Climate Resilience Alliance

EVIDENCE REPORT

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Adaptation finance and the private sector: opportunities and challenges for developing countries

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About this report

This report was written by Paul Watkiss and Kit England of Paul Watkiss Associates and included contributions and inputs from Blanche Butera, Nella Canales and Dipesh Chapagain from the Adaptation Gap Report team, as well as from Alistair Hunt, Adriana Quevedo, Pieter Sayers and John Ward. It was funded through the Zurich Climate Resilience Alliance.

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Executive Summary

A large number of recent studies have highlighted the potential for the private sector to scale up climate change adaptation. This study aims to assess the potential role of, opportunities for, and limits of the private sector in helping to bridge the adaptation gap in developing countries.

Study framing and objectives

- The focus of the analysis in this report is on **developing countries only**, i.e. the United Nations Framework Convention on Climate Change- (UNFCCC-) defined non-Annex I countries. The focus is also on the types of adaptation priorities identified in Nationally Determined Contributions (NDCs) and National Adaptation Plans (NAPs), i.e. **government-determined priorities for adaptation**.
- The study objectives are to assess how the private sector can help bridge the adaptation gap in developing countries in relation to these priorities. The private sector has different roles to play in bridging this gap, which involve different types of institutions, from both developed and developing countries. The private sector's role includes:
  - Financing: The private financial sector and investors play an important role in providing the upfront finance for adaptation.
  - Delivering adaptation goods and services: The private sector is involved in innovation and developing and delivering new adaptation goods and services.
  - Addressing their own needs: Private sector companies will address their own adaptation needs, adapting their own assets and supply chains.
- In discussions of these issues the term 'finance' is often used very broadly to represent all sources of finance (from the public, private, and third sectors) and all financial instruments (including grant, debt, equity, and others). The terms 'financing' and 'funding' are also used interchangeably. However, for this study, we differentiate between these terms as follows:
  - **Who finances the adaptation** i.e. where does the money come from? This focuses on the role of the public or private sector in providing the upfront money to implement adaptation and associated financing costs (if relevant).
  - **Who funds the adaptation** i.e. who pays for the adaptation? This focuses on how the costs of adaptation are met over the lifetime of the investment, including the cost of the financing (if relevant). This considers whether the adaptation is paid for from international public finance grants or domestic public budgets, or by households, etc.
- This distinction is crucial in the context of the international climate negotiations and the principles of common but differentiated responsibilities and respective capabilities (CBDR-RC). While the private sector can help reduce the adaptation financing gap in developing countries, it may not necessarily reduce the adaptation funding gap, i.e. there is a risk that developing countries themselves will end up paying for adaptation.

- To provide a simple example: Adaptation to rising sea levels can be addressed through coastal protection schemes which are normally public projects. The finance for these can be provided by private financial markets, but this will need to be repaid from government budgets, thus the developing country itself is paying for adaptation. In practice, most adaptation actions involve more complicated arrangements, but the consideration of financing and funding is important.

Data sources and boundaries

- The report uses the interim update from the United Nations Environment Programme's (UNEP's) Adaptation Gap Report (AGR) 2025 on adaptation *financing* needs, which are estimated as a plausible central range of approximately US$320 billion to US$400 billion per year in developing countries by 2035 (in US$2023 prices). Using the definitions above, this also represents US$320 billion to US$400 billion per year **of adaptation *funding* needs.** These needs are approximately an order of magnitude higher than current international public adaptation finance flows, indicating a large funding gap.
- The report uses the lower range of the updated AGR estimate, of US$320 billion per year by 2035, as a plausible estimate of the minimum cost of developing countries, noting that the coverage of climate risk, and thus adaptation needs, in the AGR is partial.
- It is stressed that there are additional adaptation finance and funding needs for the private sector in developing countries on top of these public priorities, such as for making private assets resilient. These costs will be large and are provisionally estimated at US$200 billion per year for developing countries. However, we assume these will be mostly financed and funded by the private sector and they are excluded from this analysis.

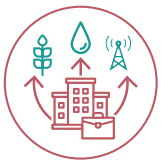
Analysis of the potential role of the private sector in helping to bridge the adaptation gap

This study looks at the potential contribution of the private sector in scaling up adaptation for publicly identified adaptation priorities. The study methodology involved analysing tracked private sector finance flows for adaptation and then assessing the potential for these to be scaled up under two scenarios: a) current policies; and b) with innovation.

KEY MESSAGE 1:
Tracked private adaptation flows are currently low in developing countries, and are equivalent to approximately 3% of estimated total adaptation finance needs.

- The analysis considered the potential for the private sector to help bridge the adaptation gap, starting with an analysis of current flows. The study finds as follows:
  - The Organisation for Economic Co-operation and Development (OECD) tracks private sector finance flows for adaptation that are mobilized from international public finance. These were reported at US$3.5 billion in 2022. This accounted for 11% of total international public adaptation finance flows (of US$32.4 billion in 2022). It is stressed that these tracked flows represent finance, not funding.
  - The Climate Policy Initiative (CPI) has developed an approach to tracking additional private sector adaptation finance and estimates that current tracked private adaptation flows in developing countries amount to approximately US$4 to US$5 billion per year. Again, these focus on finance, not funding.

- It is highlighted that total private flows are likely to be higher than the values above, and that the numbers exclude the private sector's role in adaptation for small enterprises and households. However, a large proportion of these private flows will be associated with addressing the private sector's own needs (and are outside the scope of this study).
- Noting the caveats above, and that current data relates to finance not funding, tracked private sector flows for adaptation flows in developing countries are currently low, equivalent to around 3% of adaptation funding needs (of US$320 billion/year).



KEY MESSAGE 2:
Looking forward, with a continuation of current policies, the private sector could deliver around 15% of the adaptation priorities in developing countries by 2035.

- The analysis used the data on the modelled costs of adaptation for 2035 from the AGR (US$320 billion per year for developing countries), as this provides detailed estimates of adaptation funding needs, broken down by sector and adaptation activity, and by country. It first assessed the nature of the individual adaptation actions in this dataset, and whether they are commercially viable, offer below-market returns, or have low financial viability (meaning they are likely to be funded by the public sector).
  - The analysis indicates that 40% of priority adaptation actions are public goods, such as major coastal or river flood protection projects. These typically do not provide financial returns and are usually funded by the public sector. A further 35% are either essential public services or are currently provided by the public sector in developing countries (e.g. cash transfers in adaptive social protection). This means that around three-quarters of estimated adaptation needs in developing countries would typically be publicly funded.
  - The remaining 25% involves actions for which there is the theoretical potential for private sector investment under a current policies scenario, with returns that may be mixed or commercial. These are primarily in agriculture, some aspects of water (particularly on the demand side), and infrastructure.
  - However, the realistic potential is lower, reflecting existing levels of public and private investment in each sector, as well as the need for public support to help scale up private investment. Taking this into account, the analysis indicates **that around 15% of overall adaptation needs could be delivered by the private sector in developing countries,** though this varies strongly by country grouping (noting there will be much higher levels than this for some sectors, such as agriculture).
  - The potential for the private sector is lower in the least developed countries (LDCs), estimated just over 5% of adaptation needs. This reflects the mix of adaptation needs in these countries, and the greater role of official development assistance (ODA). The potential for the private sector is also likely to be lower in small island developing states (SIDS), estimated at approximately 10%.
  - There is a further question as to whether this private sector investment reduces the adaptation funding gap, as well as the financing gap. This is more difficult to assess. Some – but importantly not all – of these private activities will have revenue models that can help fund adaptation, e.g. agricultural yield improvements, or cost savings for water. Nonetheless, it is likely that the contribution to the funding gap will be around 15%.
  - As highlighted above, the private sector will likely have a greater role (higher than the around 15% mentioned above) in the financing of adaptation and in delivering paid-for- adaptation goods and services. These actions will be critical in helping developing countries to adapt, but they will primarily reduce the financing gap, not the funding gap.

KEY MESSAGE 3:
Increasing the role of the private sector will require concerted policy action; it will also require public finance.

- There are barriers and constraints to adaptation, and moving from current private flows (3%) to around 15% (as above) in developing countries will not happen if this process is left to the market alone. It will require a concerted scale-up of current policies and support.
- A number of enabling initiatives are already under way and offer the potential to help the private sector to scale up. These include adaptation investment planning, country platforms, and adaptation taxonomies, as well as encouraging greater private sector participation in NAPs and NDCs. Public policy action, as well as some public funding, will be required to deliver these initiatives.
- Blended finance could also help the private sector scale-up, i.e. the use of concessionary public finance to help de-risk private investment. The study reviewed the evidence on the potential for blended finance and finds:
  - The majority of existing blended adaptation finance deals are in the agriculture sector (60% by volume). While this demonstrates the high potential in this sector, agriculture only represents around 15% of the total adaptation funding needs in developing countries.
  - An analysis of current blended adaptation finance deals finds that leveraging ratios and private mobilization ratios are low. The latter are only 0.51: this means that currently US$1 of public funding mobilizes only US$0.51 of private investment.
  - While this ratio could be improved, as things stand a large amount of international public finance will be needed to mobilize modest flows of private capital, e.g. US$50 billion of public finance might only mobilize US$26 billion of commercial finance.

KEY MESSAGE 4:
There are a number of innovative approaches to scaling up the private sector role further and reducing the *financing* gap, but most of these do not address the funding gap.

The final area that the study looks at is innovative models for adaptation.

- An analysis was undertaken of the current state of play in innovation. This involved looking in detail at global adaptation accelerators and facilities, which provide early-stage support to the private sector for new technology solutions, financial instruments, and business models.
  - These show potential for private sector innovation, and do provide many viable business models, but these are distributed unevenly: half of all projects (52%) are in the agriculture sector and two-thirds are in middle-income countries (MICs).
  - For those projects outside of market sectors, the analysis finds that most involve use models that provide new goods and services, which are paid for locally. These have a major role in helping people in developing countries to adapt, but unless they generate net positive financial returns, they do not reduce the funding gap.
- A further detailed review of the literature was conducted, looking at emerging innovative approaches for scaling up private adaptation in different sectors, with a particular focus on documented case studies.
  - The study finds that many new models are already being piloted, even for the public priorities that are the focus of this study. These models could deliver a much higher level of private sector financing (than 15% above) and could provide many new adaptation goods and services.

- However, many of these approaches involve cost recovery models that involve payment by governments or direct user charges to households and local businesses. The former requires higher taxation or borrowing for developing countries, noting existing concerns about fiscal stress in developing countries. The latter means higher costs for households and businesses, and has potential distributional impacts. Both involve the developing country paying for adaptation and so reduce the financing gap but not the funding gap.
- Many of these models also require wider reforms (e.g. increasing the role of the private sector in the delivery of services) or may be difficult to implement politically as they involve a shift in perceptions about the role of government. They may also have important negative distributional consequences.
- Many also still require public finance, to help demonstrate and scale up these models, and often for co-financing or de-risking.
- More positively, a smaller number of innovative models have the potential to help pay for adaptation because of their cost recovery models (e.g. land value capture, mitigation co-benefit models). These offer the greatest potential for bridging the adaptation funding gap.
- It is extremely difficult to know what these models might be able to achieve, though it is plausible that they could deliver an additional 5–10% of adaptation funding needs in developing countries. However, further work is needed to assess their potential and to ensure that such schemes do not, inadvertently, lead to maladaptation.

KEY MESSAGE 5:
With higher levels of private sector adaptation, it is important to ensure the quality, as well as the quantity, of adaptation, and that activities are equitable and inclusive.

- Successful adaptation requires a portfolio of actions, including anticipatory and transformational actions, across all sectors. However, the private sector will naturally gravitate towards short-term, incremental adaptation in market sectors: this concentration could lead to underinvestment in action to deliver long-term climate resilience.
- Climate change is projected to have disproportionately large impacts on the poorest and most vulnerable people, and to exacerbate existing inequalities. When scaling up private sector action, it will be critical to ensure this delivers adaptation that is inclusive and equitable. This is likely to require targeted actions. These include raising awareness; increasing tracking, reporting, and disclosures; and promoting financial instruments that favour these actions.

Final insights

A number of insights emerge from this analysis:

- It is important to differentiate between the financing and funding of adaptation, especially in the context of developing countries and CBDR-RC. Most discussions to date have not made this distinction and it needs to be brought out more transparently in negotiations and discussions.
- The study finds that there is potential for the private sector to help bridge the financing and funding gap in certain sectors (especially agriculture), where there is revenue generation and cost saving potential. However, its overall potential for publicly identified adaptation priorities will be much more limited than many assume. Its potential will also vary by countries' income status: private sector opportunities are likely to be greater in MICs.

- Increasing the levels of private sector funding for adaptation in developing countries – from the current low levels (3%) to around 15% – will require concerted policy action and it will also require public finance. This means that private sector investment is not a direct substitute for international public finance.
- Achieving a higher level of private sector finance and investment is possible; however, while this can help bridge the financing gap it will have less of an impact on the funding gap. Many models transfer the costs of adaptation back to developing countries, and may require regulatory change or shifts in willingness to pay; such models will not necessarily be easy to implement.
- In conclusion, the report finds that even with the most optimistic projections, a large funding gap seems likely for developing countries. Reducing this is likely to require an increase in international public finance, due to its dual role in supporting adaptation directly as well scaling up private sector investment. Without such support, a much larger burden of adaptation will fall on domestic public finances, and on households, in developing countries.

Contents

Abbreviations

ADB	Asian Development Bank
AGR	Adaptation Gap Report
CBDR-RC	Common but differentiated responsibilities and respective capabilities
CIVs	Collective investment vehicles
DFI	Development finance institution
GDP	Gross domestic product
GEF	Global Environment Facility
GESI	Gender equality and social inclusion
IHLEG	Independent High-Level Expert Group
IMF	International Monetary Fund
LDCs	Least developed countries
LICs	Low-income countries
LMICs	Lower middle-income countries
MDB	Multilateral development bank
MICs	Middle-income countries
NAP	National Adaptation Plan
NbS	Nature-based solutions
NCQG	New Collective Quantified Goal
NDCs	Nationally Determined Contributions
NGO	Non-government organization
NPV	Net present value
ODA	Official development assistance
OECD	Organisation for Economic Co-operation and Development
PPP	Public–private partnership
R&D	Research and Development
SIDS	Small island developing states
TNC	The Nature Conservancy
UMIC	Upper middle-income country
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
WASH	Water, sanitation and hygiene

Introduction

Background

Developing countries[1] face a large climate change adaptation finance gap, defined as the shortfall between adaptation financing needs and current adaptation finance flows (UNEP, 2023). Given the likely limits to international public finance for adaptation, a large number of recent studies have highlighted the potential for the private sector to help bridge this gap.

The current study assesses the potential role of, opportunities for, and limits of the private sector to help bridge the adaptation finance and funding gap in developing countries. It has been commissioned, funded, and supported by the Zurich Climate Resilience Alliance and has been written by Paul Watkiss Associates, drawing on, and linked to, the finance analysis in the Adaptation Gap Report (AGR) of the United Nations Environment Programme (UNEP).

Structure of the report

The report is divided into three sections:

- **Section 1** presents the conceptual framing for the study, setting out the relevant concepts in regard to the financing and funding of adaptation. This framing was used to develop the key research questions for the study. Section 1 also sets out the latest evidence from the AGR's analysis of adaptation funding needs, which provides the numbers with which the study works.
- **Section 2** then investigates the potential role of the private sector in helping to fill the adaptation finance and funding gap. It starts with an analysis of current private adaptation finance flows, and then looks at the potential for these to be scaled up under a **current policies** scenario.
- **Section 3** then extends this analysis further, exploring the potential to increase the role of the private sector beyond this, through the use of **innovation**. It looks at emerging approaches and business models and asks what might be possible, and also what the implications of these approaches and models are for funding.

A note on definitions

The terms 'finance' and 'finance flows' are commonly used in very broad terms in international climate finance debate and negotiations, to represent all sources of money (from the public, private, and third sectors) and all financial instruments (including grant, debt, equity, and others).

However, there are different definitions for these terms. For example, financing is sometimes defined as capital raised from financial institutions or other lenders, as compared to funding, which is provided by governments or by grants for a particular purpose.

An alternative definition, which is the one used in this study, is that financing relates to the provision of money upfront, taking account of the source of finance and associated terms, while funding relates to whether/how that money will be paid for, and by whom. These definitions are expanded in Section 1.

1 Developing countries are defined here as non-Annex I countries under the United Nations Framework Convention on Climate Change (UNFCCC). See www.unfccc.int/process/parties-non-party-stakeholders/parties-convention-and-observer-states.

Limitations

This work is based on detailed analysis and has been subject to an extensive peer review, both directly and through the peer review process of the AGR. It applied an evidence-based approach in order to identify private sector opportunities in adaptation. However, it is important to note that this topic is highly complex and the data available on this subject are limited. It is also highlighted that the specific input data and assumptions (e.g. the size of the overall adaptation gap, the proportion of agriculture as part of this total, the existing level of private sector investment in agriculture, etc.) significantly affect the results. These sources of uncertainty are discussed alongside the results presented in the report. The analysis presented here should therefore be understood as an indicative analysis that seeks to assess the scale of private sector potential, to explore relevant issues, and to provide insights based on these, rather than to provide highly precise numbers with a high level of confidence. As such, the study highlights the need for much more work to be undertaken on this topic, including improved data collection and analysis. This should be a priority for future research and policy analysis.

Section 1: Framing and inputs

The aim of this study is to assess the potential role of, opportunities for, and limits of the private sector in helping to bridge the climate change adaptation gap in developing countries. To do this it is necessary to first frame the study analysis. This section sets out these framing issues. It also presents the baseline data that is used in the study, which is based on the latest evidence from the AGR analysis.

Framing

Key message: In framing this analysis, it is critical to define the roles of the public sector and the private sector in adaptation, as well as the different 'types' of adaptation needs. This study focuses on the **publicly identified priorities for adaptation.** For these priorities, the private sector can play a large number of different roles, provided by different types of institutions. However, in looking at these roles, it is critical to differentiate between the financing and funding of adaptation, and to ask who actually pays for adaptation.

To undertake an analysis of the role of the private sector in adaptation, a conceptual framing is needed. This is presented in this section by exploring three key questions:

1. What types of adaptation do developing countries need?
2. What is the potential role of the private sector?
3. What are the financing and funding needs for adaptation and who pays?

While these questions seem simple, they are extremely complex and difficult to answer in practice. Moreover, different actors will have differing views on the framing used and the findings. The starting point for this report is therefore to define the framing that this study uses, which is centred on the three questions above.

1) What types of adaptation do developing countries need?

Adaptation is different to mitigation. It seeks to address the current and future risks of climate change, moderating harm and taking advantage of opportunities. These risks arise from slow-onset and extreme weather events, and they are extremely site- and context-specific, varying with hazard, exposure, and vulnerability. Adaptation is a combination of reactive decisions to effects already experienced and anticipatory action in advance of increasing future climate change. To make matters more complicated, there is deep uncertainty around future risks, and it is not possible to predict what will happen with a high level of confidence.

Against this background, **adaptation is usually seen as a process.** It is therefore very different to mitigation and should not be seen as a simple set of technical solutions. Adaptation includes a wide range of potential actions and activities in portfolios – combining capacity building and soft measures (behavioural or non-technical) with hard actions (engineered or technical) – rather than single solutions. These adaptation actions can be brought together in iterative adaptive management frameworks, which change over time as part of a continuous cycle (or pathway) of planning, implementation, monitoring, and learning (IPCC, 2022).

Given this complexity, there are many different framings and typologies that can be used to categorize adaptation. In this study, we require a framing that identifies and differentiates the **role of public and private sector actors.** At a simple level, there are existing activities that are currently provided by the public sector, as well as existing markets for private goods and services: adaptation can be mapped onto these existing roles (although these roles vary by country).

However, this is only part of the story. It is also important to consider why the public or private sector might act on adaptation. Clearly, the private sector will primarily act when there are profitable opportunities (see the next section). The case for why governments should act is set out in economic public policy theory (e.g. HMT, 2020). This is based on the societal case for action, considering social and environmental costs and benefits, not just market costs and benefits.[2]

Related to this, it is useful to look at the potential financial returns that an adaptation action can deliver, to see whether it is something that the private sector does, or could, invest in. To do this, we use a framework proposed by the Organisation for Economic Co-operation and Development (OECD) (2023), which differentiates between the following: adaptation actions where low or no returns are likely, in which case they are more likely to be provided by the public sector; those actions that provide below-market returns, in which case there may be a role for the public sector; and those that are commercially viable.

Bringing together the discussion above leads to three different types of adaptation (see Figure 1):

- First, there are some activities which the public sector typically undertakes and where it delivers adaptation directly, such as delivering public goods or intervening in non-market sectors. As an example, flood protection investments are typically a public good and are usually initiated and financed by government. These activities are generally characterized by the fact they have low or no financial returns for the private sector. We call these Type a) actions.
- Second, there are cases where a government may act to address non-public good market failures.[3] In such cases, public intervention might be used to help deliver more positive welfare outcomes (using market mechanisms). For example, public activities might be undertaken to help the private sector to implement climate-smart agriculture, in recognition of its positive environmental benefits (its positive externalities) or

2 These approaches are based on the concepts of welfare economics, which is concerned with social or public value and not simply market efficiency. Welfare economics includes all relevant costs and benefits that affect wellbeing, not just market costs and benefits, and thus includes environmental, cultural, health, social, and justice effects.

3 Noting that public goods are usually considered to be a market failure.

distributional objectives. These public activities (and associated public investment) also have the potential to help make these activities more commercially viable and to scale up private sector action (and associated private investment). We call these Type b) actions.

- Finally, there are areas where there are existing well-functioning markets that already provide commercial returns for the private sector, and where government would not normally intervene. For example, there are existing markets for air conditioning and additional cooling for factories, and these would be expected to be entirely private.[4] We call these Type c) actions.

This framing is highly relevant for the adaptation actions identified in submitted National Adaptation Plans (NAPs) and the adaptation priorities in Nationally Determined Contributions (NDCs). The focus of these submissions is typically on activities that involve direct public or supporting actions, i.e. Type a) and Type b) actions above. They rarely include the actions of purely private sector activities (i.e. Type c). It is noted that this is an important omission more generally, given the role of the private sector in development, and this is a priority for future NAPs and NDCs (see Asia Investor Group on Climate Change, 2025).

Type a) Public	Type b) Mix of public and private	Type c) Private
Low or no market	Low or no market	Commercial return
e.g. public good such as major flood protection	e.g. public good such as major flood protection	e.g. existing market for air conditioning in factories
Typically publicly funded	**Typically publicly funded**	**Privately funded**

Figure 1: Simplified categorization of adaptation based on justification for intervention

This framework sets the boundaries for this study. Our focus is on the **role of the private sector in adaptation financing and funding of the Type a) and Type b) actions in Figure 1 above.**

We note that the private sector will provide both the financing and funding for Type c) adaptation, but this **Type c) adaptation is outside the scope of this current study's analysis.**[5]

In practice, this categorisation into these three types is more complicated than the simple examples above indicate, because the role of the public and private sectors is a very nuanced mix, which varies by sector and by country.[6] However, the framing makes the allocation of potential roles transparent, thus facilitating subsequent analysis and discussion.

4 Note, however, that non-renewable air conditioning energy use can lead to carbon emissions and negative externalities, which should be addressed as a market failure.

5 In practice, because of the challenging nature of adaptation, a range of barriers affect private sector engagement and so many Type c) adaptation activities will in fact be Type b).

6 For example, there are both publicly and privately owned hospitals, and making new buildings climate resilient (adaptation) would include both the pure public and pure private categories above (as well as grey areas in between). Further, the share of public versus private health facilities varies by country, and countries often use different financing models that mix up these roles, such as public–private partnerships (PPPs), which contract the private sector to finance Type a) investments and pay those financiers back over 20 years or so, swapping a financing obligation for a funding obligation. There is also the question of where smallholder farmers and households fit in this spectrum. There is also the broader issue of what counts as adaptation, which is particularly relevant for developing countries. Stricter definitions set out that adaptation should have a primary or secondary objective that targets climate risks. A broader definition can include development actions that build general resilience: for example, education improves informed decisions, while improved access to markets improves incomes, both of which make households more resilient.

2) What is the potential role of the private sector?

Given the size of the adaptation gap (set out below), numerous studies in the grey literature identify the opportunity for the private sector to help fill that gap (e.g. OECD, 2023; Gautam et al., 2024; World Bank, 2025). A separate subset of recent grey literature also identifies very large potential markets for adaptation goods and services (e.g. Standard Chartered, 2023; GARI, 2024; GCI, 2025; BCG, 2025). In order to frame these opportunities and market in the context of this study, it is important to set out the different roles that the private sector can play in adaptation.

Looking back to the typology in Figure 1, at the simplest level there is the private sector's role in delivering private adaptation (Type c) as well as in delivering adaptation in areas where there is also some form of public support (Type b). However, the private sector plays additional roles in adaptation, which involve different types of institutions, in both developed and developing countries. These include the following:

- **Financing:** *The private financial sector and private investors* play a role by financing public adaptation, e.g. sovereign green bonds issued by government. They also play a similar role by financing or investing in private sector adaptation, e.g. through loans, equity, or private bonds. There are also opportunities for financial services companies and intermediaries. These opportunities include many types of organizations in both developed and developing countries (institutional investors, venture capital, local commercial banks, micro-lenders, etc.) and investors from both developed and developing countries. The financial system also has a key role to play in physical risk disclosure and adaptation transition plans, and can help to encourage private actors to adapt.
- **Delivering adaptation goods and services:** Adaptation provides the private sector with new opportunities, in the form of markets for adaptation goods and services for the public and private sectors (e.g. increased government procurement for seawalls, increasing air conditioning demand for factories) that span the three types delineated in Figure 1. This can involve many different types of institutions, from multinational corporations through to small and medium-sized enterprises in developing countries, often acting in value chains.
- **Addressing their own needs:** *Private sector companies will address their own adaptation needs,* by investing in their own assets and supply chains (e.g. Type c) adaptation in Figure 1) to manage risks (both physical and reputational). Again, this includes actors based in both developed and developing countries.

When looking at these roles, it is important to look at the difference between the financing and the funding of adaptation. While these terms are often used interchangeably, they in fact refer to very different things (Fay et al., 2021; Watkiss, 2023: ADB, forthcoming), specifically:

- **Who finances adaptation** (i.e. where does the money come from)? This relates to the source of finance and the financing model for adaptation, i.e. how the upfront costs of investment are met, and the financial instruments involved in this. This focuses on the role of the public and/or private actors in providing the money to implement adaptation, through relevant financial instruments with associated terms (including financing costs such as interest, i.e. the cost of capital).
- **Who funds adaptation** (i.e. who pays for adaptation)? Alongside the issue of financing, there is a separate question regarding the funding of adaptation, i.e. how to pay for adaptation over the lifetime of the investment and how these costs (including the financing costs, the cost of capital) will be paid for. This relates to the cost recovery mechanism and requires consideration of whether the funding is from the public budget, from user charges, etc.
- **Who delivers adaptation** (i.e. how is the money spent)? Once the funding is in place, the adaptation activities will be implemented, but there are choices on how this money is spent. For a public project, this could be through the use of government agencies, but it could also involve a contract with the private sector.

These different considerations explain some of the confusion around adaptation finance and the private sector potential. It means there is a **distinction between the adaptation finance gap and the adaptation funding gap.** These two separate concepts are used in this study.

A simple illustrative example is given in Box 1 to illustrate how all three areas above can combine for adaptation. This shows that there are different roles for the private sector in regard to financing public (as well as private) adaptation, and large new markets for private sector goods and services, both of which offer private sector opportunities. However, to deliver these opportunities, there is also a need for funding.

Box 1: The potential roles of the public and private sectors

We start with a simple example of a large coastal seawall programme in an NAP to address rising sea levels. This programme will be initiated by a public body, as a direct planned public investment (i.e. a Type a) investment as shown in Figure 1). This investment is a public good and does not typically generate a direct revenue stream.

To build the seawall will require money (**finance**). This may come from an international public grant (e.g. from the Green Climate Fund). This money can also come from the public finances (the budget) and the additional costs could be financed through government borrowing, such as with a loan from an international public finance institution (e.g. a multilateral development bank (MDB)) or by issuing a sovereign green bond through the capital markets to private investors (private finance). Loans and bonds involve additional financing costs on top of the capital investment (the return expected, i.e. the cost of capital). Note that this money could also be raised by a budget reallocation (a shift from other budget areas to flood protection) or via increased taxes.

The design and building of the seawall (**spending**) may be carried out by a public organization but it could alternatively involve contracting a private engineering company. It will require construction materials, such as concrete and steel, which will be sourced from private sector suppliers. This leads to opportunities for the private sector.

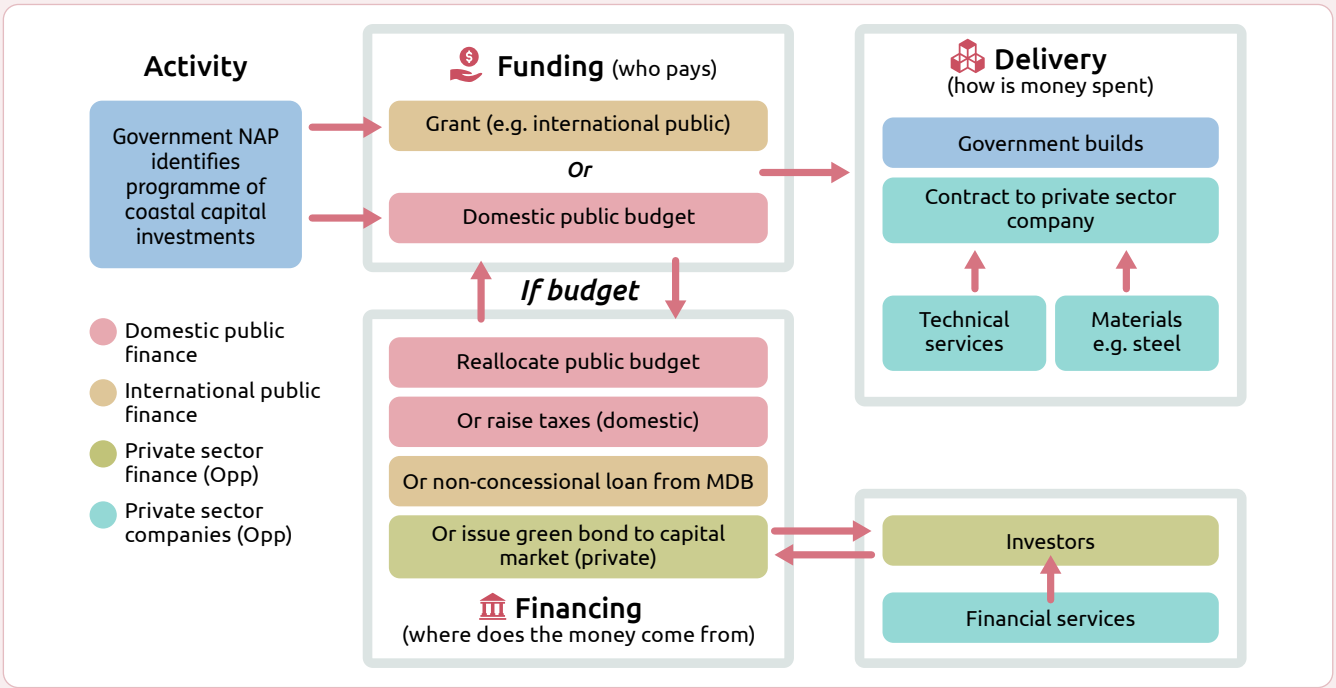


Figure 2: A simple example of the financing, funding, and delivery of adaptation for coastal protection

(Box 1: Continued)

Seawalls will be required worldwide, with AGR estimating that annual coastal protection investment needs could amount to over US$50 billion per year by 2035 for developing countries. This will clearly create large new market opportunities for the private sector (see the green boxes in Figure 2), including for investors, financial services companies, engineering companies, materials suppliers, etc.[7] However, this does not address the issue of **funding**, i.e. **who ultimately pays** for all this. Unless there is international public concessionary finance available, the investment will likely be funded by the domestic public budget, and thus by tax payers in the developing country.

In this simple example, the key funding challenge is that the investments (flood defences) do not generate a revenue stream. However, there are cases where adaptation can generate a revenue stream.

As a contrasting example, solar irrigation is an adaptation option that allows farmers to address increasing rainfall variability. This action is initiated by private actors (farmers) and the adaptation investment sits within a market sector (agriculture). Such an investment can help address increasing climate variability, and provides benefits in the future due to climate change (avoided losses), but it can also enhance yields in the current climate. However, there are barriers (including market failures) that prevent the uptake of the technology. These include the high upfront capital costs, a lack of information on the design and operation of systems and the benefits they provide, and the lack of carbon prices for alternative diesel irrigation. Going back to Figure 1, there would therefore be a justification for government intervention, which could take the form of various actions: for example, information and technical assistance programmes, access to concessionary finance (recognizing the positive externalities of solar), etc.

This creates a very different landscape to the one related to the flood protection investment described above, because while the farmer still pays for the adaptation, the financial benefits they receive mean this has a net positive effect on yields, and thus income. Effectively, the adaptation investment pays for itself and therefore provides a way of funding adaptation, it just requires the government to help incentivize the uptake of the investment. Note that there would still be a need for some government finance (e.g. for the upfront costs of the information programme and the concessionary finance) and funding (e.g. paid for from the public finances and agricultural development budget).

Finally, this can be contrasted with a different example of an investment in agriculture that is purely defensive and that addresses rising losses: for example, a new, more expensive drought-tolerant variety of crop that is more resilient but that has no yield benefits. In this case, the farmer has to bear the cost of adaptation (more expensive seeds) to produce the same yield and profit, but has the benefit of avoiding potential losses. The benefits accrue to the farmer, but they also have to pay for this adaptation, and this means they are worse off than in the counterfactual without climate change.

7 It is noted that, alongside these large headline investments, private companies will also take some additional action themselves to protect their investments, e.g. with flood protection for local sites. This could involve quite significant investments, but these investments will not provide wider societal benefits directly and would be financed by private companies themselves and funded in turn by their customers.

The above examples and discussion serve to highlight that the private sector is not a homogenous group: it involves many different actors. Each of these has a different role to play in the landscape and some may play more than one role. For example, corporations as well as households may fund or deliver adaptation, while pension funds may finance but also fund and deliver their adaptation across their own operations. These actors include institutions from both developed countries and developing countries. Finally, multiple private actors often collaborate across value chains or solutions, as well as with public and third sector actors (as in Figure 2). Different private sector actors also have different expectations on returns. Some organizations seek to profit maximize in the short term, while others seek longer-term and more secure investments (such as pension funds) or have stronger social objectives (such as impact investors). Further, the overall mix also includes privately funded philanthropic organizations and foundations, which are not driven by profit maximization (and in many ways are more aligned with the public sector, given that they seek to intervene for catalytic effect).

3) What are the financing and funding needs for adaptation and who pays?

As highlighted above, the terms 'financing' and 'funding' are often used interchangeably, but they refer to very different things. This is critical in the developing country context, because **while the private sector can help reduce the adaptation financing gap, it may not necessarily reduce the funding gap.**

A look at the priority adaptation actions in NAPs and NDCs shows that **most of the financing needs they identify (in US$) are heavily weighted towards public priorities.** They are typically focused on Type a) and the public component of Type b) activities (see Figure 1).

This has important implications because of **who ultimately pays for adaptation.** In many cases – though importantly not all – it is possible for the private sector to finance this adaptation, but the funding (and the cost of capital) will be paid for by developing countries themselves.[8]

Linked to the discussion above (and to Figure 2), private financial markets can invest in green bonds to help provide the finance for public adaptation, but it is the government that is likely to provide the funding for these investments, whether from revenues the projects generate or from general taxation. Similarly, it is possible that private water utilities could finance adaptation infrastructure (e.g. climate proofing water transmission lines or building new reservoirs to provide more resilient services), but it will be the utility customers who pay for this adaptation through increased user charges. Finally, if there are new adaptation goods and services that are provided by the private sector in developing countries (e.g. new information or technologies for farmers), these will be paid for by consumers. Unless these generate other financial benefits, then the costs of adaptation will be transferred to consumers in those developing countries.

This does not align with the UNFCCC (United Nations, 1992) principle that *parties should protect the climate system for the benefit of present and future generations of humankind, on the basis of equity and in accordance with their* ***common but differentiated responsibilities and respective capabilities*** (CBDR-RC). This principle has underpinned UNFCCC negotiations in subsequent decades and is referenced in most agreements, including the Paris Agreement and the New Collective Quantified Goal (NCQG).

This principle means that those countries that have contributed more to the climate crisis have a greater responsibility to address it. It also means that it is inequitable for countries which make an extremely low contribution to global greenhouse gas emissions to have to pay for all adaptation themselves. To explore these issues, the analysis in this study considers all developing countries (the UNFCCC-defined non-Annex I countries), but applies sensitivity analysis to explore different country groupings.

8 The financing needs will be the same as the funding needs if met by grant finance. However, if the private sector finances the NAP investments, then because of the cost of capital the financing needs will be higher than the NAP.

The estimates of the adaptation gap used in this study

Key message: This study uses estimates of adaptation financing needs – which also represent the adaptation funding needs – from the AGR. It uses interim estimates from the AGR 2025 update. These report that the adaptation needs for developing countries are in a plausible central range of US$320 billion to US$400 billion per year by 2035 (in US$2023 prices). These values can be compared to current international public adaptation finance flows, which were reported at US$32 billion in 2022. These findings indicate a large adaptation gap. It is also noted that only 7% of submitted adaptation finance needs (in NDCs and NAPs) are stated as unconditional, i.e. which are expected to be met through domestic resources.

This section presents the data used in the analysis in this study. These are based on the estimates of adaptation finance needs from the AGR (UNEP, 2023; UNEP, 2025 forthcoming). The **adaptation finance gap** is defined as the difference between the estimated costs of adaptation for a given adaptation target versus the amount of finance (defined as all sources of finance)[9] that is available (UNEP, 2016). The AGR uses several evidence lines to estimate this gap, set out in Box 2 below. In practice, quantifying this gap is challenging, both conceptually and analytically (see UNEP, 2023).

Box 2: UNEP AGR method for estimating the adaptation finance gap

UNEP's AGR estimates the adaptation finance gap for developing countries (non-Annex I countries) using the following evidence lines:

1) The estimated needs in US$ expressed as a range based on two different methods:

- A modelled estimate of the incremental costs of adaptation for all developing countries, based on global sectoral models with national-level resolution.
- An analysis of adaptation finance needs as reported in developing countries' NAPs and NDCs, extrapolating this data to all developing countries.

2) An analysis of international public adaptation finance flows (in US$) from developed countries to developing countries, aggregated from country-level data.

The range from the modelled costs/finance needs (1) is compared to the current adaptation finance flows (2) to estimate the adaptation finance gap for developing countries. Domestic finance from developing countries and private sector flows are omitted in this assessment.

Using this approach, the AGR 2023 (UNEP, 2023) estimated the plausible central range for the adaptation costs/financing needs at US$215 billion per year to US$387 billion per year for developing countries up to 2030 (in US$2021 values). These numbers fed into the Independent High Level Expert Group (IHLEG) estimate of adaptation finance needs of US$320 billion per year by 2035 (Bhattacharya et al., 2024).

As part of the ongoing Adaptation Finance Gap Update, these AGR 2023 values are currently being updated (in 2025). **This study uses an interim update (draft results) from the AGR 2025 update, but we stress that the final AGR 2025 numbers will be released later this year.** The values here are therefore subject to change.

9 The definition has traditionally focused on financing, but in line with the discussion in Section 1 this should really now differentiate between financing and funding.

In interpreting the values for this study, it is important to link back to the framing above.

- In relation to Figure 1, the AGR adaptation financing needs are focused on publicly identified priorities, and thus on Type a) and Type b) adaptation. They do not include the private sector priorities and finance needs associated with Type c). The values also relate to the baseline investment costs: they do not include any additional costs of capital.
- Further, while the AGR estimates have traditionally been presented as adaptation financing needs and as an adaptation finance gap, in line with the discussion above, in practice they also represent the *adaptation **funding** gap*.

The modelled costs of adaptation

The AGR uses a set of established, peer-reviewed sector models, working with these teams to estimate adaptation costs. The approach is documented in the AGR 2023 (UNEP, 2023). These costs are being updated in AGR2025 and this study uses an interim update (draft results). The results of this interim modelling analysis estimate the incremental costs of adaptation due to climate change in 2035 at **US$320 billion per year** (US$2023 prices, central estimate) for all developing countries. Of this total, the costs for least developed countries (LDCs) are US$32 billion per year and for small island developing states (SIDS) they are US$3.0 billion per year (noting that some SIDS are also LDCs). The breakdown of these costs is presented in Figure 3, showing the splits by World Bank region and country income-level classification, and by modelled sector for a moderate warming scenario (e.g. Representative Concentration Pathway (RCP) 4.5).

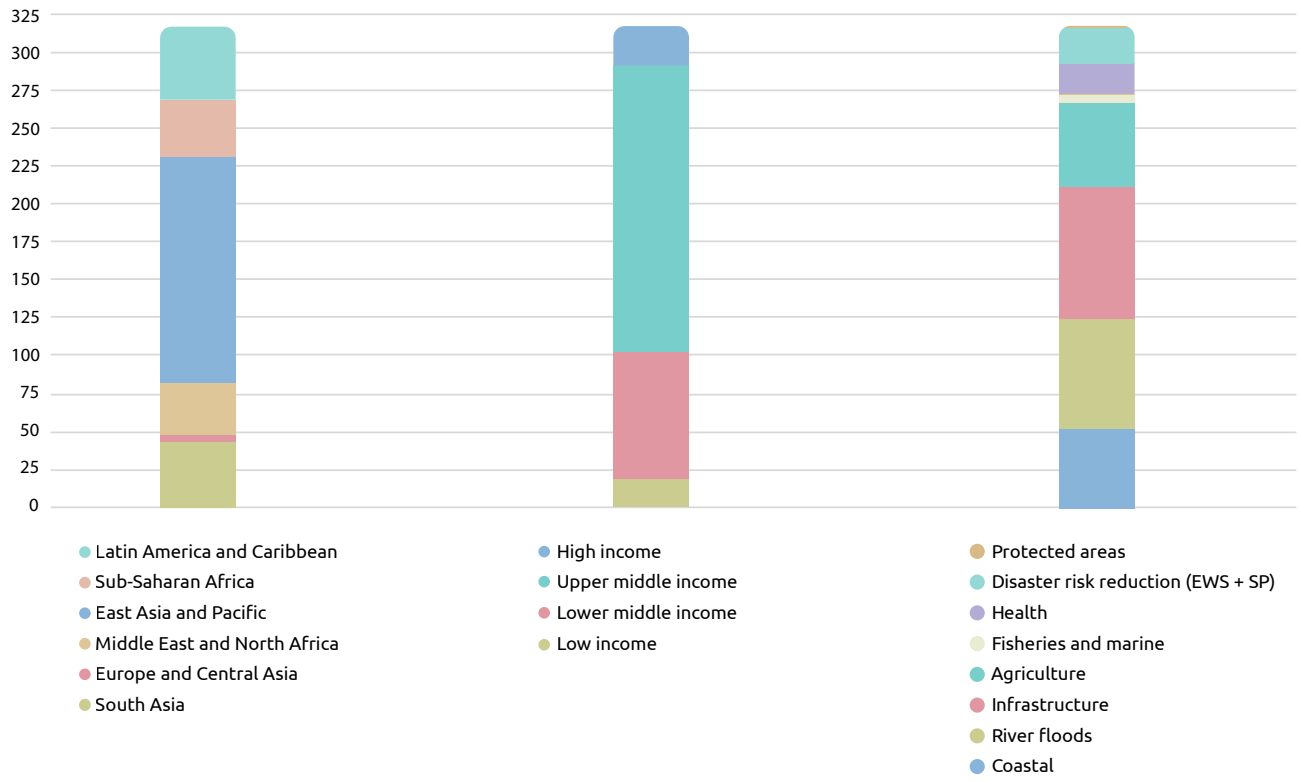


Figure 3: Estimated annual costs of adaptation in US$ billion per year, by region, income, and sector for developing countries in 2035

The results show that these modelled costs are especially high in East Asia and the Pacific, Latin America and the Caribbean, and in sub-Saharan Africa. They also show that the highest proportion of these costs (in total US$) are for middle-income countries (MICs), but importantly the relative impacts are high (per capita as a percentage of GDP) for LICs.

There are several issues to highlight with these estimates. First, there is a considerable range around these values: this is determined by the objectives set, as well as the scenario, climate model, impact model and other assumptions. Second, there are additional costs of residual damage on top of these adaptation costs, which are critical to consider when looking at climate costs and benefits overall. Finally, while the coverage is wider than earlier studies, the values remain partial. The modelled costs are therefore likely to represent an underestimate of adaptation costs. We stress that the values above also do not include most additional private sector adaptation finance needs for developing countries (see later section).

Adaptation finance needs in NDCs and NAPs

The AGR complements the modelling analysis referred to above with an analysis of finance needs for adaptation priorities as submitted in countries' NAPs and NDCs. These values are also being updated during 2025, to take account of the new round of NDC3.0 submissions (Chapagain, forthcoming). The country-driven and bottom-up nature of the information in these NDCs and NAPs makes them an important source of evidence. However, they are highly heterogeneous and differ in terms of scenarios, methods, and coverage.

Previous analysis (UNEP, 2023) reports that only approximately half of these submissions state whether these finance needs are conditional (i.e. they are conditional on receiving international support) or unconditional (i.e. they will be implemented with domestic resources). The latest figures (Chapagain, forthcoming) indicate **only around 5% of reported adaptation finance needs are marked as unconditional, i.e. they are expected to be met through domestic resources.**

The AGR also uses the submitted financing needs and derives functions (per capita adaptation costs for different country groupings) to extrapolate to all developing countries. These financing needs are being updated in AGR2025. The previous of this analysis estimate that adaptation finance needs amount to around **US$400 billion** per year for all developing countries (Chapagain, forthcoming), of which around US$50 billion per year is for LDCs and SIDS. As well as indicating slightly higher values than the modelled results above, these submissions indicate some other differences in terms of sectoral splits, with notably a slightly higher percentage of finance needs for the agriculture sector.

Estimates used in this study

The interim AGR 2025 estimates above indicate a plausible central range of adaptation financing needs of US$320–400 billion per year for developing countries by the year 2035 (in US$2023 prices), though there is a significant range around these values. The total amount is larger than total official development assistance (ODA) flows, which were US$212 billion in 2024 (OECD, 2025), or 0.33% of developed countries' gross national income.

To make the results in this study more comprehensible, the analysis of private sector opportunities in the next section uses a single number, rather than a range: it **uses the lower range estimate based on the modelled costs of adaptation, of US$320 billion per year.** Of this, approximately US$32 billion per year is for LDCs, US$3.0 billion per year is for SIDS (noting that some SIDS are also LDCs), and, using the World Bank country income classifications, US$19 billion per year is for LICs and US$ 84 billion per year is for lower-middle-income countries (LMICs) (noting that LDCs include LICs and some LMICs). As highlighted above, these financed needs focus on publicly identified priorities only.

The adaptation finance needs above can be compared to the NCQG on Climate Finance (CMA11a), which was agreed at COP29. This set the following goal: *'with developed country Parties taking the lead, of at least US$300 billion per year by 2035 for developing country Parties for climate action, from a wide variety of sources including public, private and alternative sources'*.[10] It should be stressed that this amount is for all climate finance, including both mitigation and adaptation. The NCQG text also launched the Baku to Belém roadmap to US$1.3 trillion.[11] The NCQG does not specify how much of the US$300 billion or US$1.3 trillion will be required for adaptation.[12]

It is critical to compare the adaptation finance gaps and NCQG on a like-for-like basis, making sure all values are presented in equivalent price years and including the potential **effects of inflation.** This will be outlined in more detail in AGR 2025, but, in summary, the goal of at least US$300 billion per year represents US$300 billion of climate finance in US$2035 values. Assuming that inflation is 3% annually over the next decade, this would mean that the goal only represents US$210 billion in US$2023 prices. It is this value that should be compared to the AGR value of US$300 billion per year (in $2023 prices).[13]

The issue of inflation is also key for any discussions of future adaptation finance goals.

International public adaptation finance flows

The value of US$320 billion for adaptation needs can be compared to current **international public adaptation finance** flows. These were assessed as US$27.5 billion in 2022 for public flows only (UNEP, 2024) and US$32 billion in 2022 when mobilized private flows are included (OECD, 2024) (US$2022 prices). Early data from AGR 2025 (Canales, forthcoming) indicates that international public adaptation flows in 2023 may actually have declined slightly. This indicates there is a growing adaptation finance gap.

These flows will change in coming years, including due to announced goals and targets, although assessing these is challenging in the current political climate. Two main goals have been announced:

- COP26 (United Nations Climate Change, 2021) urged developed nations to at least double their collective provision of adaptation finance from 2019 levels by 2025, from approximately US$20 billion provided and mobilized in 2019 to **US$40 billion by 2025.**[14] However, based on current trends (including data for 2023), developed countries are not on track to deliver this goal, and it is likely to be much more challenging to achieve in light of recent political announcements from the US.
- MDBs issued a statement at COP29[15] that set a goal of US$42 billion for adaptation by 2030 for LICs and MICs, with a further US$7 billion for high-income developing countries.[16]

10 The NCQG text highlights the need to achieve a balance between adaptation and mitigation, and to take account of needs and priorities, especially of LDCs and SIDS.

11 UNFCCC COP29 Baku text, CMA. 11a. Paragraph 27. This aims at *'scaling up climate finance to developing country Parties to support low greenhouse gas emissions and climate-resilient development pathways and implement the nationally determined contributions and national adaptation plans including through grants, concessional and non-debt creating instruments, and measures to create fiscal space, taking into account relevant multilateral initiatives as appropriate.'*

12 But the IHLEG report – on which the US$1.3 trillion figure is based – proposes that approximately US$300 billion of this will be needed for adaptation (IHLEG, 2024), though this includes a different country grouping to the non-Annex I countries and is not directly comparable to the AGR number.

13 Alternatively, the AGR value can be increased with potential inflation. At 3% this would increase to US$450 billion per year by 2035 with inflation, as compared to the NCQG of US$300 billion in 2035.

14 In the 2022 Climate Finance Delivery Plan Progress Report, and in a joint letter published in 2023, developed countries confirmed their understanding that doubling adaptation finance implies an increase by contributors from the approximately US$20 billion provided and mobilized in 2019 to US$40 billion by 2025.

15 'By 2030, our annual collective climate financing for LICs and MICs will reach US$120 billion, including US$42 billion for adaptation, and we aim to mobilize US$65 billion from the private sector. For HICs, this annual collective climate financing is projected to reach US$50 billion, including US$7 billion for adaptation, and we aim to mobilize US$65 billion from the private sector' (European Investment Bank, no date).

16 Again, the text implies the total of US$49 billion will be measured in 2030, rather than in current prices with inflation.

It is stressed that while the AGR focuses on international public adaptation finance, in line with the discussions around the climate finance targets and negotiations, there are other sources of potential adaptation finance. As highlighted by UNEP (2023), the three main sources of finance are **international public adaptation finance, domestic public expenditure on adaptation, and private sector finance** for adaptation (although there are of course additional approaches to unlocking adaptation finance too).

The potential for the private sector is the focus of the next section. There is, however, an important role for **domestic public finance,** though this is outside the scope of this study. The use of domestic public finance from developing countries for adaptation is also linked to the earlier discussion on CBDR-RC. Robust tracked numbers are not available for domestic public finance flows for adaptation in developing countries. A number of countries have undertaken studies (adaptation budget tagging or public expenditure reviews) to assess these flows (see UNFCCC, 2022); however, a comparison between countries finds very wide ranges (in US$ or as a percentage of public budgets or GDP) due to differing methodological approaches and assumptions. Nonetheless, linking back to the earlier discussion, it should be underscored that the use of domestic public finance can help address the financing gap but not the funding gap, because it involves the use of scarce public funds from the developing countries themselves.

The additional private sector costs of adaptation

Key message: This study focuses on the publicly determined priorities for adaptation. However, there are additional private adaptation finance and funding needs on top of these public priorities, such as for making private assets resilient. These will be large and are estimated at several US$ hundred billion per year for developing countries. However, we assume these will be financed and funded by the private sector and they are excluded from this analysis.

The AGR finance needs outlined above – the central estimate of US$320 to US$400 billion per year – focus on the **publicly determined priorities for adaptation.** They do not include all adaptation finance needs in developing countries, notably those for many purely private sector activities in developing counties (Type c) in Figure 1). These additional private sector adaptation finance needs are potentially large and it is important that these are not confused or conflated with the more public priorities. They include the additional costs associated with climate-proofing new purely private infrastructure, as well as retrofitting existing private infrastructure: for example, industrial plants and factories. The International Monetary Fund (IMF) (Aligishiev et al., 2022) has estimated that the costs of adaptation for these private sector assets could amount to as much as 0.4 to 0.6% of GDP annually. Based on analysis of this IMF data, we estimate that, as a minimum, this could mean additional private sector adaptation finance needs of around US$120 billion per year for developing countries by 2035. These costs also include private sector investment to adapt to the impacts of higher temperatures and extreme heat on the labour force, and the reduced labour supply (reduced working time) and labour productivity (reduced output) from climate change. While there are some public adaptation actions that can help reduce some of these impacts, the majority of adaptation actions will be initiated, financed, and funded by the private sector. The additional investment in cooling (air conditioning) to address these impacts has been estimated provisionally by AGR 2025 at approximately US$100 billion per year. Taken together, these two categories alone indicate additional private sector – Type c) – adaptation financing and funding needs could be approximately several hundred billion per year.

Section 2: The potential role of the private sector in adaptation under current scenarios

Introduction

This section explores the potential role of the private sector in helping to deliver adaptation and to help bridge the gap identified in the previous section, focusing on the publicly determined priorities for adaptation.

We start with an analysis of current private adaptation finance flows and then look at the potential for these to be scaled up under a **current policies** scenario.

To provide insights on this, this section focuses on the framing issue outlined in Section 1:

1. What are the potential levels of private sector finance flows that could help bridge the finance gap now?
2. Who pays for this adaptation, i.e. what are the funding arrangements associated with the private sector opportunities for adaptation?

The study takes the estimates above of the adaptation finance and funding needs for adaptation in developing countries (taking the **incremental modelled cost value of US$320 billion per year**) and assesses the current and future potential for the private sector to help bridge the gap. To do this, the analysis works through the following steps:

- It starts by assessing current **tracked private sector finance flows** to adaptation.
- It then builds up a **baseline scenario** of the likely levels of public and private sector roles going forward to 2035, based on the historic trends for adaptation investments and current policies.

Section 3 then looks at an **innovation scenario,** which assesses the potential for innovative technologies, producing an upper estimate of private finance flows.

Current tracked private adaptation flows in developing countries

Key message: Despite high expectations for the private sector's role in bridging the adaptation finance gap, and noting the challenges in measuring these private flows, the latest data indicates that tracked private sector flows for adaptation in developing countries are only currently around 3% of adaptation finance needs. It is stressed that these tracked flows represent finance, not funding.

As the previous section outlined, the OECD has been tracking progress on international climate finance and progress towards climate finance goals. This includes the amount of private finance mobilized by bilateral and multilateral public climate finance from (attributed to) developed countries. The latest figures estimate the total finance flows of adaptation from developed to developing countries at US$32.4 billion in 2022, of which **mobilized private flows attributed to developed countries amounted to US$3.5 billion** (OECD, 2024). However, as shown in the data below, there is high variability between years, due to the influence of a small number of large-scale projects. While the US$3.5 billion is a notable proportion (11%) of current international public adaptation finance flows (of US$32.4 billion), it is a small proportion (around 1%) of total adaptation

finance needs (i.e. of the estimated needs of approximately US$320 billion per year). There is emerging data for 2023 (OECD, 2025) that indicates broadly similar mobilized private finance for adaptation in the most recent year available. It is stressed that these tracked flows represent finance flows and not the funding of adaptation.

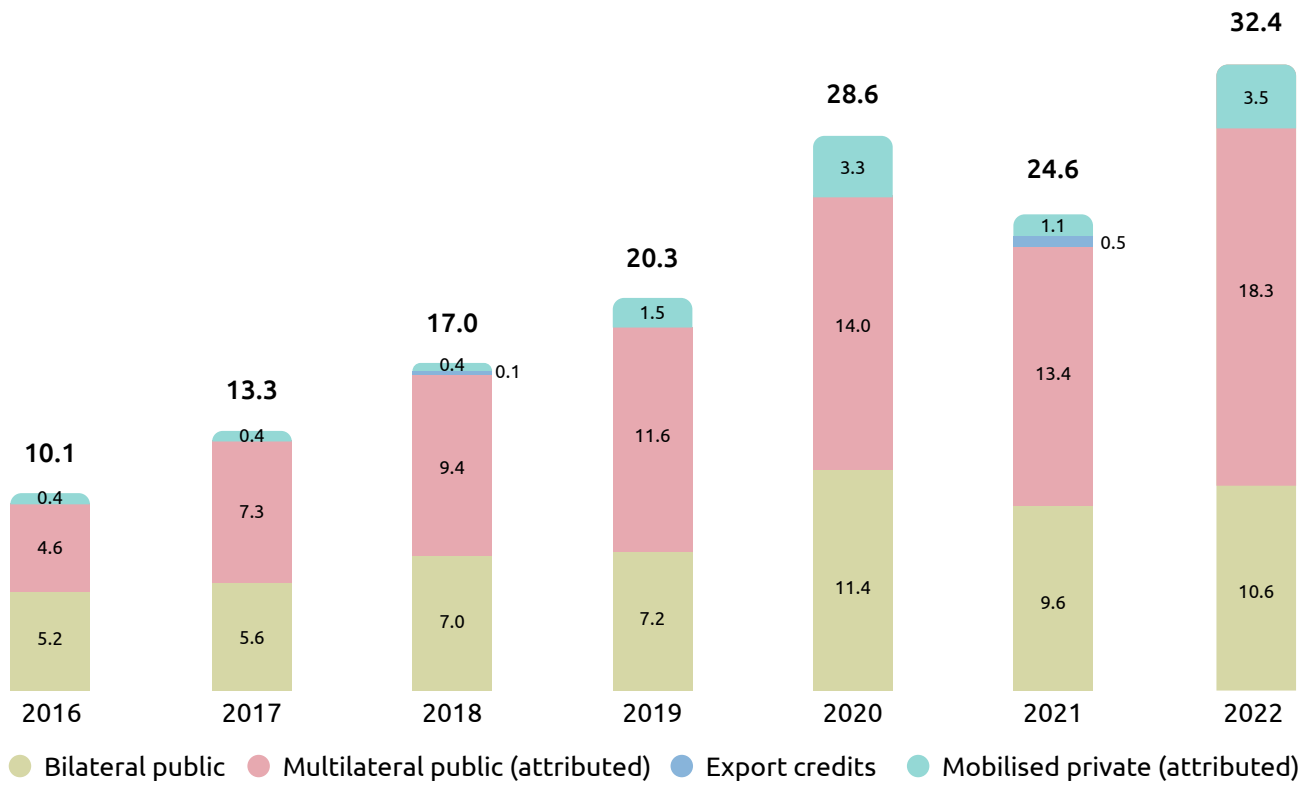


Figure 4: Adaptation finance provided and mobilised 2016-2022 (US$ billion) – Source: OECD (2024)

There are, however, additional private finance flows for adaptation, though these are more difficult to track. The Climate Policy Initiative (CPI) have developed improved methods for tracking such flows and their recent analysis (CPI, 2024) provides key new insights. Their analysis covers commercial banks, asset managers, private equity and venture capital, small and medium-sized enterprises, pension funds, insurers, corporations, and households and consumers. They estimate that, globally, annual average flows amount to US$4.7 billion from the private sector to adaptation-relevant activities. However, a proportion of these global flows are in developed countries and are thus not relevant for this analysis. It is also stressed that, for the finance in developing countries, this finance originates from financial institutions in both developed and developing countries: again, the latter would not count towards the international climate finance targets. The recent 2025 update (CPI, 2025) and data dashboard reports that private adaptation finance flows amounted to US$5.74 billion globally for 2023. Excluding North America and Europe, the figure is US$4.4 billion.

This is approximately 1.5% of the estimated adaptation needs of US$320 billion per year. Again, this focuses on finance flows and not funding.

A number of caveats are highlighted with regard to this CPI data. Total private flows are likely to be higher than the values stated above (US$4.45 billion), and it is also noted that the numbers exclude the flows of adaptation finance from the private sector in delivering adaptation goods and services to households/small enterprises or farmers. Countering this, these private flows are dominated by commercial financial institutions (53%) (which are likely to involve lending for adaptation), followed by corporations (41%). They are also heavily weighted towards investments in the water and sanitation sector (wastewater treatment, sanitation services, and industrial water reuse). This indicates that the CPI numbers include private finance flows for private sector adaptation needs (Type c) investments in Figure 1, which are beyond the scope of this study). It also indicates that they represent financing and not funding of adaptation. Further research and refinement of understanding on this issue is needed.

With the best information currently available, and noting the caveats set out above, combining the OECD mobilized private investment and the CPI estimates indicates tracked private finance flows to developing countries (around US$8 billion) comprise **approximately 3% of total adaptation finance needs (of US$320 billion per year)**. This indicates that current (tracked) flows have not yet had a large impact on reducing the adaptation finance gap.

Barriers to financing adaptation

Key message: Private sector investment in adaptation remains low due to a combination of barriers. While adaptation can have high economic (societal) returns it often has low financial returns because it has more limited revenue generation potential (compared to mitigation). Private finance is more likely to flow to large, capital-intensive projects in market sectors with clear financial returns.

Global climate finance flows are increasing, including private flows, but these are predominantly for mitigation. The latest global landscape of climate finance study (CPI, 2025) reports total global climate finance flows of US$1.9 trillion in 2023, and shows that for the first time private climate finance contributions exceeded US$ 1 trillion. However, only US$65 billion of the US$1.9 trillion was for adaptation (3.4%).

This reflects the fact that there are barriers and constraints to adaptation finance (UNEP FI, 2016). These are due to market failures (Pauw et al., 2021) that include information failures,[17] positive externalities,[18] and imperfect financial markets,[19] as well as policy failures[20] and coordination failures[21] (Frontier Economics and Paul Watkiss Associates, 2022). There are also a large number of other barriers and constraints, including more practical issues that affect the bankability of adaptation, such as the site specificity and low replicability, typically small investment size, project complexity, and the number of actors and intermediaries involved. These are shown in Figure 5.

17 Information failures (imperfect information) are a market failure and act as a barrier to the private sector, because well-functioning markets require buyers and sellers to have information on what is on offer, including quality and price. When public or private actors have inaccurate, incomplete, or uncertain information they are unable to make the most appropriate decisions, or any decision at all. Information gaps are large for adaptation because of the uncertainty around future climate risks, and thus around the benefits of adaptation.

18 Positive externalities arise when the economic net benefit of a good or service is higher than the financial or private benefit. In this case, there is little incentive for the private sector to invest if the private financial benefits are not high enough to make an investment viable, as they do not benefit from the additional social benefits. Positive externalities might also appear in the form of spill-overs, when a project generates lessons that will be helpful for other actors but does not provide additional revenues to the investor.

19 UNEP (2016) highlights market failures around market imperfections. It identifies imperfect capital markets as a market barrier, when financial markets are unable to efficiently allocate capital or transfer risk. It highlights that many financial markets are characterized by a shortage of longer-term credit, which inhibits the ability/willingness to finance investments for the longer term.

20 Policy failures are cases when the framework of regulation and policy incentives creates barriers to effective adaptation, and which prevent an efficient market solution.

21 Coordination failures occur where sectors are fragmented and many parties are involved in actions, inhibiting or preventing action.

While all of these barriers are important, several inter-related issues associated with adaptation are particularly pertinent in explaining the low levels of private sector adaptation:

- Many adaptation investments have public good characteristics, which means the private sector is unlikely to invest in them.
- While the economic (societal) benefits of adaptation can be high, the financial returns of adaptation tend to be much lower.
- Adaptation often does not generate revenues (positive revenue generation or cost savings), though the potential does vary by sector.

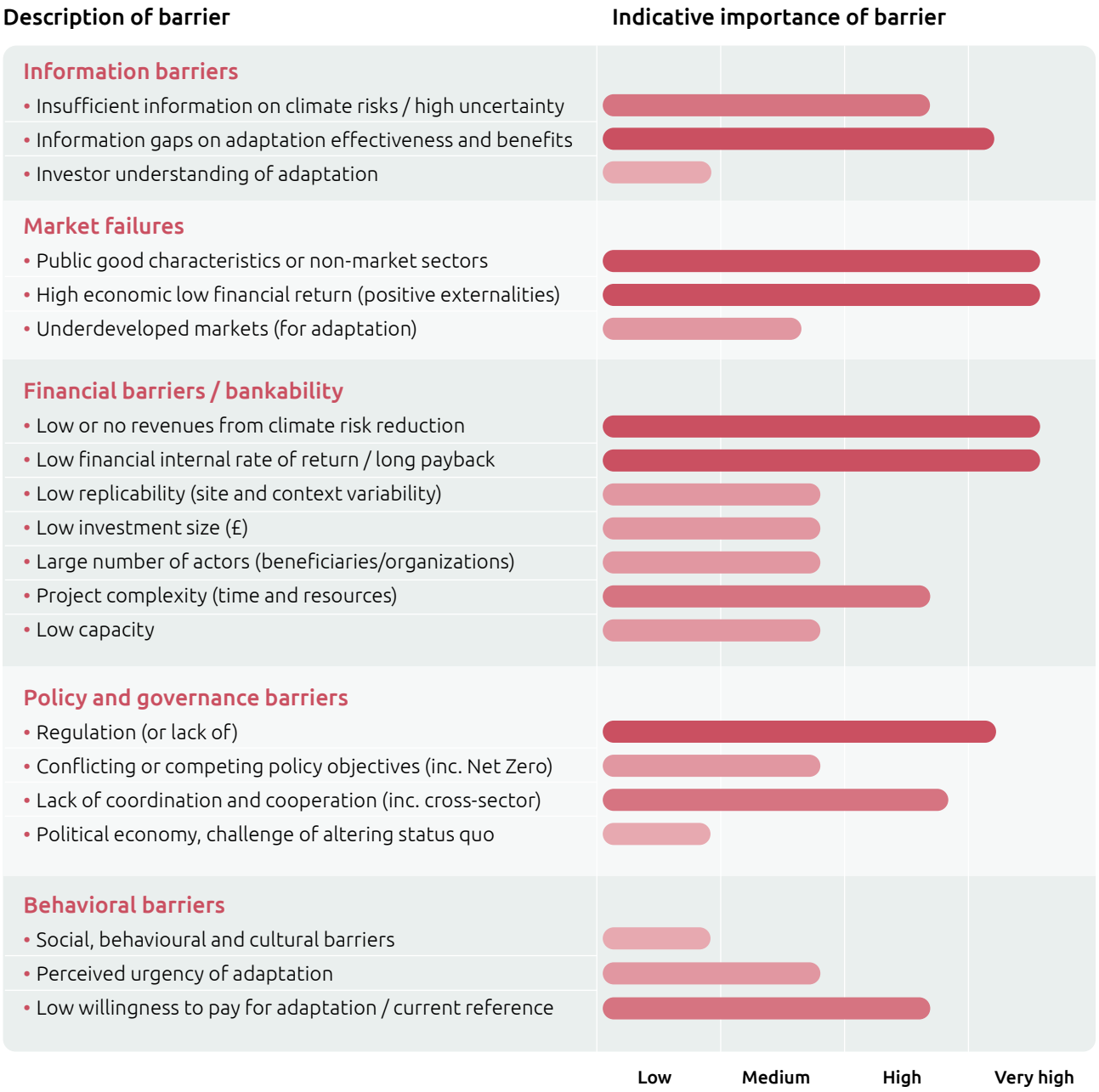


Figure 5: Example of barriers to adaptation finance and potential importance. Source: Watkiss (2023)

These barriers and constraints apply to adaptation in all geographies, but they are exacerbated in developing countries as the risks are usually greater in these areas due to regulatory uncertainty, governance and structural issues, market failures, etc. Thus, the private sector usually requires higher returns to investments in these countries. At the same time, the potential revenue models for adaptation are likely to be lower performing because of income levels, availability of public finance, etc. These issues are likely to be most significant in LDCs and also in fragile and conflict-affected states.

It is also important to note that these barriers vary by sector. The areas of adaptation that are most attractive for the private sector will be those that are in market sectors, and which have the potential to generate revenues and have financial returns. This can include adaptation investments that increase incomes or save costs (rather than just reducing avoided losses), as well as those that generate revenues through their co-benefits (e.g. mitigation benefits) rather than directly from the adaptation action itself.

However, there is often a common misconception about the returns on adaptation, because of the key difference between economic and financial returns (see Box 3 below). Very often the economic (societal) returns are high, but the financial (private) returns are lower. This means that while there is a strong case for adaptation, it will still be difficult to establish a viable financial model that works.

Many of the studies that report that adaptation has very extremely high returns – for example, high benefit-to-cost ratios (see GCA, 2018; GCA, 2021; CCC, 2021; BCG, 2025; JP Morgan, 2025; WRI 2025a) – refer to the economic (societal) return, including non-market benefits. This is not the same as the private (financial) return, which will be much lower.

Box 3: Economic and financial returns

While they are closely related, economic and financial returns are different, as set out below.

- Economic returns: Governments assess projects on the principles of welfare economics, and aim to assess the ability of a policy, programme, investment, or project to improve social welfare or wellbeing. They therefore look at the returns from the perspective of society and include the economic valuation of non-market effects, such as environmental benefits. Results of an economic appraisal or cost–benefit analysis can be expressed as the net present value (NPV),[22] the benefit-to-cost ratio,[23] or the economic internal rate of return.[24]
- Financial returns: These are different and consider the incremental revenues and costs generated by an investment, and the ability to generate cash flows that might be used to repay any financing. Analysis of financial returns is therefore carried out from the perspective of an investor, not the perspective of society as for an economic analysis, as described above. Financial returns exclude environmental or social benefits. In a financial appraisal, the analysis assesses the financial NPV or financial internal rate of return (or other similar metrics, such as the payback period).

22 The NPV is the sum of future values (in real prices) that have been discounted to bring them to today's value (HMT, 2019) and is estimated as the total present value (discounted) benefits divided by the total present value of costs.

23 The total present value of benefits divided by total present value of costs.

24 The rate at which the NPV is zero, which can be compared with the discount rate to assess if a project generates a sufficient return on investment to be viable.

More positively, there is some evidence that, in some cases, private firms can benefit from investing in adaptation, especially Type c) adaptation. This could include action to protect their assets or supply chains, or to implement water saving technology and to save costs. As identified in Figure 2, there will also be opportunities that emerge for adaptation goods and services opportunities. However, the focus of this study's analysis is to investigate whether private firms can scale up investment in the publicly identified priorities for adaptation.

Finally, the attractiveness of adaptation for the private sector will vary by the type of investment. The practical barriers also mean it is easier for the private sector to invest in large projects and is more challenging to invest in small projects, especially if the latter includes a large number of individual actors (see the later discussion on the quality of finance).

Future private sector adaptation: baseline analysis with current policies

Key message: The potential for private adaptation finance will vary by the sector, the specific adaptation activity, and the country. Detailed analysis reveals that the private sector might be able to reach around 15% (approximately US$50 billion per year) of the adaptation needs in developing countries under a current policies scenario. However, the level of private sector contribution varies strongly by country grouping. A much higher level of public finance (almost 95%) (US$25 billion/year) is likely to be needed for LDCs, reflecting the different mix of the risks involved, the high levels of current international public finance and ODA, and less developed private sectors.

For this analysis we take the **AGR modelled adaptation finance and funding** needs for the year 2035 (US$320 billion per year in 2035) and investigate the potential for the private sector to help bridge this gap, particularly with respect to funding. This dataset has disaggregated data on the costs by sector and individual adaptation option for every developing country, noting that these focus on the publicly determined adaptation priorities (those typically set out in NDCs and NAPs).

To start, the analysis looked at the individual adaptation investments (e.g. river flood protection, agricultural irrigation, etc.) that make up these estimates and assessed the potential financial returns, using the typology of OECD (2023). This considers whether an adaptation action is commercially viable, mixed (i.e. has below-market returns), or low (and thus usually publicly funded). This analysis is summarized in the table below.

The analysis then used this information to estimate the likely share of public and private activity for each individual sector and adaptation action for each country income grouping. This means, for example, that different factors are derived for the agriculture sector in LICs, as compared to LMICs, upper middle-income countries (UMICs), etc., and that different factors are applied for agriculture as compared to infrastructure.

This analysis provides a number of insights. The first key finding is that the potential for the private sector varies by adaptation activity. When looking in detail, the analysis reveals that many of the priority adaptation actions are public goods or quasi-public goods (see Box 4 below). **Indeed, 40% of the estimated priorities for adaptation are for investments that have strong public good characteristics.**

Box 4: Public goods

Public goods are goods or services that are beneficial to society. More specifically, they are goods or services that are available to all (non-excludable) and that can be enjoyed by anyone without diminishing the benefits they deliver to others (non-rivalrous). Public goods are usually funded by governments because, due to their characteristics, they will not be supplied – or will be undersupplied – by the private sector. Areas that have some public good characteristics (quasi-public goods) are also often funded by governments but can also include other revenue models (e.g. user fees). To give an example: major flood protection investments have strong public good characteristics, and the private sector will have little incentive to invest in flood protection infrastructure that will benefit others. For this reason, the majority of such defences are funded by the public sector. To take an example, in the UK, which has implemented high levels of privatization across the economy, over 90% of coastal and river protection investments still come from central government (Office for National Statistics, 2023). It is also worth noting that governments have been trying to get these investments off the public balance sheet for decades.

A further 35% of estimated needs are in areas that are typically provided by the public sector, as they involve quasi-public goods (e.g. roads) or because they are essential public services and can only be funded by the public sector (e.g. cash transfers in social protection programmes or adaptation to climate-sensitive disease in low-income households in LDCs).

Table 1: Overview of adaptation activities and potential returns for developing countries. Typology from OECD (2023). Note: This table focuses on baseline and does not consider innovative financing or funding – this is investigated in the later analysis. Source: Authors

Sector and activity	Nature of investment in baseline	Typical baseline without innovation			Evidence on baseline
		Typically public	Below-market	Commercially viable	
Coastal and river flood					
Protection (coastal and river floods)	Public	✓			Large-scale protection dominated by public, even in countries with high levels of privatization, e.g. 90% of UK investment in coastal and river protection is from central government (Office for National Statistics, 2023).
Early warning services	Public	✓			See later discussion of early warning systems / climate services.
Nature-based solutions (NbS)	Public	✓			Generally public (mangroves or wetland restoration).
Household measures	Private		✓	✓	Opportunities for household resilience and resistance measures, and can be commercially viable (Wood Environment & Infrastructure Solutions UK Limited, 2019), but these costs are additional to AGR.

Sector and activity	Nature of investment in baseline	Typical baseline without innovation			Evidence on baseline
		Typically public	Below-market	Commercially viable	
Water					
Integrated water resources management (IWRM)	Public	✓			IWRM investments (basin management and governance) are public but can unlock user charges and payment models, and thus private opportunities.
Water supply and distribution including water, sanitation and hygiene (WASH)	Mixed	✓	✓	✓	Determined by the structure of the water sector, and whether public, state-owned enterprise, contracted, or fully privatized, as well as whether water charging covers all areas (including rural) and whether there is full cost recovery.
Demand management, including efficiency measures	Mixed	✓	✓	✓	Range of activities from non-revenue water to household efficiency, but actor and viability depends on water structure above.
Agriculture					
Research and development (R&D)	Mixed	✓	✓	✓	Levels vary by country, e.g. US has low share of public, but in some countries private is close to zero (Plastina and Townsend, 2023). AGR based on R&D for international public goods research so public (Rosegrant et al., 2023). Private would be additional.
Extension services	Mixed	✓	✓	✓	Range of models from highly public through to commercial out-grower schemes. Public schemes common in LDCs for smallholders.
Climate-smart agriculture	Mixed	✓	✓	✓	Generally higher economic (societal) returns than financial returns, so mixed rather than fully commercial (Ferrarese et al., 2016; World Bank, 2019a; World Bank, 2019b), and often requiring complementary public (information, demonstration, concessionary finance).
Irrigation	Mixed	✓	✓	✓	Wide range, from large-scale irrigation schemes in developing countries (which tend to be public or have high public levels of financing) through to commercially viable (especially for improved efficiency). Note that AGR includes a mix of expansion and efficiency improvement.
Trade and trade infrastructure	Mixed	✓	✓	✓	Involves public and private investment in roads, ports, etc., as well as trade facilitation.

Sector and activity	Nature of investment in baseline	Typical baseline without innovation			Evidence on baseline
		Typically public	Below-market	Commercially viable	
Fisheries					
Fisheries management	Mixed	✓	✓	✓	Costs of fisheries management in AGR focuses on public costs and support to the private sector. Private costs would be additional but commercially viable options.
Marine protected areas	Public	✓			Costs of set-up and enforcement of marine protected areas are public.
Infrastructure					
Energy	Mixed	✓	✓	✓	Level of public to private varies (networks higher and generation lower). International Energy Association (IEA) reports 40% of investment is government/state-owned (IEA, 2020) but higher in developing countries.
Transport (road and rail)	Mixed	✓	✓		Level of public to private varies.
Health infrastructure	Mixed	✓	✓	✓	Health infrastructure is a mix of public and private (WHO, 2025a).
Education	Public	✓			Education infrastructure is a mix of public and private, but AGR costs are for public infrastructure only. Private would be additional.
Private infrastructure (assets)	Private			✓	Not included in AGR (other than in areas above) but high finance needs for retrofitting and climate proofing, albeit private and additional.
Health	–	Health systems are mixed, provided by both public and private sector (WHO, 2025b).			
Malaria, vector-borne disease, food- and water-borne	Public	✓			Malaria cases occur predominantly in LDCs (Nigeria excepted) (WHO, 2024). Current programmes dominated by domestic public and international public, with 5% from foundations (Global Fund, 2022). Similar values for basic diarrhoeal disease.
Heat – heat health alert (early warning systems and public health cascades)	Public	✓			Heat health alert systems are public, and mobilize public health sector for additional preventive action.

Sector and activity	Nature of investment in baseline	Typical baseline without innovation			Evidence on baseline
		Typically public	Below-market	Commercially viable	
Health (Continued)					
Heat cooling	Private			✓	Costs of air conditioning and passive (households and business) are private flows and not included in impact totals.
Public health services including disease surveillance	Public	✓			Public. Note that additional private health services are large in many developing countries, but adaptation costs are additional to AGR values.
Social protection					
Adaptive social protection	Public	✓			Cost is based on government social protection schemes (cash transfer and public works programmes) and costs of adaptive social protection.
Early warning / climate services					
Early warning	Public	✓			Early warning services are generally public. Data from EWS4all for all indicates majority of early warning systems funding is public (UNDRR, 2025), though also recent philanthropic funding.
Foundational observations	Public	✓			Costs are focused on public weather services and foundational activities in National Hydrological and Meteorological Services (NHMS), which are public.
Weather and climate services	Mixed	✓	✓	✓	Varied. Commercial services in certain sectors (e.g. aviation) and HICs (e.g. the US) but high public provision in developing counties.
Biodiversity and ecosystems					
Protected areas	Public	✓			AGR cost is based on nationally protected areas. Note: Will be private costs/opportunities for non-protected areas, and for some models.
Capacity building, institutional strengthening, awareness	Public	✓			Focus in AGR is on the public costs.

When these two categories are added together, this means that approximately three-quarters (75%) of the estimated adaptation needs in developing countries would typically be publicly funded. As was stressed above, we underline that this does not include the potential for the private sector to finance these investments (government budget debt financing). We also stress that these values apply to developing countries only; the level of public funding is likely to be different in developed countries.

It is also noted that a significant proportion of the public adaptation priorities involve increased recurrent costs rather than capital investment. In particular, many of the more social adaptation actions (health expenditure, social protection, weather and climate services, agriculture extension services) are associated with increased annual spending. This provides additional challenges for financing, as countries typically invest in capital projects, and are often prohibited from borrowing to increase annual expenditure.

The **remaining 25% involves actions where there is theoretical potential for private sector involvement,** with returns that may be mixed or potentially commercial. These are primarily in agriculture, some aspects of water (particularly on the demand side), and infrastructure.

However, the **realistic potential** for the private sector is lower than this, reflecting existing levels of public and private investment in each sector, the level of commercial potential, and the fact that many of these adaptation actions will still require continued public support, whether this is to address barriers or to help de-risk private investment.

The results of this analysis are shown below in Figure 6. When aggregated together, the analysis indicates that the realistic potential for the **private sector is around 15% (approximately US$50 billion per year)** of total adaptation funding needs, as an average for all developing countries, though this varies strongly by country grouping. It is also stressed that the levels will be much higher in certain sectors (e.g. agriculture).

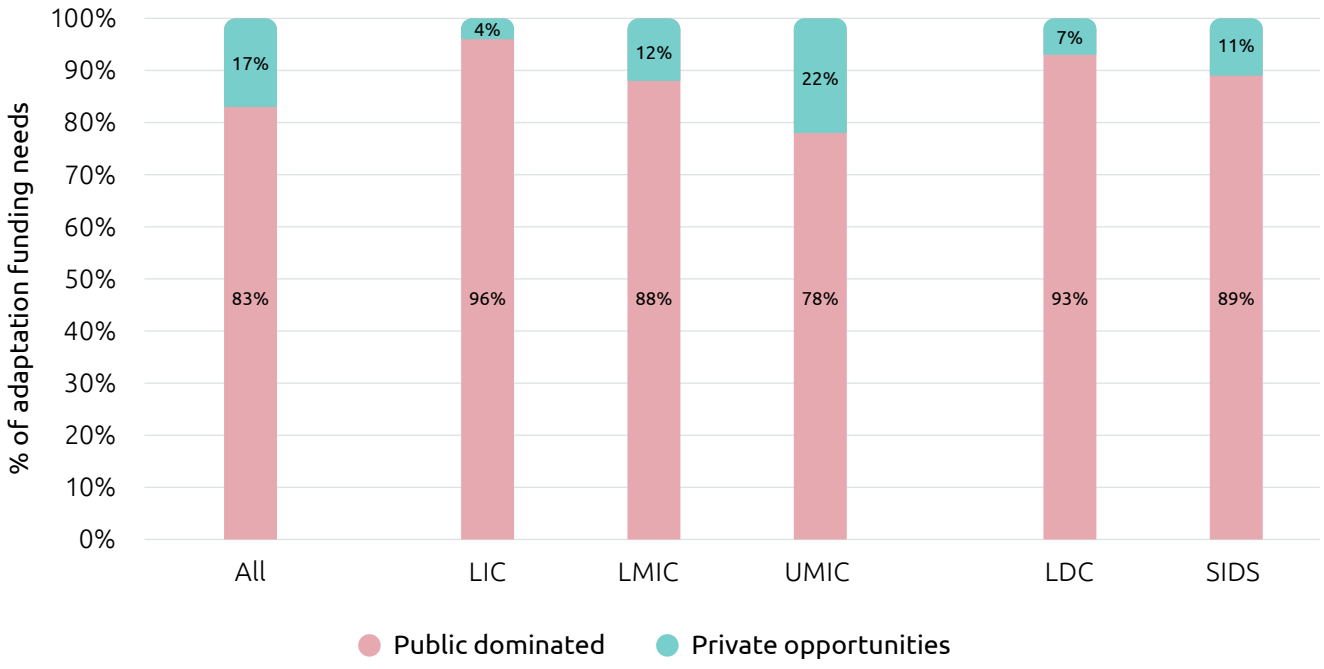


Figure 6: Realistic potential for private sector adaptation in developing countries for different country groupings under current policy scenarios. Note: LDCs include all LICs and some LMICs; SIDS include a mix of income groups.

The analysis also finds that the private sector potential varies by the country grouping. **A much higher level of public finance (around 95%) is needed for LDCs** (implying around 5% private sector involvement), reflecting the nature of such countries' adaptation needs, such as for public health or cash transfer programmes; the high role of current ODA, which is 55% of external financing in these countries (OECD, 2025); and the low level of direct foreign investment and their smaller and less developed private sectors. A high level of public finance is also estimated for SIDS (90%), reflecting their higher coastal protection needs. By contrast, the number is much lower for the UMIC, at closer to 75%.

We note that changes to the relative needs by sector, and individual adaptation actions, will change these numbers. If the adaptation finance needs for developing countries involve a higher share of agriculture, then the potential for the private sector would increase (although if these financing needs relate to subsistence farmers, then the commercial potential will remain low). We also stress that the analysis above (and in the figure) does not include private sector financing of public investment, and also does not include the delivery of this public investment through private sector goods and services procured.

At a more detailed level, it is worth noting that private opportunities vary by individual country and are determined by the specific institutional and regulatory landscape: for example, whether the country's water sector is public or has moved to state-owned enterprises, private contracting of some services, or full privatization, as well as the coverage and level of water charging in place.

The current study also conducted a benchmarking exercise to test the validity of the results. The results have been compared to the ongoing ADB Climate Adaptation Investment Programme (ADB, forthcoming). This identifies baseline public levels of 90% for water and 80% for agriculture for several developing countries (though it also notes that these could increase with innovation – discussed in the next sections). The results have also been compared to the findings from the World Bank's series of country and climate development reports. For example, the 2024 report for Armenia – a UMIC – estimates a public to private split of around 70:30 for key adaptation investments.

The final question is **whether this private sector investment reduces the adaptation funding gap, as well as the financing gap.** This is more difficult to assess with confidence.

There is emerging literature on the economic returns of adaptation (see the section on barriers) but much less evidence on the financial returns of adaptation. The literature that does exist (Watkiss et al., 2023: BCG, 2025) does indicate that some – but importantly not all – of these private activities will have revenue models that can help fund adaptation, such as by yield improvement for agriculture, or cost savings for water use.

It is therefore likely that the contribution to filling the adaptation *funding* gap will be lower than 15%, but further work is needed to assess exactly by how much.

Finally, as highlighted earlier (see Figure 2), the private sector will have a greater role in the overall adaptation landscape, from the financing of public adaptation and through public procurement. These areas will be critical in helping developing countries adapt, but they primarily reduce the financing gap, not the funding gap.

How to deliver the scaling up of private sector adaptation

Moving from the current levels of private sector adaptation in developing countries (which are currently tracked at 3%) to levels of around 15% of adaptation – for publicly identified priorities – will require concerted policy action. This will not happen automatically if left to the market. This study has assessed what the key levers could be to enable this scale-up. These include a set of enabling factors, as well as the potential for blended finance. These are discussed below.

Creating the enabling conditions

Key message: A number of enabling initiatives are already under way and offer the potential to enable the anticipated private sector scale-up. These include adaptation investment planning, country platforms and adaptation taxonomies, as well as encouraging greater private sector participation in NAPs and NDCs. Public policy action is needed to deliver these initiatives, as well as some public funding.

The AGR 2024 (UNEP, 2024) undertook a wide-ranging review of the enabling factors for bridging the adaptation finance gap. These include taxonomies, disclosures, mainstreaming, adaptation investment planning, climate fiscal planning, and budget tagging. These represent existing actions but they would need to be scaled up to deliver more private sector investment. A selection of these actions are presented briefly below.

Adaptation taxonomies

Sustainable finance taxonomies have been developed to provide guidance on activities, assets, and/or project categories that can be counted as adaptation (e.g. CPI, 2024; BCG, 2025; GERI, 2025). These can identify activities that qualify for sustainable investment funds and can be used to provide tailored packages of support (e.g. access to concessionary finance for qualifying adaptation activities). The number of countries covered by such taxonomies has increased in recent years, though taxonomies vary in terms of principles, sector coverage, and reference activities.

Adaptation investment planning

Adaptation investment planning initiatives support countries to take identified adaptation priorities in NDCs and NAPs and develop these towards investment-ready pipelines to unlock finance and systematically address funding and financing barriers. This is a growing area, with case studies currently emerging (Verschuur et al., 2025; Hernandez and Ceinos, 2025; ADB, forthcoming).

Mainstreaming in national development, economic, and fiscal planning

Many countries are now integrating adaptation into medium-term national development plans (e.g. five-year national plans), as well as into corresponding sector and decentralized development plans. Such activities can help deliver adaptation at scale. They can also mobilize adaptation finance (domestic spending and external finance) by prioritizing government spending and investment decisions within national medium-term expenditure frameworks and annual budgeting processes. There are also a set of policy, regulatory, and legal levers that can be used in these national contexts to create the enabling conditions for adaptation, linked to the adaptation investment planning discussed above.

Country platforms

Country platforms are government-led partnerships which seek to align international and national goals and investment around country-identified priorities to support a step change in climate action (Hadley et al., 2022). Such platforms involve securing and maintaining political agreement, coordinating public finance from multiple donors, and encouraging private investment. There are a number of examples of country platforms, involving different models. These include climate and development platforms (national, sector, or thematic), climate funds as platforms, and regionally anchored programmes (Gul et al., 2025). Emerging assessments indicate that these could be useful for adaptation (CADLAS, 2025a, CPI, 2025). These platforms are similar to

previous sector approaches for development partner harmonization, and thus there are questions as to how effective they will turn out to be, because they require different institutions to align around a unified set of country-led priorities, but there do appear to be emerging good practice examples (e.g. Barbados (Invest Barbados, no date), Bangladesh (IMF, 2023), and Rwanda).[25]

Private sector participation in NAPs and NDCs

Closely related to the idea of country platforms is increasing private sector participation in NAP (and NDC) processes. This involves greater involvement of, and debate and discussion with, private companies and financial institutions that developing countries expect to play a role in national adaptation priorities. Such approaches have also been supported by emerging guidance for investors on stewardship for adaptation (CADLAS, 2025b).

Blended finance

Key message: Blended finance plays an important strategic role in shaping markets, and in de-risking and bringing forward adaptation in areas where there is commercial potential. These opportunities are greater for some sectors than others: approximately 60% of current blended adaptation finance deals are in agriculture. Blended finance has less potential for more public-focused adaptation or in areas with low commercial potential, and this will limit its overall reach in helping bridge the adaptation finance and funding gap. Current private mobilization ratios for adaptation are much lower than for mitigation, with only 0.51 cents of private investment for each US$1 of public investment. This indicates that the availability of public finance could also limit scale-up, although ratios may improve as the approach matures.

Many of the recent studies on adaptation finance (e.g. OECD, 2023; NGFS, 2025; Ranger et al., 2025) identify the opportunity for blended finance, i.e. where some public sector finance is used to reduce risk and unlock private sector investment by addressing challenges (e.g. risk/return profiles) that prevent private sector participation. These studies promote blended finance as one of the main solutions for mobilizing private sector finance for adaptation (and wider development).

A particularly useful source for evaluating the state of play on blended finance is the database managed by Convergence, which specifically includes climate finance deals (Convergence, 2024a: 2024b).[26] Convergence granted the authors of the AGR and this report access to the database information on blended adaptation finance deals. This includes 102 targeted adaptation finance transactions (or 'deals') between 2006 and 2024. This is a low proportion (15%) compared to the number of deals on mitigation (383) or mixed deals that are cross-cutting, i.e. covering both adaptation and mitigation (182).[27]

The number of blended finance deals focused on adaptation has slowly risen over time, with 32 from 2021 to 2023 (i.e. approximately 11 each year) and 13 in 2024. The total value since 2006 is recorded as US$10.6 billion, with the total over the last three years reported as US$3.5 billion (though note that the median transaction size over the last three years was US$32.5 million, indicating that it was influenced by a small number of large

25 An example of a climate fund as a platform is the Green Fund and Facility.

26 Definitions of blended finance differ, as do considerations of its scope. The OECD defines blended finance as the use of development finance to mobilize additional resources towards achieving the Sustainable Development Goals. As a result, the organization tracks both upstream and downstream flows, including transactions that may involve only public sector funding. In contrast, Convergence captures only transactions that involve concessional capital alongside private investment. Because of its methodology, Convergence's database is narrower in scope. For instance, in 2021 the OECD reported US$48.6 billion in mobilized private finance, whereas Convergence reported US$14 billion for the same period.

27 Note that cross-cutting deals are excluded due to challenges with regard to attribution.

deals). Due to the higher perceived risks in adaptation finance, blended finance increasingly incorporates technical assistance, which was used in 36% of adaptation deals, compared to 22% for mitigation and 25% across the overall market.

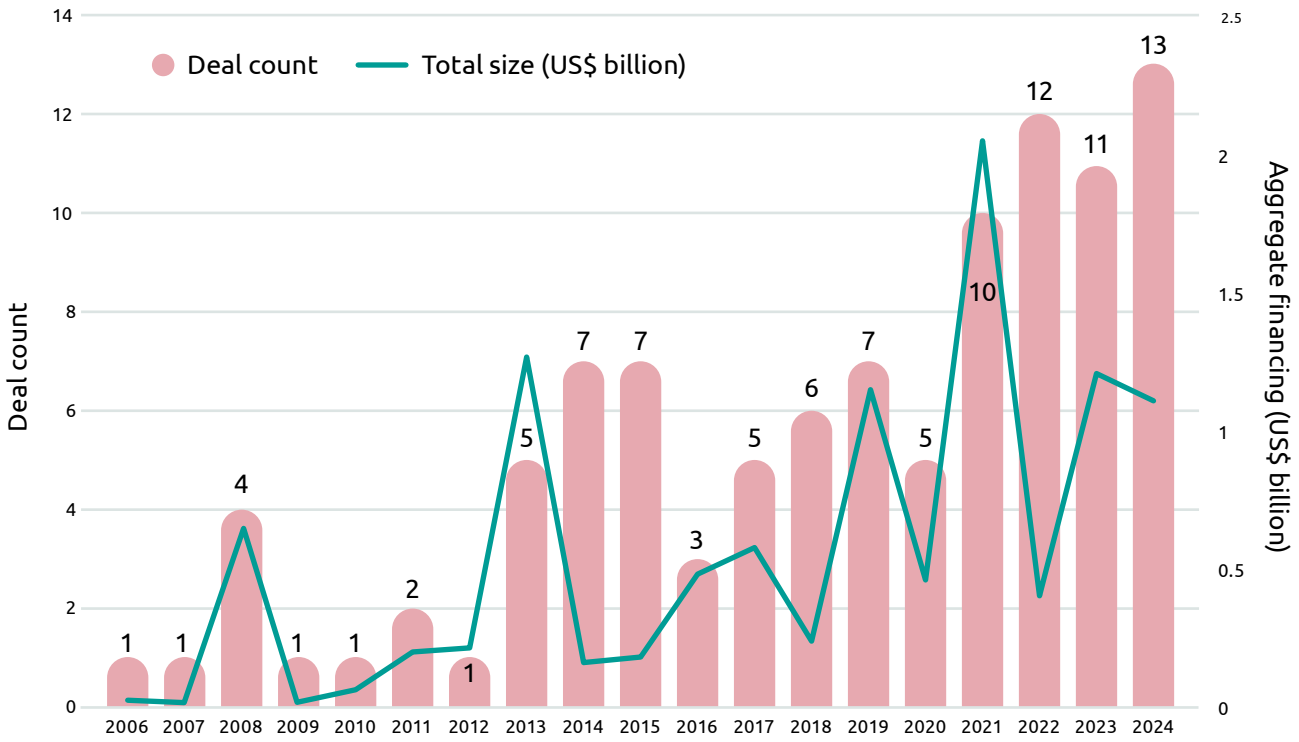


Figure 7: Blended climate adaptation deal count and aggregate financing, 2006–2024. Source: Convergence

The database includes data on the various actors and the amount of capital they contribute to each deal, known as the 'aggregate investment volume'. This represents the extent to which Convergence is able to apportion contributions.[28] Our analysis of this data finds that public finance made up 59% of total finance, with 40% from private and 2% from foundations and non-government organizations (NGOs). This is broadly in line with Convergence (2024b), which reported that 33% of blended adaptation financing from 2021 to 2023 came from private sources. The largest providers of public finance were the MDBs and development finance institutions (DFIs), at 40%, followed by bilateral development agencies, at 19%.

This data also breaks down the relative share of the private sector contributions by commercial and impact investors. This shows that commercial investors are by far the most important private sector actors, contributing 38% of total aggregate investment volume – and 96% of all private finance. Impact investors contributed just 1% of the total aggregate investment volume, and the remaining 4% of private finance.

The effectiveness of blended finance can be measured in different ways: it is typically measured using leverage ratios, but it can also be considered in terms of the amount of private sector mobilized. It is important to note that leverage ratios are calculated differently by different institutions.[29]

28 This represents the majority, but not all, of the capital involved in each deal.

29 The numerator and denominator of such ratios can include or exclude different categories of public and private finance involved (Jachnik and Raynaud, 2015, OECD, 2023).

Leverage ratios typically compare the amount of non-concessional finance (from both public and private sources) to concessional finance (rather than just private mobilized). The Convergence data indicates that adaptation has lower leverage ratios than other comparable investments. In its 2024 climate report, Convergence reported that average adaptation blended finance deals have a leveraging ratio of 2.1, as compared to 3.6 for mitigation.[30] This compares to a higher leverage ratio of 4.1 for sustainable development more broadly (Convergence, 2023).

It is also useful to look at mobilization rates. The mobilization rate can be defined as the total private capital mobilized from a dollar of concessional capital (whether public or private). Mobilization rates are typically lower than leverage ratios, with rates of 1.8 for the Sustainable Development Goals (Convergence, 2023) and 2.2 for climate (all climate) (Convergence, 2024b).

However, in the context of the climate finance negotiations and in the OECD tracking of international public finance flows, it is the ratio of private finance to *total* public finance that is most relevant in the context of the climate goals and for bridging the adaptation gap. This is because both concessional and non-concessional development finance are included in progress towards climate finance goals, i.e. the goal of doubling adaptation finance and the MDB goals for 2030 include non-concessional MDB finance.

This metric is not typically captured by other financing institutions and so has been calculated here. When considering this metric, the *private mobilization ratio* (excluding NGOs and foundations), the analysis suggests a ratio of only 0.51, meaning that, for every US$1 of public finance (concessional and non-concessional), only 51 cents of private finance is mobilized.

Table 2: Breakdown of public/private contributions to adaptation-focused blended finance deals and mobilization ratio. Source: Authors, based on Convergence data

Source	Total aggregate investment volume (US$)	% of total size
Total public (DFI/MDB and development agency)	5.3 billion	65.2%
Total private (commercial and impact investor)	2.7 billion	33.4%
Total third sector	0.1 billion	1.4%
TOTAL	**8.1 billion**	**100%**
Mobilization ratio of private to public[31]	0.51	

Blended finance has most impact when a relatively small amount of concessionary finance can scale up private sector investment that is effective and socially desirable (OECD, 2023). It is therefore important to find the sweet spot for investment: ensuring that leverage and mobilization ratios are high enough that concessional and public finance is de-risking and addressing barriers, but that ratios are not so high that funds are crowding out the private sector, or that it is providing low additionality.

30 The ratio of concessional capital (below market price) to all commercial capital (market-priced) in a transaction. Commercial capital includes capital from private, public, and philanthropic sources. Source: Convergence (2024).

31 For the purpose of this report, NGOs and philanthropic organizations have been excluded, given their relatively small contributions of US$170 million.

While some caution is needed,[32] the data above shows **low mobilization rates.** This strongly suggests that unless private-to-public mobilization ratios improve, blended finance will not have a major role in scaling up adaptation or filling the adaptation finance gap. To put this in very concrete terms, even if the entire MDB pledge of mobilizing US$50 billion of MDB finance by 2030 was used for blended finance, at current ratios this would only deliver around US$26 billion of private finance. This also highlights a further problem, which is that mobilizing private finance will require large amounts of public finance. This in itself may limit the potential volume of blended finance.

As highlighted above, there is a sweet spot for blended finance: prioritizing activities that are just below commercial returns, or where other barriers are preventing private sector investment. Reflecting this, the data shows a strongly skewed distribution of blended finance deals between sectors. This study manually coded the deals to produce a breakdown by sector.[33] Our analysis identified 111 transactions, with a total deal size of US$10.6 billion over the period 2006–2024. The split by theme is shown in Figure 8 below.

This reveals that the number of deals in the period was dominated by agriculture (43% of transactions and 60% of finance), followed by biodiversity and ecosystems (14% of transactions, 10% of finance), infrastructure (14% of deals, 9% of finance), and water (9% of transactions, 13% of finance), although it should be noted that the last two sectors have been increasing in recent years. There were no obvious deals relating to coastal, river floods, or early warning systems. However, this is not surprising: these areas have strong public good characteristics and are not the main target for blended finance.[34]

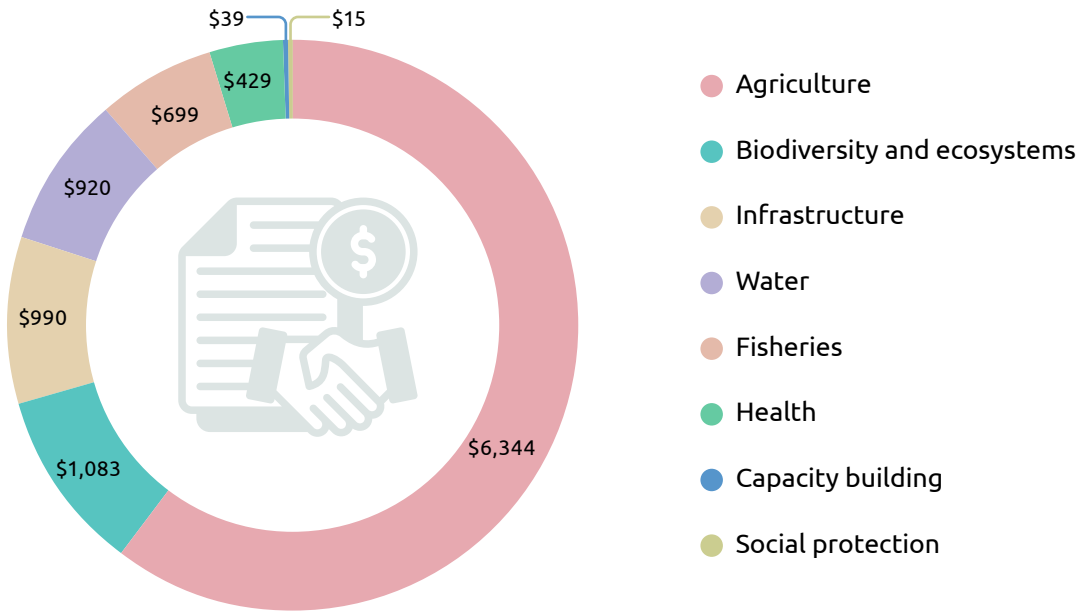


Figure 8: Blended finance deals for adaptation by theme (2006–2024), US$ million. Source: Authors, based on Convergence (2025). Note some deals cover more than one theme

32 We accept that there are some nuances and caveats in adopting such a framing and analysis. First, it may not be appropriate to assign a mobilization expectation to all public money. For example, a number of the MDBs provide capital that is not intended to mobilize the wider private sector – they are in effect the commercial actor in the deal because institutional investors will not participate. Second, there are many well-documented barriers to financing adaptation that limit scaling. Finally, adaptation finance is still relatively new to investors, meaning deals have been smaller and there is still likely potential to scale.

33 In some cases deals covered multiple subsectors, in which case these were recorded under multiple categories. Deals without a clear sectoral focus were excluded from the analysis.

34 The results may overestimate the total private flows, because a different adaptation tracking approach is used (rather than the OECD Development Assistance Committee approach of primary and significant). However, they may underestimate adaptation benefits, as 'dual use' deals that seek to provide support for both mitigation and adaptation are not included here.

This analysis reveals both some positive messages and some messages that indicate a need for caution. It indicates that blended finance has strong potential as a strategic tool to help de-risk and develop the market for adaptation in certain sectors, especially given that adaptation is still a very novel area for many investors. Based on historical deals, this is likely to be primarily for agriculture,[35] followed by biodiversity and ecosystems, infrastructure, and water. However, blended finance is not suitable for all adaptation, especially for the more public-focused priorities that comprise a large proportion of the adaptation finance gap. Indeed, in these sectors, the likely lower leveraging ratios, depending on the structuring and concessionality, may not represent a good use of public finance.

These findings are broadly in line with other studies on the modest success of blended finance for sustainable development (e.g. Mazzucato, 2025; PASS, 2025). These studies also highlight that blended finance approaches often struggle to reach LICs. The scale-up in such countries may therefore require higher proportions of concessionary and public capital or catalytic funding from philanthropic organizations.

It is also not clear exactly what type of adaptation is being advanced by these blended finance deals. Some of it is likely to represent the Type b) areas (see Figure 1), operating at just below commercial returns. However, there is also the potential that this is incentivizing new goods and services that are paid for by customers in developing countries, and thus would be addressing the financing but not the funding gap. Further investigation of this is needed.

Finally, there are some options that could improve the performance of blended finance for adaptation. For example, Convergence highlights the importance of more holistic deals (e.g. climate proofing of mitigation deals or consideration of a portfolio of mitigation and adaptation projects), the use of concessional guarantees and risk insurance, enhanced support in LICs, a strengthened role of local financial institutions, and new innovative models for NbS (Convergence, 2024b). In addition, an increased proportion of public catalytic capital could further demonstrate the feasibility of commercially viable adaptation transactions. Country platforms and the use intermediated lending (where funds are disbursed to local banks and financing institutions before reaching end communities) also have potential.

Ensuring a balanced and equitable portfolio of adaptation

Key message: With a scale-up of private finance, it is important to ensure a balanced portfolio of adaptation is taken forward. An over-reliance on the private sector carries the risk of the concentration of adaptation in certain sectors and certain activities. While this may address short-term risk in specific sectors, it may not involve the necessary actions to deliver long-term climate resilience across the economy. As climate change is projected to have disproportionately large impacts on the poorest and most vulnerable people, and can also exacerbate existing inequalities, it is also critical to ensure that adaptation reaches those who need it most and that private sector scale-up is inclusive and equitable. However, the market is likely to underdeliver such outcomes due to potential barriers. Moreover, payment models that pass through adaptation costs to local communities could actually exacerbate existing issues. There is a need to support locally led and gender equality and social inclusion- (GESI-) responsive adaptation when scaling up the private sector's role, which is likely to require targeted actions and financial instruments.

35 Note that agricultural deals cover a wide range of activities, including agricultural inputs and farm productivity, finance, agro-forestry, agro-processing, capital markets, carbon credits, and climate-resilient/sustainable agriculture. One example cited by Convergence is the Yield Lab LatAm Opportunity Fund, a venture capital fund providing early-stage equity to agrifood tech companies across Latin America and the Caribbean.

The quality – as well as the quantity – of adaptation

As highlighted in the AGR 2024 (UNEP, 2024), it is not just the volume of finance that matters but also what it is used for. Successful adaptation requires a mix of interventions, including soft and hard measures (see Section 1) and anticipatory – and even transformational – action across all sectors. However, the private sector will tend to gravitate towards investments in no-regret, reactive, and incremental adaptation in market sectors (see the early barriers section). An over-reliance on the private sector therefore risks a concentration of adaptation in certain sectors and certain types of adaptation. While this may address short-term risk in specific sectors, it may not involve the actions necessary to deliver long-term climate resilience across the economy.

GESI and locally led adaptation

Climate change is projected to affect the poorest and most vulnerable people most in relative terms, as a percentage of income, because these groups have fewer resources, higher vulnerability, and lower adaptive capacity (UNEP, 2023). Climate change is also likely to exacerbate inequality in multiple dimensions of social identity, including gender (Roy et al., 2022). It is therefore critical to ensure that adaptation finance reaches those who need it most, and that financing and funding models are inclusive and equitable.

However, this has not been the case to date, even for international public finance (Soanes et al., 2021; AGR, 2023). The AGR 2023 assessed that less than 17% of international public adaptation finance commitments were dedicated to projects with a specific focus on local communities. It also reviewed the level[36] of GESI in international public adaptation finance flows and found that gender was only weakly included.

These issues are likely to be exacerbated when considering private sector flows. This is because, viewed from a purely private (market) perspective, many of the barriers to adaptation finance (see Figure 5) are particularly acute for adaptation that is locally led or targets vulnerable groups. These kinds of projects, initiatives, and approaches are likely to involve smaller financial flows and to involve many actors, thus increasing transaction costs. Further, when targeting low-income households, it is likely to be more difficult to identify viable financial returns and there is likely to be higher financing risk. These barriers may mean that a scale-up of private sector adaptation is likely to give lower weight to locally led and inclusive adaptation. There is some, albeit limited, evidence to back this up. The AGR 2024 (UNEP, 2024) investigated the private sector adaptation accelerators and the projects within these, and found a low level of GESI integration. It is also highlighted that many of the financing models – particularly the user-pays models outlined elsewhere in this report – will transfer costs to local individuals, communities, and businesses. This means they will increase inequalities because these local actors will be the ones paying for adaptation. It is interesting to note that gender considerations are more frequently incorporated in adaptation-focused blended finance deals (30% of deals) than they are in climate finance deals as a whole (22%) (Catalytic Climate Finance Facility, 2024; Convergence, 2024b). However, within adaptation this varies by sector: 41% of climate transactions targeting agro-forestry incorporate a gender focus, compared to only 6% in the agriculture sector.

Based on the discussion above, if there is an increase in the role of the private sector for adaptation, this is likely to require targeted actions to ensure more locally led and GESI-integrated financing. A number of activities could support this.

36 The AGR 2023 used a version of the gender continuum based on four categories, with progressively greater ambition: GESI-blind, GESI-specific, GESI-integrative, and GESI-responsive.

A first priority is to address misperceptions about integrating GESI. There are investments in local adaptation that have high financial as well as economic returns. There is also increasing evidence that adaptation programmes that consider gender dynamics are more effective and efficient (Roy et al., 2022), and that gender-integrated projects are more likely to meet their targets and to achieve sustainability. These investments also yield broader benefits in terms of social cohesion and economic inclusion. This can also be assisted by ensuring greater transparency on tracking and reporting of locally led and GESI integration when tracking private sector adaptation finance. There are some initiatives that are already starting to do this. The new Taskforce on Inequality and Social-related Financial Disclosures (TISFD, 2024) could also help the financial system to make relevant disclosures and, in time, increase GESI activities.

Second, there is more that could be done to ensure that, when international public finance is used to support the private sector (e.g. through accelerator funding or for blended finance), these initiatives are encouraged (or required) to consider – and ideally include – locally led or GESI-targeted components or activities. Such initiatives could also provide tailored support to help smaller organizations.

Third, the choice of financial instruments is important. Instruments are not GESI-neutral and may contain biases that can perpetuate inequalities. Clearly, grant funding provides the easiest way to both target low-income groups and also build in GESI considerations, as these modalities allow explicit support. However, other financial instruments or approaches can be more targeted. Intermediated lending – where funds are disbursed to local banks and financing institutions to on-lend to communities – offers a way to increase local support. Equity investment, though less common than other financial instruments, can also offer support and help de-risk early-stage enterprises. It can also be directed towards local small and medium-sized enterprises and provide GESI-targeted support by focusing on women-owned businesses (International Development Research Centre, 2023). Innovative financial mechanisms – such as catalytic equity and outcome-based financing – can also help increase investment for early-stage, high-impact adaptation solutions. Moreover, there is the potential for investment (capital) stacking and pooling, i.e. combining different investors with different investment return expectations, including in blended finance, and bringing in more inclusive targeting through public and philanthropic funding.

Delivering more targeted support is likely to require more collaboration and partnerships between different actors, with a greater role for public finance, impact investors, and private philanthropic actors, as well as – potentially – NGOs.

International development funds can also support local institutions to build the capacity to programme finance, as well as to target personal savings, spending by local micro and small businesses, and remittance flows, or to use social protection programmes, all of which would use more heterogenous models than current top-down financing flows to unlock more locally led finance (Mitchell, 2025).

Section 3: Looking forward: what could the private sector deliver with innovation?

The values given in the preceding section represent what could be achieved based on current policies and models. However, innovative approaches are being developed for adaptation and it is important to look at how these might enable a greater role for the private sector. To explore this, the analysis has explored the potential for higher levels of private sector delivery, beyond the current policies baseline.

There are now many studies that recommend new **technical solutions** for adaptation, as well as many studies proposing new **financial instruments** or arrangements (e.g. Stoll et al., 2021; Wise et al., 2022). This include models that are genuinely novel, as well as those that are novel in the context of adaptation (e.g. green bonds). They include **new business models** that align risk ownership and/or adaptation costs with adaptation benefits and co-benefits (England et al., 2023; NAP Global Network, n.d.; GCA, 2021; Wise et al., 2022). These innovations can also include a combination of these new factors, such as novel technologies funded by existing business models, or new business models for existing technologies.

To explore these the study has first looked at the adaptation incubators and accelerators, as these provide a concentration of new private sector models for adaptation. It has then undertaken a wider review by sector of some of the key models and case studies from the literature.

To understand the potential of these innovations, it is necessary to consider the type of adaptation investment, and what benefit streams these new innovations are based on. This also includes the revenue generation and cost recovery – understanding these allows for an analysis of **both the financing and funding potential.** To undertake this analysis, we use a recent taxonomy outlined by the World Bank (2025), which we extend to identify the main cost recovery models. These include the following:

- Government pays. In this case the public sector is ultimately the main source of revenue for the project, arising from existing budgets, new taxes or charges, or borrowing. An example is private sector financing of flood protection through green bonds.
- User pays. In this case the costs of adaptation are passed through to customers (households or businesses): for example, by a service provider as direct charges for use of the goods or services, or as higher costs in existing charges to take account of the additional investment in adaptation. This can include utility models and user fees, as well as more direct charging. An example is increased water bills.
  - A variation of this is where households or businesses pay for a new adaptation good or service that only reduces risks and does not yield net positive financial benefits.
- Value addition. For these more innovative projects, the adaptation investment generates a new benefit stream that is used to cover part or all of the adaptation investment. An example is land value capture (see below).
- Private sector own source. In this case, the cost recovery come from companies that are willing to invest in adaptation from their own budgets.
- Co-benefits. Finally, in this case, it is the co-benefit of the adaptation that generates the revenues, such as from carbon credits.

Adaptation incubators, accelerators, and facilities

Key message: Innovative private sector solutions and new business models are emerging from adaptation accelerators and facility models. These show the potential of the private sector, but are most advanced in the agriculture sector and in MICs. This reinforces the finding that while the private sector may help bridge the adaptation gap in certain sectors and countries, it will not be able to address large parts of adaptation finance needs – particularly in areas like social protection, river flood protection, and health, and in the most vulnerable countries.

One source of evidence on private finance potential is the innovative models being developed in adaptation accelerators and facilities. These provide support for new private sector innovation for adaptation, for goods and services, as well as for business models and financial instruments.

These accelerators typically involve a central facility that provides early-stage support, including technical assistance and sometimes innovation grants, alongside offers of concessional lending, guarantees, or equity to de-risk investment. These are being complemented with adaptation platforms that help connect developers and potential investors.

To assess the state of the art, this study used a database of projects under five of the major adaptation innovation and accelerator programmes.[37] These projects are typically funded through public and philanthropic sources. The database is outcome-focused, classifying projects based on their goal. It includes 121 projects, funded between 2015 and 2025. Of these, 14 are cross-cutting and were excluded from the sector analysis because they have multiple objectives, leaving a total of 107 projects. These were then mapped by sector and classified by country groupings.

The results in the figure below show that these innovative models are very focused on the agriculture sector (52% of total projects). They also include some biodiversity and ecosystems, fisheries, and infrastructure projects, and a smaller number of coastal projects, primarily for ecosystem-based solutions, such as mangroves. The number of projects targeting MICs (72) was found to be twice that of LDCs (35). This reinforces the finding that the private sector will be able to bridge the adaptation gap in some sectors and for some types of adaptation, but that it is unlikely to be suitable for many adaptation finance needs. The figure highlights again the high potential for the private sector in agriculture, but that it indicates it is more difficult to develop viable private sector models in the areas of social protection, river flood protection, and health, as shown by the low proportion of projects.

The figure also highlights that the potential to bring new adaptation ideas to market is likely to be greatest in MICs, reflecting the current balance of projects to these areas. The current project mix indicates lower potential for LDCs, and there will be much less potential for conflict-affected and fragile contexts.

Interestingly, a number of projects are in more public-orientated sectors. These include the large number of projects in biodiversity and ecosystem services (which also include coastal projects).

It is useful to dive into how these initiatives are working (see also Table 3 below). The innovations and cost recovery models are diverse, but a large proportion of them use the co-benefits of NbS, such as carbon storage or ecosystem services (notably from mangroves). They also include agroforestry models. These do have the potential to generate net financial benefits (additional products, yield improvements, carbon credit revenues), and thus contribute to reducing the funding gap for adaptation.

37 The database was created for the 2024 AGR (England et al., 2023; UNEP, 2024) and was updated by this study to include 26 new projects funded from the accelerators. It includes adaptation projects from the following: the Global Innovation Lab for Climate Finance (https://www.climatefinancelab.org); the GEF Challenge Program for Adaptation Innovation (https://www.thegef.org/what-we-do/topics/challenge-program-adaptation-innovation); the Global Innovation Fund Innovating for Climate Resilience programme (https://www.globalinnovation.fund/innovating-for-climate-resilience); the SEED Partnership for Promoting Entrepreneurship for Sustainable Development Catalogue (https://seed.uno/about); and the GSMA Innovation Fund for Climate Resilience and Adaptation (https://www.gsma.com/solutions-and-impact/connectivity-for-good/mobile-for-development/the-gsma-innovation-fund-for-climate-resilience-and-adaptation/).

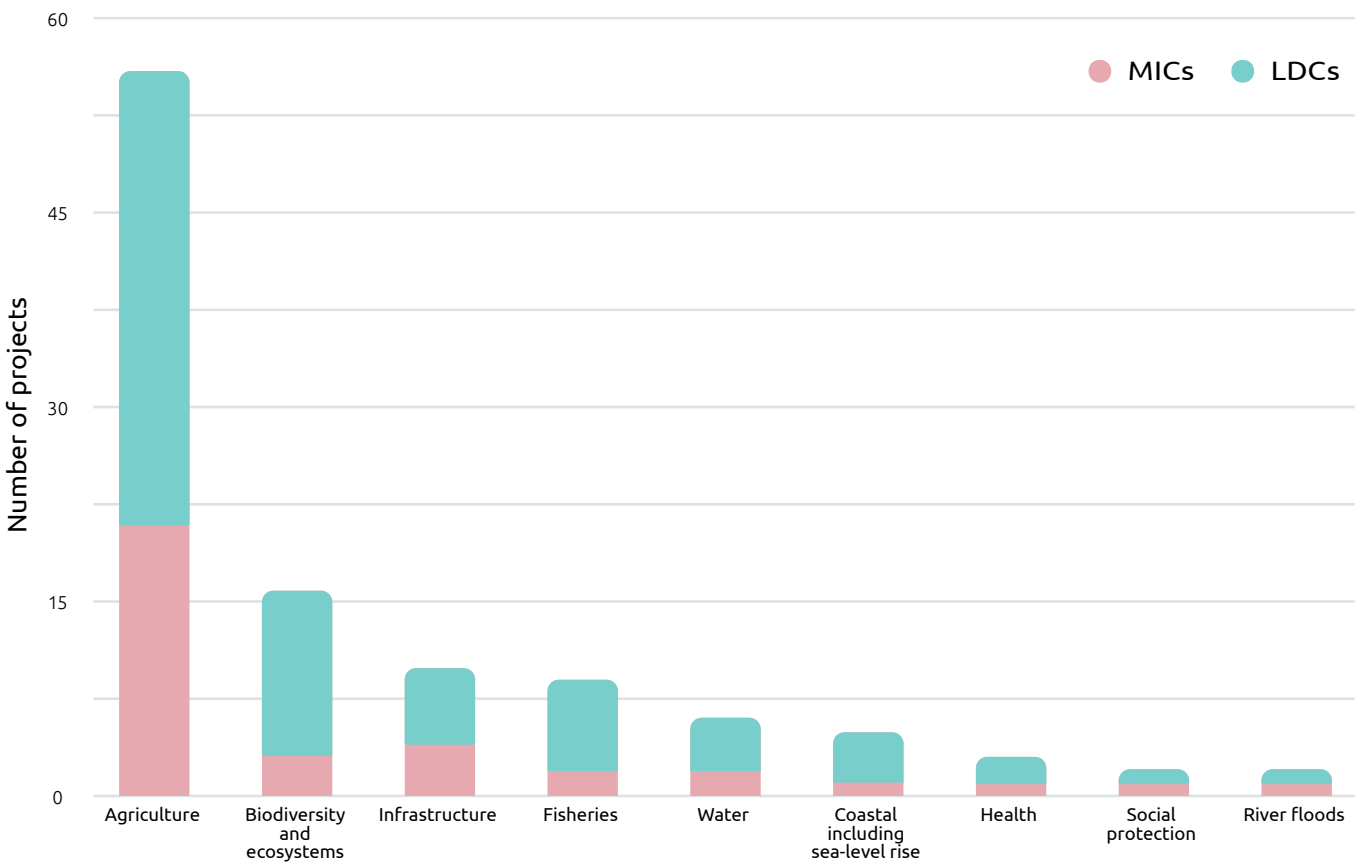


Figure 9: Number of accelerator projects by sector and country grouping. Source: Authors

These accelerator projects also include additional new business models: for example, a mangrove restoration company is selling risk reduction to insurers, as well as parametric insurance models (notably for reefs and providing coastal protection), as well as digital platforms to connect donors and investors with new technologies (e.g. blockchain earth observation). Most of these models are based on providing goods and services to customers, and thus are a form of user-pays model. These have the potential for making some contribution to reducing the funding gap for adaptation, but this depends on the exact model. For example, parametric insurance tends to work by passing through costs to local businesses: they receive the benefits of these actions, but they have to pay for it. In contrast, a few of these models generate new benefits streams that can help pay for the adaptation investment.

These insights further underscore the finding that the private sector will be able to bridge the adaptation gap in some sectors and for some types of adaptation, but that it may be less successful in addressing the overall funding gap – or, rather, that costs may still be passed through locally to developing countries.

Table 3: Innovation models for accelerator projects with public characteristics

Sector	Innovation	Examples
Biodiversity and ecosystems	Blockchain carbon credits for ecosystem services	AirEco (Indonesia) (SEED, n.d.)
	Online platform with blockchain tokens, and enhanced Monitoring, Reporting, and Verification	Global Mangrove Trust (Thailand) (SEED, 2018)
	Investment fund for nature-positive businesses	Tropical Resilience Fund (Africa, Latin America, East/Southeast Asia) (Global Innovation Lab for Climate Finance, n.d., a)
	Redeemable equity	Regenera Ventures Fund (Mexico) (Brasil-Leigh et al., 2024)
	Payment for loss reduction	Restoration Insurance Service Company (RISCO) (Philippines, Mexico, Brazil, Malaysia) – mangroves(CPI, n.d.)
	Offtaker agreements / product sales	Socio-Climate Benefits Fund (Brazil) (Global Innovation Lab for Climate Finance, n.d., b)
	Anticipatory parametric insurance for damage reduction	Parametric Insurance and Trust Fund for Paramos (Colombia) (Global Innovation Lab for Climate Finance, n.d., c)
	Platform/ecosystem development	SCALE (Global) (The Lightsmith Group, 2024a)
	Certification and standardization	Certification of NbS portfolios (Morocco, Senegal) (GEF, 2021)
	Metrics and frameworks	Indicators Framework for Climate Adaptation and Biodiversity Finance for Smallholders (Senegal, Zambia) (GEF, n.d., a)
	Sustainability premium and traceability app	Monsoon Tea Company (Thailand) (GSMA, 2024)
Health	Private sector offtaker	BENAA (Egypt) (GSMA, n.d.)
	Platform and ecosystem development	SCALE (global)
Social protection	Enhanced phone-based targeting	Y-Rise (Philippines) (The Global Innovation Fund, n.d., a)
	Cash transfers	Give Directly (The Global Innovation Fund, n.d., b)
Coastal, including sea level rise	Risk transfer, including parametric Insurance	PPP for coral reef insurance (Indonesia, Philippines, Solomon Islands) (ADB, 2023)
	Platform/ecosystem development	SCALE (global)
	Online platform with blockchain tokens, and enhanced MRV	Global Mangrove Trust (Thailand)
	Supply chain finance	A nature-based private investment facility for climate resilience in LDC cities (global) – mangroves (GEF, n.d., b)

Review of innovative solutions and financing by sector

Key message: There are additional models that can be used to scale up the private sector. However, while these typically reduce the financing gap, in general they usually do not reduce the funding gap: they will mean developing countries still pay for adaptation. A smaller number of innovation models have the potential to help fund, as well as finance, adaptation, because of the innovative cost recovery methods they use, including land value capture, mitigation co-benefit models, market-based ecosystem approaches, and supply chain finance. These models offer greater potential for bridging the adaptation funding gap.

The sections below provide additional review at a sector level. To provide some context, the figure below provides the sector splits for priority public adaptation (for the US$320 billion per year). As highlighted above, around one-third of these are in LICs and LMICs.

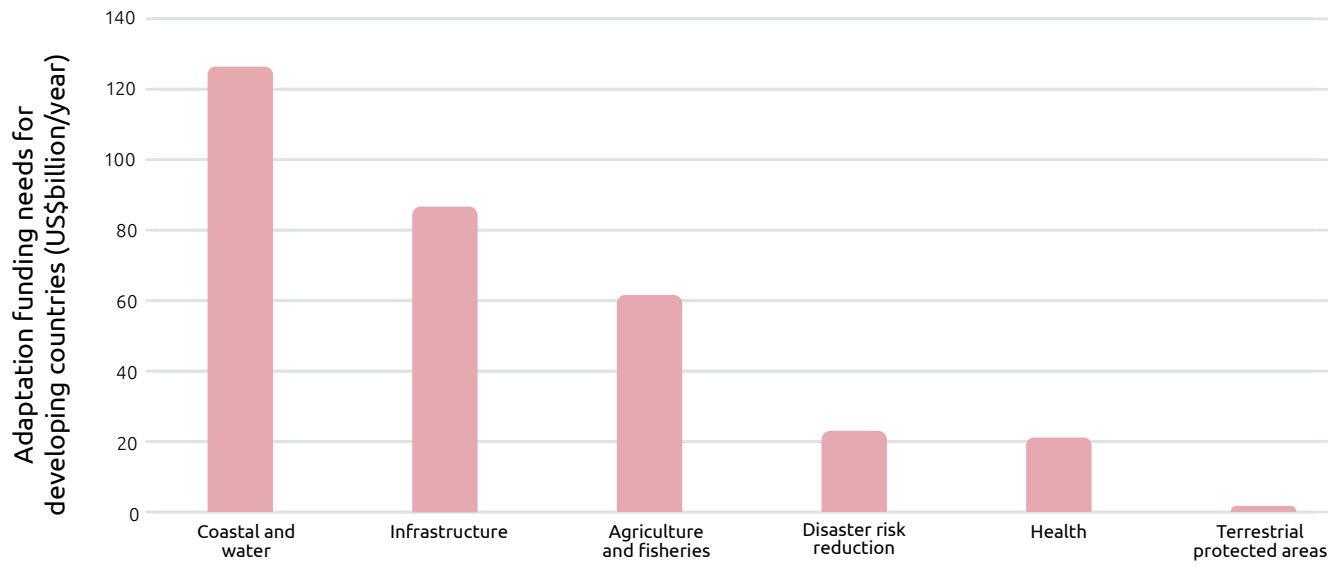


Figure 10: Sectoral adaptation financing and funding needs. Source: AGR 2025

Coastal and water-related disasters

Key message: Coastal and river flood protection make up a large proportion of adaptation costs with major societal benefits. There is potential for private financing in this area, but most models rely on government-pays or user-pays models. These increase public spending (through borrowing, taxation, or budget reallocation) or increase household and business charges or taxes. This may limit their potential in developing countries – and especially LDCs.

Coastal and river flood protection represent a large proportion of adaptation costs (over a third of adaptation funding needs), and, as highlighted above, they tend to have public good characteristics that mean they are typically delivered and funded by government (though governments may borrow from the private financial markets to finance them). These investments are capital intensive, as well as having ongoing maintenance

costs that can be significant over time. They provide benefits primarily through avoided losses, i.e. reduced fatalities/injuries and reduced damage to property and infrastructure, which means it is more difficult to get a financial return as no obvious revenues are generated. This is reflected in the low number of blended finance deals for adaptation, and the low number of accelerator models, in this area.

The study analysed the various flood protection financing models that are being considered. A selection is presented in the table below, along with case study examples, and an indication of the cost recovery model.

Table 4: Examples of innovative models for private participation in flood protection, with cost recovery model

Innovation	Examples	Cost recovery model
Green bonds, resilience bonds	UK green bonds (gilts) include coastal projects (UK Debt Management Office, n.d.) European Bank for Reconstruction and Development climate resilience bonds (Bennett, 2019)	Government pays
Local water use charges or taxes	Copenhagen Cloudburst (City of Copenhagen, 2012)	User pays (local public and private)
PPPs	UK Broadlands (Jacobs, n.d.) / US Fargo	Mixed
Co-financing, private	UK Flood and Coastal Erosion Risk Management Strategy	User pays (private)
Parametric insurance	Quintana Roo (Green Finance Institute, 2024a)	User pays (public and private sources)
Land value capture	Mission Rock Bhutan Phuentsholing Township Development (ADB, 2018)	Potential new revenue streams
Household resilience and resistance measures	UK assessment (Wood Environment & Infrastructure Solutions UK Limited, 2019)	User pays (private) (possible insurance benefit)
Tourist levies/taxes	Hawaii (Jacobo, 2025), Venice	User pays
Mitigation co-benefits	RWE wind turbines on dikes, Netherlands (Windpowernl, 2022)	Co-benefit streams - energy sales

It is worth noting that most of these models recover costs using government-pays or user-pays models. This means that, in the developing country context, it is the developing country itself that will pay for the protection. This will require increases in public spending (through borrowing or taxation, or else reallocating existing budgets away from other areas) or increases in household and business payments (e.g. through higher local taxes or water charges). Such approaches address the financing gap but not the funding gap. This is likely to limit the potential for these models in developing countries and especially LDCs, because governments will not have the fiscal space or households may not be able to afford to pay (a particular issue in rural and poorer areas).

In most developed countries, the public expect the government to provide major flood protection investments, and this is also the case in most developing countries (e.g. Andrews et al., 2025). Thus, a shift to local cost recovery models requires a local willingness to pay and there may therefore be political barriers to introducing local user-charging models.

There two exceptions to the government or user-pays model. The first is the land value capture model. This model seeks to take advantage of the benefits from unlocking economic potential through the reduction in risk (Tanner et al., 2018): notably, the increased value of land behind the protection investment. In a coastal

advance model this could be new land, but it can also be existing land that is regularly flooded and thus of lower value. If this is public land, then this can generate revenues from the lease or sale of newly developed and improved land. If this is privately owned land, then it can be reflected in local charges. These schemes still require considerable upfront public finance, not least for the technical studies required to set up the schemes, but they can provide a revenue model that helps to repay finance. However, implementing these schemes often requires reforms to the legal and administrative frameworks. Recent analysis (World Bank, 2025) highlights that examples to date are rare, and that, in practice, such schemes can be hard to implement successfully. It is also worth noting that such schemes carry a potential risk of maladaptation: for example, if they encourage development behind a barrier that subsequently is overtopped (leading to larger damages/ loss of life). The nature of the model means it is more suited to urban contexts or to higher-value coastal areas, such as tourism areas, where higher land value makes such approaches more viable. It is not possible to know how much potential these schemes have overall, because the potential will be determined by the specific scheme; nonetheless, they do have the potential to address the funding gap.

The second exception is where the investment generates co-benefits which provide revenue streams. One example comes from the Netherlands, where wind turbines have been built on dikes. These generate electricity (and revenues) that contribute to dike maintenance through usage fees (En:former, 2019)

It is stressed that because of the rising flooding hazards from climate change, there are likely to be large increases in flood protection investments. This means there will be increased opportunities for the private sector, both in relation to finance, but also in relation to goods and services (e.g. increased engineering contracts, input materials, etc.; see Figure 2). Recent studies (e.g. GIC, 2025; BCG, 2025) accordingly suggest growing market potential, with high annual growth rates and large private sector opportunities. However, unless the issues of funding are addressed, these opportunities will be paid for by developing countries.

Infrastructure

Key message: The share of the public and private financing of adaptation for infrastructure varies by the sector and type of investment, as well as by the income level and country. The regulatory landscape and the broader levels of private financing and delivery are also important. There are a range of models that can encourage private sector investment, but many of these involve a government-pays or user-pays model. There is also a large volume of private infrastructure, but this will be financed and funded by the private sector.

The main focus for infrastructure is climate resilience, either by building adaptation into the design of new structures (climate proofing) or retrofitting existing ones. The estimated adaptation finance needs for infrastructure (see figure 10) are more public in nature and include transport, energy, and water and sanitation infrastructure: these needs represent an estimated US$85 billion of adaptation costs in developing countries. However, there are additional financing needs for private infrastructure. These are estimated indicatively (see the earlier section on the additional private sector costs of adaptation) at an additional US$120 billion per year for developing countries. This makes infrastructure overall one of the largest areas for potential finance.

As infrastructure is a capital-intensive activity, there are typically existing funding models in place, and adaptation can be integrated into these. A significant proportion of infrastructure is provided by the public sector: for example, the World Bank (2017) reports that 83% of infrastructure development is sponsored by the public sector (of which-two thirds is through state-owned enterprises) and just 17% is private investment. However, the amount varies by the subsector and the region/country. As an example, sectors with higher revenue generation (energy generation or water when charging is in place) have much higher shares of private investment.

Typically, private investment in major infrastructure requires some degree of co-financing. The World Bank (2024a) estimates that, in 2022, 55% of private infrastructure investment in LMICs required co-financing. However, this also varies based on the exact nature of projects and the construction period, capital costs, revenue models, and risks.

The Convergence data on blended finance record some infrastructure deals, and these tend to focus on debt finance. However, the use of equity and collective investment vehicles (CIVs) is also growing significantly. While equity is a known structure, CIVs are more innovative; they pool funds from multiple investors to finance projects. CIVs enable diversification of risk and attract private capital for adaptation investments. One prominent example is the Urban Resilience Fund. Managed by Meridiam and supported by the Rockefeller Foundation, this is a €500 million investment fund, split between Africa and OECD countries, and includes a €20 million catalytic capital fund for project preparation. Other examples are given in the table below.

Adaptation is also beginning to include mezzanine finance. This combines debt and equity financing to provide additional capital while minimizing risk for senior investors. Although it has played a more limited role in infrastructure finance more generally, there are some examples emerging. For example, InfraCo Africa (part of the Private Infrastructure Development Group) uses mezzanine finance and convertible debt to support early-stage infrastructure in fragile and climate-vulnerable contexts. It has also recently implemented screening processes for evaluating physical risks in new investments and has evaluated the exposure of its existing portfolio to climate hazards.

A small number of accelerator projects have focused on creating infrastructure investment funds with a focus on climate resilience. One particularly novel innovation is the climate-insurance-linked Resilient Infrastructure Financing programme from the United Nations Capital Development Fund (UNCDF), which sought to create an incentive for cities to invest in resilient infrastructure through lower insurance premiums and which was piloted in the Philippines, South Africa, and Sierra Leone. This created incentives to apportioning greater funds to climate-resilient infrastructure. However, once again, this approach means cities are responsible for paying for adaptation and may pass this cost on to households through increased taxation or charges to recoup the costs if the benefits of avoided losses or stronger economic growth are not realized.

Table 5: Examples of innovative models for private participation in infrastructure, with cost recovery models

Innovation	Examples	Cost recovery model
Credit lines	US$150 million Deferred Drawdown Option (Cat-DDO) (Nepal) (World Bank, 2024b) ADB Pacific Disaster Relief Programme (Cook Islands, FSM, Marshall Islands, Tuvalu Vanuatu) (ADB, 2024)	Government pays, if not tied to grants
CIVs	The Urban Resilience Fund (TURF) (Meridiam, 2023) Caribbean Climate-Smart Accelerator (CCSA) (CCSA, n.d.)	User pays, with some costs absorbed across the financial structure (e.g. PPF, first loss capital). User benefits from improved infrastructure, resilience, and potential for local economic development.
Insurance-linked infrastructure finance	Climate Insurance-Linked Resilient Infrastructure Financing (CILRIF)	User pays or government pays. User benefits from reduced risk exposure, continuity of services, and protection of assets.
Mezzanine finance	Global Subnational Climate Fund (SCF) (Subnational Climate Fund, n.d.)	User pays and benefits to access to improved infrastructure, potential cost savings, and local business opportunities.

A well-understood set of enabling factors have been identified as helping to boost financing of climate-resilient infrastructure. These include better data, de-risking, labelling, incentives, and governance (World Bank, 2025). There are many examples of initiatives in these areas that are currently under way. For example, the Resilient Planet Data Hub's Risk Viewer seeks to provide common, robust climate metrics for use in developing country contexts. Similarly, the Institutional Investors Group on Climate Change, Gold Standard (Gold Standard, 2023) have begun to develop accounting approaches that reflect climate impacts in the baseline cases and in the cash flow, highlighting the potential financial benefits of resilience-related investment.

Novel methodological approaches have also been developed to help quantify climate impacts within the baseline scenarios and cash flows, as well as to quantify the benefits of adaptation. In particular, the Coalition for Climate Resilient Investment has focused on better accounting for physical risk in cashflows. This is now being more widely developed and applied globally by the Institutional Investors Group on Climate Change. However, while there have been some applications of these approaches in developing countries, they require a relatively high degree of effort, resources, and capability, suggesting they may have limited applicability in developing country contexts.

Given the large financing needs, there will potentially be large markets for the private sector in climate proofing and retrofitting infrastructure. Reflecting this, the studies of market potential for adaptation (GIC, 2025; BCG, 2025, LSEG, 2025) identify large growth in markets for products and services associated with climate-resilient infrastructure, especially in energy and transport resilience.

Some of this will be funded through the revenues generated (e.g. for the energy sector), while in other cases it will require more public funding (whether through public finances or user-pays models).

Agriculture

Key message: Agriculture is a sector with one of the highest levels of potential for private sector adaptation, both in terms of financing and funding. Many innovative approaches are emerging, but those targeting smallholder farmers are still likely to require public support or concessionary finance.

Agriculture is a major focus of current private sector investment in adaptation and also, by its nature, a very different case to coastal and river flooding. This is a market sector with high levels of private finance and private sector activity already, and is already the subject of most blended finance deals.

There is some uncertainty over the adaptation finance needs of the sector. Earlier studies (AGR 2023; based on Sulser, 2021) estimated agriculture adaptation needs for developing countries at only US$18 billion per year, but these are primarily public costs and the numbers are low because the modelling assumes high levels of trade (e.g. countries import to offset falling yields). By contrast, agriculture is a much higher proportion of adaptation costs in NDCs and NAPs, at potentially four times this amount. This recognizes the need to address climate impacts on smallholder farmers, as well as national goals relating to food security. The updated AGR 2025 values estimate agriculture adaptation costs at approximately US$55 billion per year but, again, these are primarily focused on more public activities (e.g. agricultural R&D, extension services, public irrigation schemes, etc.).

There has been much less focus on the private investments needed for agriculture in existing estimates, especially along the entire value chain (including post-production, i.e. storage, processing, and transport). However, these are more private in nature and likely to represent Type c) adaptation costs. This does indicate that the actual adaptation costs could be much larger, but these additional needs represent private needs

that will be primarily financed and funded by the private sector. This runs the risk that the new private sector models are merely supplying the finance for the private sector and not providing finance and funding to smallholder farmers. While estimates vary, there are still approximately 500 million or so farmers defined as smallholders (i.e. with land plots of less than 2 hectares), and these comprise a large proportion of the world's poorest people, living on less than US$2 a day (World Bank, 2016).

Nonetheless, agriculture is the sector where most innovation is happening. This involves innovative approaches along the value chain, including approaches to get more private investment into early-stage R&D, such as for climate-tolerant seeds. There is also large potential in terms of production, whether this is for traditional climate-smart agriculture (soil and water conservation) or more advanced techniques, such as precision agriculture. It also includes water management, including irrigation and irrigation efficiency. Moreover, innovative approaches to post-production steps exist, including post-harvest loss reduction and resilient logistics, storage, and processing. Many of these actions have the potential to go beyond avoided losses and to provide benefits in terms of improved yields or productivity, and thus profitability. This provides net positive financial benefits, and effectively can fund adaptation, though some caution is needed: if these actions are commercially viable the question is why they are not happening already.

As highlighted above, agriculture dominates adaptation-focused blended finance deals, with the Convergence data identifying 48 deals worth US$6.3 billion; this represents 43% of all deals identified and 60% of total finance. It also dominates the adaptation accelerator projects. A number of accelerators have supported the development of new financial instruments. Examples include Price Risk Facilities, which are embedding downside insurance into crop loans as a way to protect smallholders and agribusinesses from market volatility, as well as PricePally, which is providing platforms to connect farmers and consumers directly to reduce post-harvest losses.

Table 6: Examples of innovative models for private participation in agriculture, with cost recovery models

Innovation	Examples	Cost recovery model
Concessional credit lines (e.g. MDBs through national DFIs)	Many examples of below-market loans and guarantees	User pays but can generate value addition through financial return (adaptation goods and services).
Offtaker models	AMRU Rice (McNally et al., 2024)	
Ex-post profit sharing **Warehouse receipt financing** **Value chain integration**	International Finance Corporation's (IFC's) Global Warehouse Finance Program (IFC, n.d.)	
Seed value chain	Tolerant seed multiplication (IFC, 2019)	
PPPs for seed companies	FAO public–private blended finance facility for climate-resilient rice landscapes (Damon, 2023)	
Digital platforms (weather services and advisory)	GeoKrishi (GeoKrishi, n.d.)	
Resilience credits (reward investment in adaptation)	IFAD (Puri and Chowdhury, 2023)	

It is noted that a particular challenge in the context of agriculture is differentiating between actions that build general resilience through development and those that specifically target climate risks. The former can include almost any agricultural development, e.g. any activity that increases incomes, such as access to finance or market information. These actions can be differentiated from targeted measures with an explicit adaptation focus, such as the creation of drought-tolerant varieties. This leads to a wider discussion on whether (for agriculture in particular) development is the best form of adaptation. There are also different types of investment, including those with more public good characteristics (e.g. early-stage R&D) which can have wider benefits across an entire sector, as compared to specific targeted farm-level measures, where it is easier for the private sector to derive benefits (e.g. drip irrigation).

It is also stressed that in developing countries, and especially LDCs, the public sector plays a major role in agriculture sector support, including the provision of extension services and infrastructure (notably large-scale public irrigation projects). These activities provide key support for the sector overall, but are particularly important for smallholder farmers. Models that target smallholders generally need some level of public (international concessionary and/or domestic) support. This also means that the potential for private finance varies by country and by each country's specific level of agricultural development (including current levels of, and barriers to, private sector engagement). Higher levels of private finance would be expected for MICs, and for those steps in the value chain that are (already) more private in nature, whereas the levels for LDCs are likely to be more modest, unless more targeted interventions targeting these groups are prioritized.

Health

Key message: There is a core set of public health adaptation interventions that are critical for addressing climate risks and that will require public funding, but complementing this there are private sector opportunities, although these can be considered additional.

Existing health systems are a complex mix of public and private, and the proportion varies by country income level. Many HICs tend to have a high share of public health spending paid for through taxation and social health insurance, whereas LICs often have higher levels of private provision, alongside international and domestic public expenditure. WHO's Global Health Observatory estimates that the private sector provides between 40% and 60% of healthcare services (WHO, 2021).

Most of the adaptation options reported in the health literature have a strong public focus, and, in total, they are estimated to have adaptation financing and funding needs of US$20 billion/year in the AGR 2025 updated analysis. This reflects the high burden of climate-sensitive disease (food-borne and vector-borne) in LICs, noting that current financing modalities tend to involve international public finance. For example, current large-scale programmes combating malaria in sub-Saharan Africa are financed through a combination of international and domestic public financing and philanthropy (Global Fund, n.d.). This means the potential increases in the disease burden due to climate change are also likely to require similar expansion of these financing modalities. Other disease vectors have a different geographical profile, as seen with the recent outbreaks of dengue. Public investments are needed to address these potential risks, in terms of the investment in global public goods (G20 High Level Independent Panel, 2020; WHO and World Bank, 2022), but these can be complemented by private opportunities in diagnostics and treatment, as well as the potential for private sector innovation via vaccines.

For extreme heat (and related mortality and morbidity), there is a set of publicly funded public health adaptation responses, notably heat-related health warning systems, and also more comprehensive health services responses (e.g. targeting highly vulnerable groups). However, there is a broader nexus of heat issues

that include health, overheating, and discomfort (within buildings) and labour productivity (both indoor and outdoor). These involve a largely private response through mechanical (air conditioning) and passive ventilation, NbS (green roofs and green spaces), and changes to working practices (regulatory, behavioural, and technical options, such as moving labour activities to different times of the day and providing personal cooling equipment).

For health infrastructure, modalities will largely follow existing financing arrangements, whether public, private, or mixed (e.g. PPPs). There are some examples of blended finance, and the one health-focused accelerator project that was identified is focused on a scalable investment platform for companies providing adaptation goods and services, although there are several options for addressing heat.

Table 7: Examples of innovative models for private participation in health, with cost recovery models

Innovation	Examples	Cost recovery model
Vaccine bonds	Gavi (Gavi, n.d.)	Development partners and domestic public pay but cost savings from volume
Catalytic funds	Gates Foundation Climate and Health Catalytic Fund (Malawi) (Candid, 2025) (leverages philanthropic capital)	Philanthropic organization pays
Debt swaps (health)	Debt2Health programme (Global Fund, 2025)	Development partner pays by cancelling ODA debt
PPPs	Health infrastructure (PFI design, build, finance, operate)	Government pays
Pay-as-you-go cooling	Cooling as a service (Global Innovation Lab for Climate Finance, n.d., d)	User pays (but potential value addition via productivity)
Debt platforms	SCALE, Global (The Lightsmith Group, 2024b)	User pays

There are also ways for the private sector to provide goods and services. Recent market studies (e.g. BCG, 2025) indicate that there are large opportunities in health for the private sector, including climate-related disease surveillance, diagnostic and point-of-care testing, vaccines, medical supply chain and logistics resilience, emergency medical products and services, and personal cooling equipment. These opportunities are more focused on the private side, and are additional or complementary to public health responses.

Water management

Key message: The water sector involves a mix of public and private investment, although the share depends on the regulatory landscape and thus varies by country. It has the potential for increased private sector adaptation financing. For water infrastructure, the potential is determined by the regulatory set-up of the sector and whether water charging is in place, with the latter providing cost recovery through user-pays models. There are potential innovations on the demand side, including technology and innovative financial instruments and business models.

Water management adaptation includes a range of activities aimed at maintaining the balance between the demand and supply of water in the face of climate change for households, industries, and agriculture. It can include options for increasing water supply (including abstraction and storage, as well as wider watershed

management), resilient and more efficient distribution, and demand management (efficiency, demand reduction, and information and pricing signals). The adaptation investment needs for water are split across several categories in the AGR analysis: WASH is included in infrastructure investments, irrigation is included in agriculture, and tackling water-induced disasters is included in flood protection.

Much of the focus is on public water supply systems, which typically require high upfront capital investments, as well as ongoing maintenance costs. There are a number of barriers to facilitating investment that can limit private sector participation in this space, including long payback periods, tariffs that are often below real cost, and the absence of a pipeline of investable projects (Blended Finance Taskforce and Systemiq, 2022). In addition, smaller projects also suffer from increased transaction costs as each project has separate commercial and legal due diligence requirements (IWMI, 2024). Despite these obstacles, there are a range of models of private investment. These include private financing of public infrastructure (e.g. through bonds), as well as private sector management approaches such as service contracts, management contracts, leases, concessions, build-operate-transfer, and divestiture.

While originally promoted as a potentially effective model, private sector financing in the water sector has turned out to be quite challenging due to a wide range of risks and challenges. The OECD found that water represented between just 2% and 10% of total private investment in LICs and MICs between 2014 and 2023 (Trémolet, 2024). This is similar to other estimates. For example, the World Bank found that 90% of investments in 2017 in the water sector were from the public sector, with the highest prevalence of private sector investments in East Asia and the Pacific (15%) and Latin America and the Caribbean (9%) (World Bank, 2017). New asset types are also emerging (e.g. wastewater recycling), which may offer new opportunities to boost further private sector financing, though this remains unclear.

The review did find two funding models of note where the private sector pays. The first is water funds, such as that in Upper Tana-Nairobi, which leverage investment from downstream water users – including businesses and utility companies – to invest in water security (Calvache et al., 2012). The second is that applied by Sanivation, where the sale of firewood fuel products from faecal sludge management is used to cover the operational costs of waste treatment plants, although it should be noted that upfront costs were still provided by governments.

In developed countries, where the water supply network is partially or fully privatized, adaptation costs can be passed through to consumers (e.g. in Copenhagen in Denmark or in the UK). In addition, the more novel elements of these programmes (such as water retention in urban landscapes) can offer opportunities to crowd in additional finance from local real economy actors. However, the additional coordination elements of such innovations suggest that they may be more relevant for MICs than LICs.

There could be a more significant role for private sector financing to address the shortfall in investment. A range of innovative blended finance models have sought to increase the deployment of private sector innovations to try to bridge adaptation financing gaps. These include PPPs, infrastructure funds and green bonds, micro finance, supply chain finance, and land restoration funds (Blended Finance Taskforce and Systemiq, 2022).

Some of the accelerators have also sought to develop financing models. For example, the Water Financing Facility (Kenya) is a blended financing arrangement that mobilizes large-scale domestic private investment from institutional investors such as pension funds and insurance companies. Similarly, Climate Adaptation Notes seeks to streamline water project financing by screening and aggregating projects that can be sold to DFIs and institutional investors on the debt markets. However, neither were successfully implemented, highlighting the challenges of moving from theory to practice, including issues relating to building and evaluating robust project pipelines (Global Innovation Lab for Climate Finance, 2024). There have also been more novel approaches, such as the Parametric Insurance and Trust Fund for Paramos, which has sought to

provide pre-emptive adaptation financing and emergency response funds to address landscape degradation and wildfire damage as a way of securing water supplies in Bogotá.

Finally, some accelerators have focused on developing new products and business models for the sector, which have reduced the cost of providing water infrastructure. For example, CityTaps (Kenya) has used water prepayment meters in combination with mobile payment services to tackle cost barriers. The project reports that 25% of their users in Niger earn less than US$25 per month, yet using their service has lowered water bills for most. Similarly, the GEF Challenge Fund's Resilience for Peace, Stability, Food and Water Security Innovation Grant Program is supporting the development of new products and services for multiple sectors, including water.

Table 8: Examples of innovative models for private participation in water management, with cost recovery models

Innovation	Examples	Cost recovery model
Water funds	Upper Tana-Nairobi Water Fund	Private sector pays / User pays / Government pays
Collective Investment Vehicles (CIVs)	WaterEquity Global Access Fund IV (Heading For Change, n.d.)	User pays
Prepayment meters and mobile payment services	CityTaps, Kenya (The Global Innovation Fun, n.d., c)	User pays but potential cost savings for users
Project aggregation	Climate Adaptation Notes	User pays
PPPs	Kigali Bulk Water Project (Rwanda) (Blended Finance Taskforce and Systemiq, n.d.)	User pays and government pays
Sustainability-linked finance	Pennon Group Green Finance Framework (UK) (Pennon, 2024)	User pays
Debt for adaptation swaps	Climate resilience water and sewage investment from cheaper debt (Barbados) (IDB, 2024)	DFIs/development partners pay
Micro finance	Water Credit Initiative (Water.org, n.d.)	User pays
Supply chain finance	Sanivation (Africa) (Sanivation, n.d.)	Government pays and private sector pays / new revenue model
Syndicated loans	Enhancing Water and Sanitation Resilience with IDB Invest and partners (Brazil) (IDB Invest, 2025)	User pays
Securitization, guarantees, and credit enhancement	Water Finance Facility, Kenya Pooled Water Fund (Blended Finance Taskforce and Systemiq, n.d.)	User pays

In addition to the above, there is the potential for the private sector to supply goods and services, and this is reflected in estimates of market growth. GIC identifies water storage, water treatment, and water conservation technologies as significant areas of future growth through to 2050. LSEG identifies a range of water infrastructure and technologies that contribute to adaptation, while BCG identifies 10 particular opportunities within the water sector, including seawater desalination, groundwater recharge, water storage infrastructure, rainwater harvesting, and water efficiency (BCG, 2025, GIC, 2025, LSEG, 2025).

These findings suggest there is a strong role for the water sector in financing adaptation, but less of a role in funding, with the exception of the water funds and wastewater products discussed above, where there is the potential for the private sector to contribute. However, in relation to financing, in many cases it is challenging to separate out the adaptation from wider development, given the relatively low level of water infrastructure development in developing countries. Moreover, it is unclear how much future climate variability is really planned into such investments.

Who ultimately pays is also likely to vary depending on the type of investment. In cases of new water networks that mainstream considerations of adaptation as part of development, the costs will be borne by the public sector. However, for adaptation of existing networks this is likely to be more private. This is because, regardless of ownership or financing, most water sector models aim at internal cost recovery, which means water users (businesses, households, and smallholders) paying for services. In such situations, additional adaptation costs can then be passed through to consumers (e.g. as has happened in Copenhagen in Denmark, or in the UK). In addition, the more novel elements of these programmes (such as water retention in urban landscapes) can offer opportunities to crowd in additional finance from local real economy actors.

Biodiversity, ecosystems, and NbS

Key message: NbS offer innovative financial models to address the adaptation financing gap, particularly in relation to restoration, sustainable land management, and natural infrastructure. These can benefit from carbon benefits models, but also include other models, including user charging, though some public co-financing is often needed. However, there are an additional set of adaptation financing and funding needs in relation to helping biodiversity and enabling habitats to adapt. These involve more public-orientated actions.

There is a major focus on green and nature financing at present, and much of this focuses on NbS. These are defined as 'actions to protect, sustainably use, manage and restore natural or modified ecosystems, which address societal challenges, effectively and adaptively, providing human well-being and biodiversity benefits' (IUCN, 2016). The private sector is increasingly engaged in financing NbS in developing countries, driven by both risk mitigation and emerging opportunities, and overall finance flows are now large, though they need to be seen against the projected needs by 2030 of US$484 billion per year) (UNEP, 2022) (though it is stressed that this is for all nature financing, not just adaptation).

NbS can support climate adaptation, for example by reducing flood risk and enhancing coastal protection for communities and ecosystems. They also provide other benefits, such as the following: (i) environmental benefits (carbon sequestration/storage, biodiversity uplift, improved water quality/quantity, soil health, reduced erosion); (ii) economic benefits (job creation, livelihood diversification, increased agricultural yields, tourism revenue, avoided losses and damages from disasters, reduced operational costs for businesses, e.g. water treatment); and (iii) social benefits (food security, improved health, cultural preservation, and community empowerment) (United Nations Environment Programme, 2024; Arora, 2024; Ranger and van Raalte, 2025; WRI, 2025b; TNC 2024a; GCA 2025). These co-benefits are important, since in many cases it is these that are the main driver of financial performance (WRI, 2025a; Verschuur et al., 2025; England and Watkiss, 2025).

NbS often provide 'public goods' and, as outlined above, this often means governments or individual remain the ultimate payer. However, other models exist, including sustainable agriculture products or eco-tourism, i.e. forms of a user-pays model (KPMG, 2023; The Nature Conservancy and Forest Trends, 2025). There are examples of more innovative models, such as the Yuba Forest Resilience Bond in the US, where avoided losses from wildfires and increased revenues from hydropower were used to justify private sector contributions towards the cost of the financing. Other examples include instances where the private sector has contributed to NbS for their co-benefits (e.g. to improve the viability of urban centres through value additions models), though these will be more challenging in LICs and MICs.

NbS often generate high economic benefits (and high economic returns); however, because they deliver multiple benefits, the actual climate risk reduction (the actual adaptation benefit) can be modest. They are also often not as effective as hard adaptation, especially to more major extremes, and therefore are often deployed as complements to hard adaptation rather than substitutes for it.

There are also financial barriers to NbS, which can be more acute in developing countries. These include the novelty and maturation timeframes and longer-term returns of NbS, the more complicated revenue streams, the need to often work with multiple actors (such as a mix of private and public/philanthropic investors), and the local specificity and often small scale, which makes replication and aggregation difficult (New Private Markets, 2024; EIB, 2023)). A lack of robust, standardized methodologies and accessible data for quantifying NbS impacts and co-benefits (especially for adaptation benefits), along with investors' lack of familiarity with NbS as an asset class, creates perceived high risks and uncertainties (Arora, 2024; weADAPT, 2025; England and Watkiss, 2025). Finally, the public good nature of many NbS benefits reduces the direct financial incentive for private investors (EIB, 2023). The absence of strong policy and regulatory frameworks, and insufficient capacity among project developers and the financial sector, can further hinder the flow of private capital.

As highlighted above, there are blended finance models, and accelerator projects, for NbS projects, and there is potential through high-integrity voluntary carbon and emerging biodiversity credit markets which offer revenue streams for these projects (MDPI, 2024; weADAPT, 2025). Performance-based finance is a further interesting area where there are innovative financial instruments, including sustainability-linked loans and impact bonds. Sustainability-linked loans have interest rates that decrease if the borrower meets predefined NbS targets. Similarly for impact bonds, private investors provide upfront capital for an NbS project, then, an 'outcome payer' (often a government or philanthropic foundation) repays the investors only if the project achieves agreed-upon NbS outcomes. These have not been used in developing countries but they have high potential in such contexts.

The use of market-based mechanisms, whereby the private sector pays for environmental outcomes through the creation of a market for ecosystem services or 'nature credits', may hold additional potential for adaptation, since they are one of only a few areas where the private sector funds adaptation directly. Examples of market-based mechanisms include biodiversity offsets and payments for ecosystem services. These are purchased either for voluntary reasons (e.g. for reputational reasons) or due to regulatory requirements. Crucially, empowering Indigenous peoples and local communities through direct payments and benefit-sharing mechanisms in projects like payments for ecosystem services and voluntary carbon markets can enhance project success, ensure equitable outcomes, and can leverage these groups' vital role as stewards of nature (BIOFIN, 2024). However, there are still likely to be limitations as facilitating projects through such mechanisms means adaptation is likely to be a secondary outcome, with funders targeting projects with strong mitigation or biodiversity outcomes.

Table 9: Examples of innovative models for private participation in NbS, with cost recovery models

Innovation	Examples	Cost recovery model
Direct investment in NbS-generating businesses/ projects (equity-based)	Cacao Oro de Nicaragua (sustainable agroforestry for cacao production) (GIZ, 2023) African Conservation and Communities Tourism (ACCT) Fund (eco-tourism supporting conservation) (GIZ, 2023)	User pays but can generate value addition through financial return. They can access sustainable products, tourism experiences, or gain from local employment.
Sustainability-linked loans	ING's Nature Framework and SLLs (Europe) (ING, 2025)	User pays for costs or savings from company that 'borrows'
Impact bonds (e.g. conservation impact bonds)	Deshkan Ziibi Conservation Impact Bond (DZCIB) (Canada) (Arjaliès, 2024)	Government or philanthropic organization pays
Biodiversity credits/ offsets	Ambatovy Minerals Project (Madagascar) (World Bank Group, 2016) Lom Pangar Hydropower Project (Cameroon) Savimbo (Colombia, Colombian Amazon) (Dasgupta, 2024) WWF Pilot Projects (Tanzania) (WWF, n.d.)	Private sector pays but can generate value addition through financial return
Voluntary carbon markets (with NbS projects)	REDD+ examples, such as Mai Ndombe REDD+ project (Democratic Republic of Congo) and Lariba REDD+ project (Zimbabwe) Reforestation/afforestation projects such as CommuniTree Carbon Program (Nicaragua) Regenerative agriculture projects such as Nature Carbon (Cerrado Biome) (Brazil)	Private sector pays but can generate value addition through financial return
Payments for ecosystem services	The Nature Conservancy (TNC) Water Funds Portfolio (TNC, 2024) BIOFIN – capacity building in identifying and implementing relevant ecosystem services payments (BIOFIN, 2024a) Forest Resilience Bond (California, US) (Green Finance Institute, 2024b) UN-REDD Programme Initiatives	Private sector pays / new revenue model
Blended finance for NbS	Amazon Biodiversity Fund (Brazil) (Ivory, 2025) Tropical Forest Forever Facility (Brazil/World Bank) (weADAPT 2025)	Consumer/end user pays and gets access to better services, cost savings, or enhanced ecosystem benefits.
Insurance and risk transfer mechanisms – risk mitigation	Quintana Roo Coral Reef Insurance (Mexico) (GIZ, 2023)	Consumers pay via tourism, and taxpayers via government, while benefiting from public goods – tourism assets, reduced disaster risk, and ecosystem health.

There are a range of additional reforms that could boost private sector participation. The growing recognition among businesses and financial institutions of nature-related risks and opportunities, driven by initiatives like the Taskforce on Nature-related Financial Disclosures, is increasing demand for nature-positive investments (UNEP FI, 2024). Direct investment in profitable NbS businesses, carbon/biodiversity credit sales, and blended finance are highlighted as key mechanisms to attract this capital (KPMG, 2023; UNEP FI, 2024; Convergence, 2025; Invest4Nature, 2025).

A number of improvements in the enabling environment have been identified. For example, developing clear typologies of NbS investment types, strengthening enabling policy environments (e.g. through national targets and green taxonomies), and fostering international collaboration on shared metrics and data will be critical to mainstreaming NbS as a viable and impactful investment class (WRI, 2025b; weADAPT, 2025).

This shows that there is a significant role for the private sector in the financing of solutions, and that, compared to other public good areas, it may be less challenging due to the range of additional co-benefits that NbS provide. However, with the exception of market-based mechanisms, or businesses that rely directly on goods and services from nature (e.g. tourism or agroforestry), there is limited potential for the private sector to fund such work directly.

There is a less clear consensus on the role of the private sector in the selling of NbS as an adaptation good or service. Out of the three reports reviewed (BCG, 2025, GIC, 2025 and LSEG, 2025), only BCG's mentions NbS, identifying a range of related growth opportunities, supporting infrastructure, biodiversity, and water resilience.

Finally, there are a set of conservation and protection measures that are included within the broader definition of NbS, but which are typically focused on supporting adaptation of habitats and species directly. These include actions to support existing protected and valuable areas with conservation, rehabilitation and restoration, but which, given the high risks of climate change to natural systems, will also require buffer zone refugia, connectivity (including wildlife corridors), and even translocation. These fall under more typical conservation measures, and tend to be very public in nature, but will be required and can be very costly. The financing and funding for these remains less developed and is a priority.

Delivering high levels of private sector adaptation: what might be possible and what are the trade-offs?

Overall, this section has shown that there are many innovative approaches that are emerging for scaling up private adaptation. These models could deliver a much higher level of private sector financing even for the public priorities that are the focus of this study. However, for many, the revenue and cost recovery models involve payment by governments or direct user charges to households and local businesses. The former will require higher taxation or borrowing (debt) for developing countries, noting existing concerns about existing fiscal stress and debt distress. The latter would mean higher costs for households and businesses. Both involve the developing country paying for adaptation. This means they reduce the financing gap but not the funding gap. As highlighted earlier, this does not align with the principle of CBDR-RC .

Many of these models also require wider reforms (e.g. increasing the role of the private sector in the delivery of services, and even full or partial privatization of some services) or involve local citizens paying directly for services that were formally delivered by governments, which requires shifts in perceptions and increased willingness to pay. These will not be easy to implement politically, and they will require major shifts in government: political economy studies show such changes can be very difficult to actually implement. They will also have potentially large distributional impacts.

Most of these innovative models still require significant volumes of public finance, to help demonstrate and scale up the approaches, to provide concessionary support for de-risking, or for co-financing in delivery. This highlights again that international public finance is likely to be conditional for delivering higher private sector action on adaptation.

Finally, and more positively, a smaller number of innovative models have the potential to help fund, as well as finance, adaptation (e.g. land value capture, mitigation co-benefit models) by avoiding or minimizing the government-pays or user-pays model. These offer the greatest potential for bridging the adaptation financing and funding gap, and should be the focus for scale-up. The greatest potential is for those models that focus on adaptation benefits streams: models that generate revenues through co-benefit streams tend to involve more complex projects and more actors, and can reduce the focus of projects on adaptation and lead to lower levels of adaptation benefits (see Kholsa and Watkiss, 2022: Watkiss, 2023).

It is extremely difficult to know what these models might be able to achieve, though it is plausible they could deliver an additional 5–10% of adaptation funding needs in developing countries, on top of the current policy scenario. However, further work is needed to assess their potential and to ensure that such schemes do not, inadvertently, lead to maladaptation.

Concluding insights

A number of insights emerge from this analysis:

- It is important to differentiate between the financing and funding of adaptation, especially in the context of developing countries and in relation to CBDR-RC. Most of the discussion to date has not made this distinction and it needs to be brought out more transparently in discussions.
- The study finds that there is potential for the private sector to help bridge the funding gap in certain sectors (especially agriculture), where there is revenue generation and cost saving potential. However, its overall potential for the publicly identified adaptation priorities will be much more limited than many assume. Its potential will also vary by income status: private sector opportunities are likely to be greater in MICs.
- Increasing the levels of private sector funding for adaptation in developing countries – from the current low levels to around 15% – will require concerted policy action and public finance. This means that private sector investment is not a direct substitute for international public finance.
- Achieving a higher level of private sector finance and investment is possible, but while this can help bridge the financing gap it will have less impact on the funding gap. Many models transfer the costs of adaptation back to developing countries, and higher levels of private sector involvement may require regulatory change or shifts in willingness to pay: such models will not necessarily be easy to implement.
- In conclusion, the report finds that even with the most optimistic projections, a large funding gap seems likely for developing countries. Reducing this is likely to require an increase in international public finance, due to its dual role in supporting adaptation directly, as well scaling up private sector investment. Without such support, a much larger burden of adaptation will fall on the domestic public finances, and on households, in developing countries.

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Climate Resilience Alliance

Keep in touch...

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Front cover image: *Elvi Rufino, an Indigenous Bolivian woman who fought against wildfires in 2023, now helps her community increase its resilience against future climate hazards.* Photo: Freddy Barragan

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