidence of the project's viability to K-Rep Bank.
- Technical assistance was important to facilitate project preparation and financing.
- The right private financing partner is critical; K-Rep Bank had been involved in similarly financed projects.

Adapted from Atieno et al., 2021. A summary of this case study is provided in Appendix A.1.



Pooled investments are an example of blended finance, where capital from different entities is combined to finance projects. While pooled investments to finance adaptation projects are not common, interest in this approach is increasing. For example, Lightsmith Climate Resilience Partners is the first private equity fund that focuses on climate resilience and is supporting companies that are developing technologies in such areas as water efficiency, resilient food systems, and catastrophe risk modelling (Lightsmith Group, 2022).

Another example is the World Bank's Blended Finance Facility, which is aimed at developing countries. The facility combines capital from the International Development Association's (IDA's) Private Sector Window alongside the International Finance Corporation's (IFC's) own investment to adjust the risk and return parameters for private investors. IDA's funds allow the IFC to invest in riskier projects, as the IDA capital is the first lost if the investment does not meet return expectations. In addition, the IDA capital is used to lengthen the timeframe of investments, which is a key benefit because investment lengths are shorter in developing countries that are deemed higher risk. The Blended Finance Facility focuses on investments across sectors with high development impacts, including climate change adaptation and mitigation, among others (IDA, 2021).

Similarly, the GCF projects referred to in the previous section and outlined in Table 2 are typical examples of blended finance mechanisms at work in developing countries. In most cases, the GCF will finance an adaptation project with a grant and/or a concessional loan to alter the risk and return profile for project financiers or developers. Ideally, the grant and/or concessional loan incentivizes the project financiers or developers to undertake projects that would not have been completed in the absence of the GCF grant or loan. The information in Table 2 demonstrates that the GCF uses grants, loans, equity investments, and guarantees to create these incentives to finance adaptation projects.

Blended finance arrangements for adaptation are expected to continue to grow. This presumption is based on four observations.

- First, on the multilateral climate fund side, the Global Environment Facility and the GCF completed their replenishment cycles in 2022 and are likely to continue pursuing blended finance arrangements for many of their projects (GCF 2022; Global Environment Facility, 2023).
- Second, if major donors deliver the climate finance goal established under the UNFCCC and Paris Agreement, they are likely to utilize blended finance mechanisms to stretch public concessional finance. Countries such as Canada already have experience working with the IFC to blend financial resources to finance climate mitigation and adaptation projects (IFC, 2020).

Blended finance arrangements for adaptation are expected to continue to grow.



- Third, the Sharm el-Sheikh Implementation Plan, 2022, called for a reform of MDB practices and priorities to enable the banks to scale up financing for climate change, simplify access, and mobilize climate finance from diverse sources. The plan also encouraged MDBs to define a new vision and operational model, channels, and instruments to address climate priorities, including grants, guarantees, and non-debt instruments (UNFCCC, 2022b, p. 7). This request is consistent with broader discussions about the reform of the global financial architecture, which call for the reform of MDBs. These reforms include an expanded climate change agenda that includes using multilateral financing to catalyze other financial flows including private capital; and using new and innovative instruments and structures to crowd in private finance, such as guarantees and blended finance (The 2022 Bridgetown Initiative, 2022; Hodgson et al., 2023; World Bank Group, 2023).
- Fourth, many private project developers will be facing rising financing costs as well as higher operational costs due to inflation and rises in interest rates that have been attributed to the increase in money supply in many countries to address the COVID-19 pandemic, supply shortages, and the effect of Russia's invasion of Ukraine on the prices of oil, natural gas, fertilizer, and food (Frick, 2022). If public entities want to maintain or grow private sector investment in adaptation projects, blended finance arrangements that include concessional capital provided by public entities will be crucial as private investors face rising financing costs.

So, while the form and function of blended finance arrangements for adaptation may not be innovative, it is likely that their utilization will increase in the near future as public finance providers optimize disbursements of their limited capital. MDBs have been early actors in blended finance arrangements (see Boxes 2 and 3, and Appendix A) and will need to play a larger role in these arrangements to catalyze the needed investments in adaptation in poor countries (Songwe et al., 2022).

Box 3. Blending concessional loans with private equity for climate-smart agriculture in Nepal

As a country reliant upon its agriculture sector, Nepal is highly vulnerable to climate change. Despite its economic and social importance, investment in Nepal's agriculture sector is considered risky. Investment from local banks and other private financiers is undermined by the segmented nature of the sector and the fact that the required investment amounts are small, which leads to higher relative transactional costs.

A case study prepared by the Prakriti Resource Centre (summarized in Appendix A.2) outlines a project that was implemented from 2013 to 2019 that included blending a concessional loan from the IFC with equity investments from local agribusiness firms and a local private equity fund, Business Oxygen, to allow these agribusiness firms to invest in climate-resilient farming practices. Investees also benefited from government subsidies on imported goods and 5% rebates on the bank interest rate on agricultural loans.



Lessons drawn from the case study included:

- Catalytic, concessional capital can encourage private investment in an agriculture sector that is segmented and traditionally viewed as too risky for private investment.
- When possible, enlisting local investors and local banks to facilitate the flow of private finance is crucial, as they best understand local markets and the investees.
- Government support is required to allow foreign investment in important local sectors and to create the conditions under which the risks to private investments are transparent.

Adapted from Sherchan & Singh, 2021.

4.1.2 Public–Private Partnerships

A PPP is defined as “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” (PPP Knowledge Lab, 2017, p. 1). They are another instrument that seeks to align public and private investor interests to deliver goods and services to the public. Analysts of PPPs cite that these projects can deliver public assets/services cheaper and more effectively than projects purely financed and steered by the public sector if these projects are structured and managed correctly (PPP Knowledge Lab, 2017). Given that public finance for adaptation projects far surpasses private finance, PPPs may offer a viable solution to attract private investment in adaptation solutions.

PPPs have been utilized across many sectors in developing countries, but the application of PPPs for adaptation projects in these countries has been limited. One interesting example is African Parks (n.d.), a private, non-profit conservation organization that maintains the full responsibility and execution of all management functions of protected areas in southern Africa. African Parks is accountable to the respective governments who retain ownership of the protected areas and set the policies that govern their protection. The African Parks PPP has subsequently attracted philanthropic capital from the Wyss Foundation (African Parks, 2021). While this example does not include a traditional, return-driven private financier, African Parks (2022) did earn USD 4.5 million in commercial revenue derived from tourism in 2021 on assets of USD 78.6 million, demonstrating the financial viability of such models.

Growing the number of PPPs for adaptation projects may be more challenging than increasing the utilization of blended finance arrangements. The latter can be financed by investors exterior to a specific country or municipality and can have investor agreements that are enforceable in jurisdictions foreign to the actual project. Private investors in PPPs are more likely to be exposed to the impacts that the domestic governments can have on their investments because these governments are the project partners. These situations require either a higher risk tolerance by the private investor or complex contractual agreements that mitigate geographic and political



risks. While private investors have demonstrated a willingness to overcome these issues in certain sectors in developing countries—such as transport and energy infrastructure—adaptation projects are unlikely to be motivating to such an extent that private flows to adaptation projects via PPPs increase dramatically.

However, there is an opportunity to integrate adaptation and resilience into infrastructure projects financed through PPPs (Musmanni, 2021; World Bank, 2022a). The greater the proportion of public finance included in a PPP investment, the greater the influence that this finance could have on ensuring that projects are developed and implemented in a manner that accounts for projected physical climate hazards and risks.

4.1.3 Payment for Ecosystem Services

PES arrangements are transfers of cash or other resources from ecosystem service beneficiaries (such as downstream water consumers, city dwellers, and hydropower owners) to providers (such as farmers, land trusts, and protected areas). PES arrangements operationalize a “beneficiary pays” principle approach in relation to ecosystem services and create an opportunity for providers of these benefits to generate revenue and, as a result, funding. The implementation of a PES instrument requires strong public institutions and private property rights that allow beneficiaries to internalize the benefits and pay for them. The case study of Peru’s Remuneration Mechanism for Ecosystem Services (MERESE) and the Quiroz–Chira Water Fund, outlined in Box 4 and discussed in more depth in Appendix A.3, is a good example of the effectiveness of a PES to channel funding to adaptation.

The success of (and the likelihood of scaling up) PES instruments requires early participant buy-in. Specifically, participants need to be supportive of program characteristics, such as contract length and payment amounts, and participants must be trusting of the institutions managing the payment scheme (Sorice et al., 2018). While it can be surmised that these characteristics would be important for any adaptation scheme, the distributed nature of beneficiaries and providers with PES arrangements requires an enhanced focus on the front-end design of the scheme to support participant buy-in.

Box 4. The Quiroz–Chira Water Fund: A PES supporting conservation efforts

Peru, with its diverse landscape and burgeoning urban population, is increasingly vulnerable to issues of water scarcity that are compounded by climate change. Peru’s government recognized these issues and has established systems to promote the sustainable use of ecosystem services. Specifically, Peru’s Ministry of Environment developed the MERESE as a mechanism focused on alleviating risks to Peru’s hydrological system. The MERESE is a voluntary agreement that combines the interests of payers—that is, those benefitting from the ecosystem services—with the interests of contributors who facilitate the conservation and recovery of the ecosystem by providing relevant services.



A case study prepared by Libélula, which is summarized in Appendix A.3, outlines how Nature and Culture International led the creation of the Quiroz-Chira Water Fund, a voluntary agreement of monetary and in-kind contributions under the MERESE program. The fund's mandate was focused on conserving the Quiroz-Chira basin because it is a critical source of water contributing to agriculture, aquaculture, domestic consumption, and industrial use. Between 2014 and 2020, financial flows from the water fund went toward community development (53%), conservation and recovery of ecosystems (37%), and management of the water fund (10%).

Lessons drawn from the case study include

- The voluntary nature of the water fund meant that contributions to the fund remained quite modest.
- The contributions from local municipalities conveyed legitimacy to the fund.
- The presence of multiple payers and multiple contributors requires a coordinating body that must maintain stakeholder support, and this coordinating body requires adequate funding allocations to carry out its roles and functions.
- International NGOs and development partners can play a critical role in providing seed funding that supports management and operational costs.

Adapted from Fonseca & Lahud, 2022.

4.1.4 Stormwater Markets and Tax Increment Financing

Stormwater markets and TIFs are financial instruments that have been used to finance adaptation actions in developed countries but have limited or no application in developing countries. While these instruments are not focused on adaptation, the types of actions that can be financed or incentivized by these instruments, such as private investment in green infrastructure, can help property owners and municipal governments to adapt to or build resilience to the impacts of climate change.

Stormwater markets refer to a variety of mechanisms that provide private property owners with an incentive to manage stormwater runoff on their properties. There are multiple options for designing and implementing stormwater markets as an effective incentive system. In most cases, property owners that have put in place runoff prevention measures (such as green roofs, rain barrels, and permeable pavement that allows rainwater to seep back into the ground) receive a credit from the municipal government that can be applied to their municipal water or tax bills (Bassi et al., 2017). The stormwater market in Washington, D.C., which is based on a credit trading program, was recognized in 2014 as an innovative climate program that increased climate resilience through green infrastructure that prevents floods and reduces the urban heat island effect (Department of Energy & Environment, 2014).



Rainwater harvesting rebates and rain taxes similarly incentivize property owners to reduce water runoff. These instruments are widely used in Australia, Europe, and North America, and their use is increasing in developing countries such as India, Nepal, and the Philippines. For example, 19.27% of households in the city of Dharan, located in eastern Nepal, collected rainwater in 2017 as a strategy to cope with water scarcity, encouraged by the municipal authority's provision of a 30% rebate on building permit fees for households that install a rainwater harvesting system during house construction (Rai et al., 2019).

TIF is a financing scheme based on the expected appreciation of land value. TIFs are founded on the assumption that once redevelopment projects are completed, land values will increase and, as a result, the taxation authority will receive higher tax revenue. The initial redevelopment is financed with upfront government resources, whereby the government reimburses a private developer as incremental taxes are generated or issues a bond—as was the case when the City of Chicago sought to install green infrastructure (City of Chicago, 2019).

Both stormwater markets and TIFs require public institutional capacity to develop, implement, and monitor the programs. This includes a taxation and/or monitoring body that has the capacity and authority to collect property taxes and change the tax rates if needed. This ability to tax and collect taxes is a major challenge facing many developing countries. Stormwater markets and TIFs likely will remain infeasible as options to increase financial flows for adaptation in developing countries that face these types of taxation issues.

4.2 De-Risking Mechanisms for Financing of Adaptation

Some well-known financial de-risking mechanisms have had mixed levels of utilization in financing adaptation projects. The most popular, credit guarantees, are highlighted below, and the section also discusses the potential for liquidity facilities and catastrophe bonds to be adopted as catalysts to increase financial flows to adaptation projects.

4.2.1 Credit Guarantees

Credit guarantee schemes are “mechanisms in which a third party—the guarantor—pledges to repay some or the entire loan amount to the lender in case the original borrower defaults” (Gozzi & Schmukler, 2016). Guarantees act as a form of insurance against non-repayment and decrease the risk of losses from a default, making the project loans more attractive to lenders. They can be used to facilitate access to finance for adaptation activities.

MDBs and bilateral development partners have used guarantees in developing countries to scale up private investment in infrastructure projects. The MDB or development partner indicates to the lender, usually a financial institution, that it will pay on behalf of the borrower if the project developer is unable to repay the loan. Guarantees currently make up a very small portion of MDBs' investments for adaptation. In 2021, they comprised less than 1% of MDB finance for adaptation flowing to low- and middle-income economies (USD 145 million of a total USD



17,611 million), and there were no allocations for guarantees for adaptation projects in high-income economies (African Development Bank et al., 2022b, pp. 9 & 23).⁶

Similar to PPPs, adaptation and resilience can be integrated into infrastructure projects whose investment is supported with MDB guarantees. The Multilateral Investment Guarantee Agency (MIGA) of the World Bank Group, which is tasked with providing guarantees to promote foreign direct investment into developing countries, addressed climate risks in various projects in 2022 through the addition of resilience enhancements and adaptation measures in project design (MIGA, 2022). This is consistent with the aim of screening all proposed MIGA guarantees for physical climate risks by the end of 2023 and aligning 100% of MIGA's financial flows with the objectives of the Paris Agreement by 2025 (MIGA, 2022).

The GCF's use of guarantees to mobilize finance for adaptation projects also remains limited. As of January 2023, the GCF had employed guarantees twice for adaptation projects. In Tanzania, the GCF guaranteed loans from CRED Bank to Tanzanian small and medium-sized enterprises (SMEs) pursuing agricultural resilience and adaptation practices (GCF, 2021b). In the second project, implemented in six Central American countries and the Dominican Republic, the GCF (2021a) provided USD 30 million for a guarantee facility. The facility provides security to intermediary financial institutions that on-lend to partner financial institutions that provide loans for ecosystem-based adaptation projects as well as investments in water- and resource-efficient technologies. In both cases, the GCF documents highlighted access to finance as a key constraint to the proliferation of adaptation practices, along with the use of guarantees to address this constraint.

The 2022 report of the High-Level Expert Group on Climate Finance calls for greater use of guarantees by MDBs to increase access to low-cost financing for adaptation and mitigation (Songwe et al., 2022). Efforts to improve the adaptation outcomes of initiatives that include guarantees include technical assistance to support local financial institutions in understanding climate risks and the opportunities for adaptation, supporting market studies to identify adaptation opportunities, and ensuring climate risk and vulnerability assessments inform project design. Guarantees have the potential to fill gaps in climate finance but will require technical assistance resources to support the private and public sectors in designing and delivering the guarantee program (Atkins Cowi, 2021).

⁶ In contrast, MDBs are more likely to use guarantees to support financing for climate mitigation projects, albeit still to a limited extent. In 2021, guarantees comprised 2.5% of financial flows for mitigation projects received by high-income economies (USD 744 million of a total USD 29,475 million) and 4.5% of total MDB mitigation finance in low- and middle-economies (USD 1,506 million of a total USD 33,055 million) (African Development Bank et al., 2022b, pp. 13 & 27).



4.2.2 Liquidity Facilities

Liquidity facilities are financial instruments that have been used to support the financing of development projects by enabling the availability of finance in times of crisis. Liquidity facilities provide backup liquidity during the initial and operational phases of a project or program that may face financing or revenue shortages. The backup liquidity reduces the probability of loan default and enhances the project's or program's creditworthiness, which makes it more attractive to private investors and may allow project developers to borrow on cheaper financing terms.

Liquidity facilities have been used to assist countries with limited resources that have been impacted by a climate-related crisis. For example, the IMF established the Resilience and Sustainability Facility in 2022 to finance projects in low- and middle-income countries related to climate change and the COVID-19 pandemic (IMF, 2022). Contingent liquidity facilities for microfinance institutions (MFIs) provide emergency liquidity/short-term loans to these institutions during emergencies caused by external shocks, such as hurricanes (Inter-American Development Bank, 2008). The short-term funding enables MFIs to meet increased credit demand from clients, and the ability to continue to provide loans can help households and small businesses recover from disasters. VisionFund and Global Parametrics implement the African and Asian Resilience Disaster Insurance Scheme in 27 countries that provides contingent liquidity to MFIs in times of drought or extreme storms (Global Parametrics, 2022).

The Global Center on Adaptation (2021a) recommended that liquidity support (both corporate financing and government support) be contingent upon the recipient incorporating climate risk screening and governance improvements, such as disclosure. However, their recommendation stopped short of putting greater focus on steps to strengthen climate resilience, such as tying liquidity availability to adaptation spending or creating or strengthening a country's National Adaptation Plan.

4.2.3 Catastrophe Bonds

Catastrophe bonds are used by insurance and re-insurance companies to mitigate the impacts of large payouts in the event of a natural disaster, including weather-related disasters such as storms, hurricanes, and typhoons. Catastrophe bonds tend to cover short periods of time (3 to 5 years) and offer investors, such as pension funds, an attractive return. This return is based on the risk associated with the bond buyer/investor potentially losing some or all of their investment should the catastrophic event covered by the bond occur, requiring the insurance/re-insurance company to use the investor's capital to make significant payouts.

The uptake of catastrophe bonds at the sovereign (national government) level is growing in developing countries, but the overall size of the market remains small (Ando et al., 2022).⁷ Insurance against natural disasters can be considered an element of adaptation policy for

⁷ A sovereign catastrophe bond transfers risk to bond investors by enabling the government to access financing from the capital market if a catastrophe, such as a hurricane, occurs.



countries with exposure to climate change risks, and storms and hurricanes constitute a significant share of catastrophic events covered by the insurance (after earthquakes) (Ando et al., 2022).

The World Bank has issued catastrophe bonds and provided development policy loans with a catastrophe deferred drawdown option to help countries meet shortfalls in financial resources as a result of natural disasters or health-related crises (World Bank, 2021). Some of the agreements, such as those with Kenya and the Philippines, specifically mention the risks from climate shocks and extreme climatic events (IISD, 2022).

Catastrophe bonds can be a means to help countries adapt to the increasing frequency of extreme weather events. However, they should be part of a balanced approach to climate resilience where an entity invests in adaptation policies, programs, and projects to strengthen their resilience against a climate catastrophe but has the bond payment available if adaptation measures are not sufficient when a catastrophe strikes.

4.3 Instruments That May Encourage Financing for Adaptation

The previous sections examined instruments that could directly finance adaptation projects or change the risk parameters of an adaptation project. This section explores instruments that require an intervening event that may release financing that could then be redirected toward adaptation.

4.3.1 Sustainable Bonds

Bonds are debt instruments in which the issuer, such as a government, borrows funds from buyers of the bond (the bond holder) on the promise that they will repay the funds along with interest on an agreed-upon schedule. In return, investors receive predictable returns (Fernando, 2022).

Issuers of sustainable bonds, such as green bonds, blue bonds, social bonds, sustainability bonds, and sustainability-linked bonds, commit to using the proceeds raised to finance projects that advance the achievement of sustainability goals.⁸ Climate Bonds Initiative (2022) reported that cumulative green, social, sustainability, and sustainability-linked bond issuances that were aligned with the Paris Agreement reached USD 2 trillion in September 2022. While the sustainable bond market has experienced growth over the past 5 years, it represents only a fraction of the overall bond market, and the sustainable bond market is considered a niche sector (OECD, 2022).

⁸ For more information about these types of sustainable bonds may be found at Innovative Financial Instruments for Adaptation (IISD, 2022).



The main climate change-related motivation for many sovereign issuers of sustainable bonds has been to use the proceeds to meet greenhouse gas emission reduction objectives set out in nationally determined contributions (OECD, 2022). Despite this, sustainable bonds can be used to raise finance for priority adaptation initiatives set out in nationally determined contributions and National Adaptation Plans.

Green bonds are perhaps the most widely known sustainable bond. Proceeds raised from their issuance can be used to finance green project categories as set out in the associated bond framework. To support issuers in financing environmentally sound projects, the International Capital Market Association introduced the voluntary Green Bond Principles in 2014. Under these principles, climate change adaptation is identified as an eligible project category for the use of bond proceeds, in addition to project categories that could possibly contribute to adaptation objectives, namely sustainable water and waste management; sustainable management of living natural resources and land, terrestrial and aquatic biodiversity conservation; and green buildings (International Capital Market Association, 2021). The European Bank for Reconstruction and Development (EBRD, 2020) issued the first-ever climate resilience bond in 2019 that is underpinned by a portfolio that is consistent with the Climate Bonds Initiative's Climate Resilience Principles. The portfolio includes adaptation projects that are categorized as climate-resilient infrastructure, climate-resilient business and commercial operations, and climate-resilient agriculture systems (EBRD, 2019).

The public sector is among the largest issuers of sustainable bonds. MDBs, such as the World Bank, and large economies, such as the United States, Germany, France, and China, were leaders in sustainable bond issuance in 2021 and 2022 (Climate Bonds Initiative, 2022). Middle-income countries such as Chile, Egypt, Indonesia, and Thailand have issued sustainable bonds, but generally, countries eligible for official development assistance have lagged behind, accounting for 6% of issuances over the years (OECD, 2022). This situation may be linked to the size of the issuance required. For example, the average size of green bonds issued in 2021 was USD 250 million (Climate Bonds Initiative, 2022). Many developing countries may be challenged in taking on such debt and may lack a pipeline of projects to finance with the bond proceeds.

Even when the right size of an issuance can be ascertained, issuers must have the skills and capacities to issue sustainable bonds. Issuers need to be creditworthy and able to demonstrate the governance and reporting frameworks expected of sustainable bond issuers. Some issuers, public or private, may not be able to meet these requirements, regardless of their absorptive capacity for sustainable finance.

Fundamentally, issuing a sustainable bond is similar to issuing any other kind of debt, and, to do so, the issuing entity must be able to access a cadre of buyers of that debt willing to believe that the issuer will deliver on the promises outlined during the debt issuance process. These are significant issues and likely the main reasons why many developing countries have not been active in the sustainable bond market. MDBs and other public entities have provided technical assistance for many countries to issue sovereign sustainable bonds, and, with the support of development partners, more developing country governments can benefit from the sustainable



bond market (OECD, 2022). Still, there must be a willing market of buyers for these bonds—and the existence of these buyers is strongly linked to the country’s pre-existing financial fundamentals.

4.3.2 Debt-for-Nature and Debt-for-Climate Swaps

Debt-for-nature swaps and debt-for-climate swaps are transactions in which a lender will renegotiate repayment terms with a borrower in return for the borrower allocating repayment savings to investments in nature or climate action, such as climate-resilient infrastructure. An alternative is when the lender sells a portion of the borrower’s outstanding debt to a third-party organization that has experience implementing investments in nature or adaptation. The borrower then repays the outstanding debt to the third-party organization that uses this repayment to invest in nature or climate action. Debt-for nature swaps can involve a combination of public and private support, such as Belize’s 2021 transaction, where a government commitment to conservation action helped incentivize Belize’s private creditors to provide greater debt relief by writing down expensive loans and replacing them with cheaper finance through a mix of private and MDB investments and guarantees (Amorim, 2023).

These swaps may be viewed as an attractive way for indebted countries to reduce their debt loads while undertaking adaptation measures and offer an opportunity to encourage private sector investment in conservation efforts. But the swaps can be quite complex. Debt-for-nature and debt-for-climate swaps introduce performance requirements to standard lending arrangements that require upfront due diligence, monitoring, and evaluation. While a lender may offer a swap to a borrower for climate change adaptation purposes only, the borrower may have different priorities that make negotiation and implementation difficult. Also, crucial to the utilization of the debt-for-nature and debt-for-climate swaps is the lender having confidence that the original borrower will not simply replace the alleviated debt with new debt—a belief that is difficult to guarantee during the negotiation. Thus, while these transactions can potentially assist indebted borrowers in addressing adaptation, they must be carefully considered (Georgieva et al., 2022).



5.0 Lessons and Recommendations

Having explained the ways in which innovative financial instruments have worked and may work in the future to attract private sector investment in adaptation projects, it is important to focus on the lessons that can be drawn from the limited usage of these instruments. These lessons are four-fold and interconnected:

- First, many adaptation projects with some form of private finance have been and will continue to be financed using structures that blend concessional public capital and private capital.
- Second, packaging adaptation projects alongside projects that generate revenue is a way to increase flows to adaptation.
- Third, some financing arrangements that would be considered standard in one country or market could be considered innovative in another market.
- Fourth, and finally, the most suitable form of finance for some adaptation projects in some geographic regions—such as adaptation interventions in poor and fragile countries and communities that provide no adequate return on investments—is grant and concessional finance from a public entity. These initiatives should be identified and put aside as they can cloud the conversation of incentivizing private finance to other adaptation projects.

5.1 Blended Arrangements

The discussion of blended finance arrangements in Section 4 clarified that these arrangements are used to adjust the risk and return profiles for private investors. Where there is space to innovate is in regard to the types of instruments that public entities use to incentivize private investment. For example, grants and concessional loans have been the chief means by which public entities adjust risk and return calculations for private investors, but there are other methods at their disposal.

Increasing the usage of credit de-risking instruments like guarantees and liquidity facilities is one way to increase flows to adaptation. Guarantees and liquidity facilities have been used by institutions such as MDBs to attract private finance to development projects, but their use has largely been missing when financing climate change adaptation projects. While there is less incentive for many financial institutions to employ guarantees and liquidity facilities when compared to issuing traditional loans,⁹ these instruments have a role in enhancing more traditional blended structures. In many cases, guarantees and liquidity facilities mitigate the perception of credit risk and are never tapped—and so require no intervention by the public guarantor or liquidity provider.

⁹ Guarantees and liquidity facilities require the issuing organization to account for the entire callable amount, similar to a loan, but in most cases, the organization receives less in guarantee premiums than it would through the interest on a traditional loan (Humphrey & Prizzon, 2014).



Broadening the collection of partners with which multilateral entities are willing to co-finance projects is a second way to increase blended arrangements for adaptation. As an example, as of January 2023, the GCF (n.d.-c) listed 114 accredited entities that can access GCF funding and implemented projects. Of the 290 national development banks in existence, fewer than 20 are GCF-accredited (GCF, n.d.-c.; Xu et al., 2021).

Potential partners of the GCF have cited the accreditation process as arduous, costly, and not worth the effort (Griffith-Jones et al., 2020). Instead, MDBs, such as the EBRD, are among the leading organizations accessing GCF funding (GCF, n.d.-b). Many national development banks would serve as competent local finance partners for the GCF and could provide a conduit to local banks that could co-finance projects or deliver loan programs for adaptation action. Having local market knowledge and strong relationships with local financing institutions is valuable, as was demonstrated in the case of enhancing water access in Kenya described in Box 4 and Appendix A.1, where K-Rep Bank was a crucial local financial intermediary.

Finally, **MDBs and other public funders should evaluate where in the blended financing structure their finance is most valuable and what types of financing are needed at particular points in project development.** Providing a loan at near-market interest rates (which are often much higher in developing countries than developed countries) to incentivize a private project loan is likely to have less importance than providing grant financing during the project development stage, which may lessen future due diligence requirements for private lenders.

Moreover, there may be cases where publicly backed loan guarantees facilitate adaptation project construction, whereas a liquidity facility would be more suitable to back operational costs. Consideration should also be given to balancing the needs of the countries in which investments are required. MDBs could play a larger role in attracting private finance to poor and fragile countries, and significant amounts of blended finance could reduce the cost of capital for adaptation projects (Songwa et al., 2022). Care is needed to ensure that public finance to incentivize private sector investments does not come at the expense of direct investments in these countries' prioritized adaptation projects. Blended structures can be advantageous to both public and private investors, but MDBs and other public funders should consider their decisions just as strategically as their private partners if they are to optimize their balance sheets and limited public funds.

5.2 Packaging Adaptation Projects

Revenue generation is a crucial element for private investors contemplating any project investment as it provides a clear path to the repayment of loans or equity investments. Given that many adaptation investments are financing public goods that do not have associated revenue generation streams (such as seawalls and population resettlement), limited participation from private investors in financing adaptation projects is understandable. Even among revenue-generating adaptation projects, many may not generate enough revenue to attract private



investment. **For adaptation projects that are unlikely to be financially attractive to private sector investors on their own, project developers and sponsors should look to package these projects alongside revenue-generating projects to enhance the attractiveness of the packaged projects.**

The packaged project investments will still likely need the involvement of MDBs and other types of public financiers to enable a private investment. For example, if an ecosystem-based adaptation project in a conservation area that costs USD 5 million were packaged with a funicular to that conservation area that cost USD 5 million as well, it is unlikely that the investor who wanted to own the funicular at the outset would be willing to pay USD 10 million for the full package. However, they may be willing to pay USD 7 million if public finance contributed the other USD 3 million, especially if a government or development partner allowed the private investor to retain all funicular profits and provided a guarantee in case of loss. The investment might be further enhanced if the investor was permitted to construct a restaurant at the bottom of the funicular, outside of the conservation area. Packaging projects will demand creativity but could provide a partial solution to the adaptation financing issue.

5.3 Innovativeness of Financing Arrangements

The cases in Boxes 3, 4, and 5 and further outlined in Appendix A, point to different understandings of “innovative” when discussing financing arrangements. Specifically, the Nepal and Kenya case studies indicated that blended finance arrangements in both countries were quite rare. The Nepal case mentioned that private sector investment in the country’s agriculture sector was challenging due to an uncertain policy environment, high transaction costs, and low rates of return on investments—making the inclusion of private equity financing in the adaptation project innovative within its context. The blended arrangement mitigated some of the risks for the private investor and facilitated investment in a sector perceived as risky.

This differentiated understanding of “innovative” is an important lesson to draw from these cases. While investors and researchers are looking for innovative solutions, some more traditional solutions, such as blended finance arrangements, have not been tried in all markets and in all sectors. Innovation can mean a change in method or application, which is not the same as invention and the creation of something new. Therefore, **innovation does not need to mean new financing arrangements.** Rather, it may mean the application of tested arrangements to different issues or the application of mechanisms that have been successful in some countries that are adopted in new countries.

5.4 Acknowledging Limits to Incentivizing Investors

The need to increase private finance for adaptation is generally understood, but discussions around this issue must be nuanced to recognize that there are limitations to financing structures, and some adaptation projects may never be attractive to some investors. Specifically, investors have certain mandated target markets and target sectors as well as varying risk tolerances and



return expectations. For some investors, investments in adaptation are not in their mandates and may never be, and investable adaptation projects may not be in the right geographic markets for them. Moreover, investments may be subject to country-level risks (such as policy, technology, and political risks) and country-specific issues (such as the business enabling environment, regulations, and market trends), which are often perceived to be high in many developing countries (Egyptian Ministry of International Cooperation, 2022). Additionally, some investors will never invest in adaptation because the projects do not meet their risk and return profiles, regardless of the ways these profiles can be altered by public finance.

Advocates for increased private investment in adaptation must present a nuanced picture of financing opportunities to maintain credibility. Telling all private investors that they need to dedicate more investment to adaptation is far less efficient than ascertaining the types of investors that are on the cusp of investing in adaptation and the conditions they need to take the leap. Continued work is needed to take those close-to-investible projects to a state where investors are comfortable financing them while also ensuring that the regulatory frameworks and investing environments in the locations of these projects are conducive to private investment. Instead of targeting all investors and having the advocacy for more finance for adaptation lost in the noise, advocates must work at the margins and create understanding between the suppliers of capital and those needing investment about what is needed by both parties. These targeted interventions, while acknowledging that some adaptation projects will likely remain unattractive to some investors, are the most credible way forward.

Efforts to scale up private sector investment in adaptation could initially focus on those areas where private investment can generate revenue flows in specific countries, such as (i) building the climate resilience of infrastructure, agriculture, and water management and (ii) where innovative financial approaches, such as blended finance, can increase the attractiveness of the investment for the private sector.

For those adaptation projects or programs that will remain unattractive to investors regardless of the efforts of incentives offered by public financiers, grant and concessional financing will remain crucial and continue to play a large role. Acknowledging that grants will be needed is not admitting the failure of public finance to incentivize private finance but rather presenting a credible picture of the financing for the adaptation landscape and acting accordingly.



6.0 Concluding Remarks

Record heat waves, cold snaps, floods, droughts, and their associated human impacts remind us that the climate crisis is upon us. Both climate change mitigation and adaptation strategies are necessary to avoid the worst impacts of our current climate trajectory, yet mitigation strategies and investments garner the majority of public and private capital, while adaptation flows remain below stated targets. While it remains likely that developed countries will be able to summon finance for adaptation projects when they deem adaptation to climate change an urgency, developing countries with limited financial capacity do not have that luxury.

In response to this situation, and previous missed finance targets, at the 2021 UN Climate Conference, parties committed to the Glasgow Climate Pact, which urges “developed country Parties to at least double their collective provision of climate finance for adaptation to developing country Parties from 2019 levels by 2025” (UNFCCC, 2022a, p. 4). Parties reaffirmed this commitment at the 2022 UN Climate Conference (COP 27) in Egypt. The Sharm el-Sheikh Implementation Plan also called upon MDBs to mobilize climate finance from various sources and encouraged them

to define a new vision and commensurate operational model, channels and instruments that are fit for the purpose of adequately addressing the global climate emergency, including deploying a full suite of instruments, from grants to guarantees and non-debt instruments, taking into account debt burdens, and to address risk appetite, with a view to substantially increasing climate finance (UNFCCC, 2022b, p. 7).

For their part, the MDBs’ joint statement at COP 27 identified critical priorities that included “boosting adaptation finance” with particular attention to small island states, low-income countries, and disadvantaged populations, and using concessional finance to catalyze public and private sector investment in adaptation (African Development Bank et al., 2022a).

While an influx of dedicated capital in response to these international commitments will likely result in more adaptation projects being financed, public capital from governments and MDBs alone will not fill the adaptation financing gap. Moreover, given the numerous demands on limited public coffers, particularly in developing countries, governments and MDBs must be strategic in their deployment of public capital. They must identify where their use of catalytic capital can most effectively attract private investment in adaptation initiatives while recognizing that there will continue to be adaptation projects that will require purely public financing—particularly via grants and concessional finance.

A strategic approach can include an adaptation investment plan that identifies a package of priority adaptation investments and sets out the best and most strategic uses of various sources of finance for these priorities. The plan can identify those actions that should be funded with domestic resources, those actions that might best be financed with grant climate funds or concessional finance through MDBs or the GCF, and those actions that are best placed to attract



private investment (mainly those with some type of revenue stream that generates a return on investment). Adaptation investment planning can help developing countries move toward a more programmatic way of allocating and mobilizing resources for adaptation.

The use of a greater variety of financial instruments, such as those described in Section 3, has the potential to attract private sector finance into projects that provide adaptation benefits. However, the conversation should focus on the use of available instruments rather than the creation of new instruments specially designed to increase financing for adaptation. A wide range of financial instruments is already available and, as they are agnostic, can be applied in a variety of circumstances to meet a range of financing needs. **Innovative approaches to combining available instruments and matching them to specific projects have the greatest potential to increase financing flows to adaptation.** This area is the one in which public entities must focus their efforts, or they will continue to be the sole and/or majority financiers for the foreseeable future.

The use of a greater variety of financial instruments has the potential to attract private sector finance into projects that provide adaptation benefits

Moreover, the use of the term “innovative finance” needs to be nuanced in two ways. First, the term itself may confuse and obfuscate the target. In some contexts, as demonstrated in the cases of Kenya and Nepal, a blended finance arrangement was considered innovative. While this may not be the case for all countries and contexts, providers of capital must not overcomplicate the terminology and instead **focus on the best financial instrument(s) within the context for which the specific investment is being considered.** Sometimes a simple loan combined with a technical assistance grant to conduct the due diligence is enough to get an adaptation project financed; it does not have to be complicated just because it can be complicated.

Second, those seeking innovative financing for adaptation and desiring to incentivize private finance to adaptation projects must be more nuanced in their communications by acknowledging that some types of adaptation projects in some countries will not be attractive for private finance in the near future or at all. Investments in these sectors and locations will still rely on financing from domestic governments, bilateral donors, and MDBs. Not acknowledging this publicly while calling for more private finance for adaptation projects may confuse the recipients of the message. **Yes, more private finance for adaptation is needed but only where those investments are feasible.** The focus, therefore, should be on identifying the sectors—such as climate-resilient infrastructure, agriculture, and water management projects—where there is greater opportunity to meet the revenue generation expectations of private financiers. Concurrently, efforts need to focus on identifying and clearly communicating to private sector entities that are on the cusp of being interested in investing in adaptation projects should the conditions be suitable.

There is little doubt that more public and private finance for adaptation projects is needed. This need is greatest in developing countries where, in most cases, domestic financial resources are drastically insufficient to meet adaptation needs, and there are greater challenges in attracting



domestic and international private finance. The challenge is to determine the most appropriate instrument or combination of instruments for the provision of this finance, who will provide it, and where it will be used. After surveying the financing for adaptation landscape and studying the numerous financial instruments that could be used to finance adaptation projects, it is clear that it is not instruments that will meet the gap in financing for adaptation, but innovative thinking on how to use known instruments. Efforts spent otherwise waste the time left to act and adapt to the climate crisis.



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Appendix A. Summary of Case Studies

In 2020 and 2021, the African Centre for Technology Studies in Kenya, the Prakriti Resources Centre in Nepal, and Libélula in Peru prepared case studies that analyzed innovative financial instruments for adaptation in each of Kenya, Nepal, and Peru. The case studies provide insights into how innovative financial instruments helped to channel resources toward adaptation measures, and how they could be used to scale up investment in adaptation.

A.1 Kenya: Blended finance arrangements increasing water access¹⁰

Introduction

Severe water scarcity issues affect several areas of Kenya, and about 40% of the population did not have access to basic drinking water services in 2020 (World Bank, 2022b). Kenya's National Adaptation Plan (NAP) identified priority actions in the water and sanitation sector (Government of Kenya, 2016). Kenya's National Climate Change Action Plan 2018–2022 pointed out that increased risk of drought due to climate change and other factors like rapid population growth, urbanization, and industrialization were expected to contribute to increased water stress in the future and identified adaptation actions to improve access to and quality of water (Government of Kenya, 2018).

An estimated USD 14 billion in investment is required by 2030 to achieve universal access to safe water in Kenya (World Bank, 2018). However, the government and civil society have limited capacity and resources to meet this need. Furthermore, commercial loans for enhancing water supply are constrained by collateral requirements, capacity, and affordability (United States Agency for International Development, 2019). These constraints have resulted in local community-based organizations developing water supply systems utilizing internal resources and available grants. More than half of Kenya's water sector in 2018 was financed by development financial institutions (World Bank, 2018), and additional sources of financing are required.

These challenges are not new. The World Bank's 2004 Country Assistance Strategy included an exploration of profitable structures to mobilize commercial financing in the water sector. Aligned with the strategy, the World Bank piloted the Water and Sanitation Program from 2013 to 2019 to finance community-managed water schemes in Kenya. The World Bank leveraged existing partnerships between the government and private sector by collaborating with a microfinance institution, the Kenyan Rural Enterprise Programme (K-Rep) Bank, to enhance rural and peri-

¹⁰ This section is based on Atieno, E., Wachira, J., Atela, J. & Ogada, T. (2021). *Innovative financial instruments for climate change adaptation: The case study of Kenya Microfinance for Water Service Project*. African Centre for Technology Studies. <https://www.acts-net.org/images/Publications/Reports/Workstream03-Report.pdf>



urban populations' access to loans. The targeted groups included low-income earners as well as residents of the arid and semi-arid lands who were, and remain, the most vulnerable to droughts and other impacts of climate change.

Innovative Financing

The Water and Sanitation Project financed community-based water schemes using a blend of community equity, grants, and microfinance secured through output-based aid (OBA) subsidies and a partial credit guarantee. For individual water projects, the local community made an equity contribution of 20% of the project cost that would be combined with World Bank grants and OBA subsidies. This capital from the World Bank and a partial 50% risk guarantee provided by the United States Agency for International Development served as the basis to allow K-Rep Bank to provide finance for green and brownfield infrastructure projects to be implemented by qualified groups in vulnerable communities that had the potential to pay the operation and maintenance costs associated with these projects. Loans provided by K-Rep Bank ranged in value from KES 5 million to 10 million (about USD 50,000 to 100,000) with interest rates fixed at the market rate (ranging between 16% and 18% per annum) and could finance up to 80% of the total project cost. Technical assistance was also provided by support organizations to enable community groups to develop bankable loan applications and supervise project implementation.

The project followed a careful process to disburse loans and ensure accountability. The OBA financial scheme was results-oriented with set performance indicators and required project auditing to determine outputs and the amount of subsidy disbursement. After targets were achieved through project implementation (determined by indicators such as the number of water connections and revenue raised), the subsidy would be disbursed. Once the OBA subsidy was received by community water projects, the project was no longer covered by the partial risk guarantee with the credit risk passed to K-Rep Bank.

In addition to the requirements of the OBA subsidy, K-Rep Bank also tied performance indicators (including the number of people with water access and number of new household water connections) into the terms of their financing requirements. The specific outputs for each sub-project were clearly stated in the loan and the payment of World Bank-supported subsidies to K-Rep Bank was contingent on the successful achievement of these specific outputs. The innovative financing of these projects succeeded in gaining commercial profitability by yielding a positive rate of return of USD 2–10 for every USD 1 invested.

Insights

The project resulted in about 1,500 households in the arid and semi-arid areas of Kenya being connected to new and existing water infrastructure. Blending various financing mechanisms, such as community equity contributions, OBA subsidies, and private microfinancing from K-Rep Bank, among other sources, was an element of success. In addition, the project benefited from the provision of capacity building within the bank and the communities, as well as an emphasis on management and maintenance.



A barrier to the implementation of adaptation measures that will increase resilience to climate change in Kenya, like other parts of Africa, is a lack of bankability and the high risk involved in high-cost projects. The private sector traditionally had a low level of involvement in adaptation projects in Kenya because of a lack of revenue to recoup the investment. To help ensure a revenue stream, K-Rep Bank required the use of metering for water consumers as a condition of financing. This served two purposes: water use could be measured and mapped, and consumers could be billed properly; additionally, the water supply lines became more efficient through early detection of leakages, leading to reduced water loss and increased water conservation. To further protect the investment, revenue was invested into the long-term management and maintenance of water supply lines in the community.

While this project did not have climate change adaptation as an explicit goal, many of the steps taken to improve and increase water supply to water-scarce regions did build resilience to climate change and helped achieve the adaptation objectives set out in Kenya's NAP and National Climate Change Action Plan. Increased efficiency of water lines through metering and the investment in long-term management and maintenance of these water supply lines provided sustainable access to water with less water loss. Water storage tanks in communal water kiosks created access to water during droughts and low-precipitation events. The conditions built into the OBA subsidies and private microfinancing through K-Rep Bank ensured that the projects would be successful and profitable.

A.2 Nepal: Blended finance arrangements enhancing food security¹¹

Introduction

Nepal is highly vulnerable to climate-related disasters due to its geographic location and varied topography. In recent years, the country has experienced changes in temperature and precipitation levels that are faster than the global average rate. With 60% of agricultural land dependent on rainfall, this climate variability has adversely impacted the agriculture sector (Karki et al., 2020), which is identified as a priority sector for action in Nepal's NAP (Government of Nepal, 2021). The situation risks national food security in addition to the 60% of the country's jobs (and 25% of its national GDP) for which the agriculture sector is responsible (Ministry of Finance, 2021).

Nepal has a USD 4.8 billion investment opportunity to transition to climate-smart agriculture as an attempt to address the impacts of climate change (Mahat et al., 2019). However, the agriculture sector is considered risky and unattractive for private sector investment due to low returns on investment and an uncertain policy environment. Key players in the sector, small and

¹¹ This section is based on: Sherchan, P. & Singh, P. M. (2021). *Nepal case: Innovative financial instruments for adaptation*. Prakriti Resources Centre. <https://prc.org.np/assets/uploads/resource/c8d35e5c711d5a307456d9970e0e1e7b.pdf>



medium-sized enterprises (SMEs), face challenges in accessing finance from local banks due to high transactional costs for their relatively small-sized borrowings. Local banks are reluctant to lend due to difficulties in assessing farmers' creditworthiness, inadequate collateral, and lack of agricultural insurance. To invest in climate-smart agriculture, Nepal's private sector requires de-risking mechanisms.

Innovative Financing

The blended finance arrangements profiled in the case study prepared by Sherchan and Singh (2021) had the goal of encouraging private sector investment in climate-resilient agriculture undertaken by small farmers. The Promoting Climate Resilient Agriculture project, 2013–2019, was initiated by the International Financial Corporation as a part of a broader Pilot Program on Climate Resilience operating within the Climate Investment Funds. A concessional loan from the International Financial Corporation was used to de-risk investment in Nepal's agriculture sector.

The financial arrangement involved the participation of Business Oxygen (BO2), which is Nepal's first climate-focused private equity fund. BO2 provided equity financing, which was particularly helpful to SMEs because it did not require collateral as had been the case with previous forms of debt financing. The investment was primarily directed toward SMEs that produced three crops of strategic importance in Nepal: rice, which is a staple food, and maize and sugar cane, which are important cash crops.

Three local private agribusiness firms, in addition to BO2, were engaged to provide technical assistance and capacity building for farmers and agricultural supply chain members. Climate-resilient technologies and practices were piloted to enhance agricultural productivity in the project as part of the capacity-building efforts. This included such practices as the use of high-yield seed varieties, organic fertilizer, improved irrigation, and moisture management. The project investment resulted in increased production and productivity of all three crops, indicating the success of the adaptation practices. The aim of BO2 and the agribusiness firms, beyond increasing climate resiliency, was to increase the competitive advantage of this project for private investment.

The primary beneficiaries of the equity investments from BO2 and the capacity building were five SMEs that sought to enhance their climate-resilient business lines. The financing assisted these selected SMEs in repaying their original loans and other operational expenses. BO2 supported the scaling up of the businesses by paying a mutually agreed 25% premium on the predetermined equity share price. In addition to the equity finance, the SMEs also benefited from government subsidies on imported goods and 5% rebates on the bank interest rate on agricultural loans. The return on investment for investors was calculated to be 35% over the 3.5-year investment period.

Insights

Private sector investors in Nepal generally have low awareness of climate change and climate change adaptation. This knowledge gap was addressed through holding capacity-building activities hosted by government officials, consulting firms, NGOs, and agribusinesses, which



served to educate the private firms on the impacts of climate change on the agricultural sector and the role of adaptation. Technical assistance was provided to SMEs to help them become more competitive and attractive to private investment firms.

The main adaptation outcome, as discussed above, was the successful use of climate-resilient high-yield seed varieties for rice, maize, and sugarcane and farmers' increased knowledge of using these seed varieties. Other adaptation measures adopted through this project were increasing farmers' access to weather information and early warning systems that helped prevent crop losses due to unforeseen changes in weather, creating partnerships to improve storage infrastructure to protect seed quality between harvesting and planting, and improving farming practices supported through mechanization and irrigation. The capacity-building activities enhanced the business acumen of the SMEs and provided training in improved irrigation systems, repair and maintenance of the new farm equipment, and the use of scientific methods for the sustainable cultivation of crops that increase productivity.

Agricultural policy barriers are still entrenched in Nepal, and removing those policy barriers, such as high transaction costs, would promote private sector investment in adaptation actions. SMEs do not always benefit from existing policies, and a simplified policy environment could better engage SMEs to become competitive for climate financing. While barriers hinder adaptation investment, the Agriculture Development Strategy of Nepal has prioritized creating a conducive environment for policy actions that support SMEs. Government action to insulate the agricultural industry from the impacts of climate change have signalled to the private sector that there are opportunities for investment.

A.3 Peru: A payment for ecosystem services arrangement for ecosystem conservation¹²

Introduction

Peru is vulnerable to the impacts of climate change. About 70% of the world's tropical glaciers are in Peru, and over the last 50 years these glaciers have lost about half of their surface area due to climate change, leading to reductions in long-term water supply and increased risk of glacial lake outburst floods (Taylor et al. 2022). An estimated 3 million Peruvians (9.2% of the population) lacked access to water services in 2019 (Organisation for Economic Co-operation and Development, 2021). Peru's diverse landscape and rapidly growing urban population are expected to increase its vulnerability to water scarcity.

In 2014, the Government of Peru passed the Mechanisms of Remuneration for Ecosystem Services, Law no. 30215 (MERESE), a payment for ecosystem services (PES) mechanism that promotes financial investments and non-financial tools to enhance the sustainable use, protection,

¹² This section is based on: Fonseca, A., & Lahud, J. (2022). *Implementación de MERESE mediante el Fondo de agua Quiroz-Chira: instrumental financieros innovadores para la adaptación [Implementation of MERESE through the Quiroz-Chira Water Funds: Innovative financial instruments for adaptation]*. Libélula. <https://libelula.com.pe/download/14106/>



and recovery of ecosystem services (Ministry of Environment, 2018). The MERESE and water funds were identified in Peru's NAP and nationally determined contributions as mechanisms with the potential to increase private sector involvement in financing adaptation interventions (Ministry of Environment, 2021).

This case study explored the implementation of MERESE through the Quiroz-Chira Water Fund to better understand how these mechanisms could be used to channel resources to adaptation priorities. While the MERESE and the water fund did not include adaptation to climate change as part of their scope, the case study explored how actions carried out within these mechanisms could contribute to enhancing the adaptive capacity and resilience of the headwater ecosystems and maintaining water availability for communities as the climate changes.

Innovative Finance

The MERESE is a voluntary PES agreement, and the Quiroz-Chira Water Fund is a not-for-profit public-private association that implements the MERESE. The fund was created to manage the conservation of the Quiroz-Chira basin, with the initial establishment of the PES and water fund informed by a pilot phase. The fund targeted raising and managing funds for the conservation and recovery of the forests and headwater ecosystems in the Quiroz-Chira basin, which is a critical source of water for agriculture, aquaculture, domestic consumption, and industrial use.

The water fund was financed by a voluntary group consisting of five payers (two municipalities, two water boards, and one non-governmental organization) and five contributors consisting of various peasant communities. The water boards voluntarily contributed 1% of the water tariff they collected from users. The two municipalities committed to annual contributions of USD 17,000 and USD 15,000, respectively. They also sought to provide technical and logistical assistance in the operation of the water fund. Nature and Culture International, a non-governmental organization based in the United States with operations in Latin America, was a key player, as it was able to bring in international development finance to cover expenses, including the salaries of the employees, travel, logistics, materials and equipment, specialists' time, and other resources needed for the operation of the technical secretariat. The international finance also supported the implementation of activities and projects of the water fund.

Between 2014 and 2020, water fund flows went toward community development (53%), conservation and recovery of ecosystems (37%), and management of the water fund (10%). The actions of the water fund have positively impacted about 500 families and over 18,000 hectares of land. From 2014 to May 2020 almost USD 1 million was raised and invested by the water fund.

Insights

The MERESE was successful in blending public and private financing, including international support, that enhanced managerial efficiency to raise and distribute funding and increased the effectiveness of the investments. This innovative financing mechanism succeeded in harnessing political and citizen support to blend new and traditional funds for conservation activities.



The Quiroz-Chira Water Fund did not explicitly aim to address adaptation to climate change. However, many of the projects and actions helped achieve the aims of Peru's NAP by increasing the adaptive capacity of the mountain ecosystems and the communities that depend on their services. At the same time, one of the major challenges was that the financial mechanism was vulnerable to extreme climate events. The water boards did not make their voluntary payments between 2017 and 2019 as their revenue streams were severely impacted by droughts, flooding, and other extreme weather events, creating instability in one of the main funding streams. These financial limitations also impacted the monitoring of the results of the interventions.

The water fund filled the financial gap with funding from national public innovation programs that were managed by the government and partly financed by the World Bank. Achieving a stable funding stream is a major challenge. Efforts were underway in 2021 to educate potential beneficiaries about the fund and its projects with the aim of generating new streams of financing.

The case study demonstrated that water funds and MERESE agreements can be used in combination to implement actions that contribute to adaptation priorities. The key success factors for the MERESE and Quiroz-Chira Water Fund were:

- Trustful relationships between beneficiaries and contributors, including participation and equity in the decision-making processes.
- Education and awareness raising helped contributors and beneficiaries recognize the importance and the benefits of protecting ecosystems.
- The pilot project helped to raise the awareness of stakeholders and was an important de-risking measure that built trust in innovative financing mechanisms.
- The presence of a “champion” institution, Nature and Culture International, that initiated and managed the MERESE and provided stability and legitimacy for the Quiroz-Chira Water Fund, including funding.
- The involvement of municipalities provided legitimacy and helped with the identification of priorities for local development.
- Clear guidelines for the project activities supported through the fund, which was key to managing the expectations of various actors.

The case study demonstrates how public and philanthropic finance can be blended with private finance through a PES mechanism to encourage conservation actions that can have adaptation benefits, particularly if adaptation is considered at the planning stages and the climate risks of the area have been assessed. The support of government, including municipalities and financial support through national innovation funds, provided legitimacy that attracted private water boards. In addition, Nature and Culture International played a critical role in providing and attracting international and domestic finance, as well as managing operations and overseeing and monitoring projects.

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